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Family background and educational path of Italian graduates

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September 2015

Abstract

In this paper, we analyse social inequalities along the horizontal dimension of education in Italy. More precisely, we focus on the role of family background in completing specific fields of study both at secondary and tertiary levels of education. To mitigate the limitations of the traditional sequential model, we construct a typology of educational paths based on two axes: the prestige of one's choice of high-school track (academic or vocational) and the labour market returns of the university field of study (high or low). The ranking of the latter is performed by looking at the labour market returns in terms of monthly net income, as provided by the Survey of Household Income and Wealth carried out by the Bank of Italy. We identify four paths: academic-high, academic-low, vocational-high, and vocational-low.

We investigate the influence of social inequalities on educational path using data from the Istat "Survey on the transition to work of University graduates" regarding cohorts of university graduates in 1995, 1998, 2001, 2004 and 2007.

Results obtained from multinomial logistic regressions confirm predictions based on rational action theory. More precisely, we find that family background, defined in terms of parental education, exerts a positive and significant effect on the completion of the most advantageous educational path. Moreover, we find that high-performing students from lower socio-economic backgrounds show a higher probability of completing the vocational-high path. This result suggests that a vocational upper secondary degree could be perceived as a sort of security option for students from less wealthy families, which allows them to invest in the most lucrative and risky fields at university.

JEL Classification: I23; I24; I26

Keywords: Social origins; educational path; fields of study; Italy

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1 Introduction

The impact of family background on individual educational careers is a crucial concern for research on social stratification and inequality. Traditionally, the analysis of an individual's educational career is carried out with sequential models (Mare 1980, 1981; Shavit and Blossfeld 1993) and focuses on successive transitions between the various levels of education in an educational system. This approach has been much criticised in recent years both methodologically (Cameron and Heckman 1998) and theoretically (Breen and Jonsson 2000; Lucas 2001). Previous research on educational transitions was, in fact, mainly focused on the vertical dimension of educational inequalities and considered the horizontal dimension to be only of marginal interest. In recent years, however, a large proportion of students reach the tertiary level of education in contemporary western countries due to educational expansion. As a result, social scientists have increasingly paid attention to the available choices in terms of field of study at various levels in the educational system (Davies and Guppy 1997; Goyette and Mullen 2006; Zarifa 2012; Triventi 2013). In Italy, for example, the enrolment rates at universities, according to data from the Ministry of Education, have fluctuated between 62% and 75% in the last decade. As previous studies have noted, educational expansion does not necessarily reduce social inequality because lower-class students may complete degrees in fields with a lower economic return than upper-class students (Shavit et al. 2007, Lucas 2001). As a result, it is still important to study whether and how social origins play a role in individual educational careers in contemporary societies. In light of these findings, we propose an alternative to the educational transition approach for studies on the relationship between social origins and inequality in degree completion. More precisely, we combine the field of study at upper secondary education with the one at the university level in order to construct a typology of educational paths that reflects the complexity of individual trajectories within the current educational system. Next, we use our typology as the main dependent variable to assess the impact of social origins. We believe that the Italian education system may be particularly suitable to our purposes because it is horizontally differentiated both at the secondary and at the tertiary level, whereas access to university education is granted to every student regardless of the track they completed during their upper secondary education.

The structure of the paper is as follows: in the next section, we describe the main features of the Italian educational system. In the third section, we review the relevant literature on the role of social origins in both vertical and horizontal inequalities in education, and we present our research hypotheses. Section four describes the data used and its main variables, and the empirical analyses are presented in section five. Finally, section six summarises the main findings and concludes the paper.

2 The Italian educational system

Education in Italy is compulsory for children between 6 to 16 years of age.¹ It is divided into four stages: primary school, lower secondary school, upper secondary school and tertiary education. Primary school (Isced 1) is compulsory and lasts for five years. It is intended for children from six to eleven years of age and offers general education to all students on the basis of the same curricula. Secondary education is divided into two levels. The lower level (Isced 2) is compulsory and lasts for three years, usually until students are fourteen years old. Education at this stage is still undifferentiated: schools across the country provide students with the same general competencies. Mandatory education ends in Italy with the lower secondary school final exam. Upper secondary school (Isced 3) is the first stage that uses tracks. There are three available tracks: the academic (*liceo*), the technical (*istituto tecnico*) and the vocational track (*istituto professionale*). Each track lasts five years and ends with an examination of competency known as the *Esame di Maturità*.² All students who pass this final exam have the possibility to enrol at university independent of which track they completed. Some vocational schools offer degrees after only three years of training, but such degrees do not grant access to a university³.

Higher Education (Isced 5A) in Italy underwent a big change in 2001 after the implementation of the Bologna Process⁴. The old system was unitary and undifferentiated, and it was characterised by long courses with a high workload. The result was a selective system incapable of managing the increased heterogeneity of students. The Bologna Process replaced this old system with a sequential 3+2+3 system, which comprises a 3-year Bachelor's, resulting in the *laurea triennale*, and a 2-year Master's that leads to the *laurea magistrale*. Only the latter degree grants access to doctoral programs that usually take three years to complete. In addition, the students' workload is better defined in terms of content and credit. This process resulted in a less selective system and reduced the time and effort needed to complete university courses. Finally, the Italian Higher Education system is mainly public and not stratified, which means that all universities officially provide the same level of qualification.⁵ The differences between universities in terms of prestige and reputation are practically negligible compared to other education systems characterised by the presence of elite institutions such as those in the USA, UK and France. Consequently, the choice of a specific field becomes particularly relevant in the case of Italian education.

¹ Take note that the Italian law states that compulsory schooling lasts until the age of 15, but there is also a compulsory training that includes the first two years of upper secondary school. In other words, a student can leave the upper secondary school at age 15, but he/she is obliged to enrol in a training course for at least another year.

² The *Esame di maturità* consists of three written tests plus an oral examination, which together result in a final grade between 0 to 100, with 60 as the minimal threshold to pass. Each written test accounts for 15% of the final score, the oral examination for 30%; and the remaining 25% depends on the previous scholastic career in the three years before the examination. The national Ministry of Education prepares the first two written tests. The first test is equal for all Italian students, while the second is equal for students within the same secondary school track. The last written test and the oral examination are provided by a specific school examination committee, in which four out of seven members are external examiners.

³ These schools are managed by local governments, thus their organization can vary from region to region. For example, in some regions special rules allow students to take the *Esame di Maturità* after the completion of additional courses so that they can have access to tertiary education.

⁴ The Bologna Process reform was approved in 1999 and fully implemented in 2001.

⁵ There are a few notable exceptions in certain fields; private universities, such as *Bocconi* for economics and the *Scuola Normale* for maths, are perceived to be more prestigious than the other universities.

3 Previous studies and theoretical framework

Italy, just like other western European countries, has, in the last decades, experienced a period of sustained educational expansion that is connected to an improvement in the general economic conditions of the population. These developments, however, have not led to a complete disappearance of inequality in the educational opportunities (IEOs) of children from different social backgrounds. Despite the detection of a decline of IEOs in a number of countries (Breen et. al. 2009, 2010), family background still represents an important predicting factor for individual attainments (Bukodi and Goldthorpe, 2013; Marzadro and Schizzerotto 2014). Following rational action theory and the relative risk-aversion specification (Boudon 1974; Breen and Goldthorpe 1997), IEOs can be seen as the result of different perceptions of the cost and the utility of educational choices by students from different social backgrounds. Thus, by taking the high social position of their parents into account, pupils from wealthy families are inclined to invest a lot in education in order to avoid the risk of downward mobility associated with a lower educational degree. Their greater access to economic resources, moreover, allows them to pursue a degree for longer without having to go on the labour market, thus reducing opportunity costs. In contrast, the lower level of resources of children from less advantaged families results in a higher perception of the costs associated with a longer investment in education. In addition, the risk of downward mobility with respect to their parents' social position can also be avoided with a lower educational degree that carries fewer possibilities of failure.

According to Bourdieu (1979) and Bourdieu and Passeron (1990), the choice of a particular field of study is also connected to the educational resources at home. In fact, this choice is influenced by parental knowledge and experience with the higher education system. Hence, students with highly educated parents will have more information not only on the working of the higher education system but also on the economic returns of different fields of study.

The most common strategy adopted by social scientists to empirically test these theoretical propositions relies on the so-called "sequential model" developed by Mare (1980). The model considers an individual's educational career as a sequence of successive transitions, each of which take the form of a "yes-no" decision to continue on to the next level of education. This very convincing simplification of an individual's pathway through the educational system has proven to be extremely useful in the analysis of IEOs (Shavit and Blossfeld 1993). The model's efficacy, however, is highest for the older cohorts of individuals, who completed their studies when inequalities were mainly distributed along the vertical dimension of education. Current students in western countries, however, obtain their tertiary degree in a context where the majority of their peers reach the same educational level. Thus, as a result of this educational expansion, the importance of the qualitative dimension of education has increased. In contrast to the past, specific fields of study have become increasingly linked to the occupational outcomes of a degree (Müller 2005; Jackson et. al. 2008; Reimer et al. 2008; Triventi 2013). With respect to the Italian case, Pisati (2002) found substantial differences in the outcomes of different secondary fields of study chosen by recent cohorts of students: academic fields assure both a higher probability of enrolling in a university and a higher occupational return on the labour market. Moreover, Ballarino and Checchi (2006) have found similar results, which suggest that secondary school tracks are, at the moment, crucial to both the whole study career

and *per se*. Considering the growing importance of the qualitative dimension of education, more and more scholars have started to interpret it as a new potential source of social inequality in education.

Signs of the positive effect of family background on the field of study have recently been found in a number of countries characterized by different educational systems, such as Sweden (Hällsten 2010), France (Deer 2005), Germany (Reimer and Pollak 2010) and the Netherlands (van de Werfhorst et al., 2001). In Italy, Schizzerotto and Barone (2006), Pisati (2002) and Checchi and Flabbi (2007) found that children from wealthy families are more likely to choose the most lucrative fields of study not only at the secondary but also at the tertiary level, even if in the latter case the relationship is weaker. All these studies seem to agree that in choosing a specific educational track, pupils from lower social origins tend to prefer less prestigious fields of study. These empirical findings may be explained by Lucas's Effectively Maintained Inequality (EMI) hypothesis (Lucas 2001). By using the theoretical framework of rational action, Lucas (2001) claims that well-off families make all the necessary decisions to maintain their relative advantage throughout pupils' education, and they do not limit themselves to the vertical dimension of education if it does not guarantee protection from the risk of downward mobility. More precisely, Lucas (2001) argues that elites will use both their greater material and immaterial resources to provide their offspring with the highest level of education if there are significant vertical inequalities. However, if the enrolment rate at an educational level is very high, wealthy parents will use their socio-economic resources to ensure that their children obtain the best positions within the same educational level, namely within the most prestigious fields of study.

Following the outlined theoretical approach, we argue that well-off families that try to maintain their relative advantage may not perceive the educational career of their offspring as a sequence of choices to invest or not invest in a single additional year of education. On the contrary, they may see educational careers as a pre-determined path; such families assume graduation will take place and combine the best available qualitative options at each educational level. Having a higher ability to gather information on the functioning of the educational system and the future economic returns of the degrees (Bourdieu 1979; Erikson and Jonsson 1996), well-off families are more capable of selecting the best path to graduation for their children. In addition, they are able to mobilize greater economic resources to help their children remain on that path (Bernardi 2014). Summing up, we hypothesize that:

H1: *With respect to their less advantaged peers, students from higher social origins will graduate after following the more prestigious and remunerative path.*

To the best of our knowledge, there are very few studies on the social stratification in education that apply an approach based on educational paths instead of the more common sequential model of educational transitions. In a recent study, Reisel (2011) focuses on college degree attainment in the United States and Norway with a specific interest in the vertical dimension of education. She finds a positive influence of social origins on completing the path leading to college graduation with respect to other less prestigious paths in both countries. Another relevant study is Breen and Jonsson's research on education in Sweden (Breen and Jonsson 2000). Contrary to Reisel, the authors stress the importance of the qualitative

dimension in the educational system; the university graduation varies greatly according to the previous path followed by a student, which, in turn, is positively influenced by social class.

In this paper, we contribute to existing debates testing the influence of social origins on the educational paths of students in Italy, a country where the educational system can be seen as a mixture of the comprehensive system, presented in studies of Nordic and Anglo-Saxon countries, and the continental system. In addition, we exploit the specificity of the Italian educational system to directly test an additional hypothesis. As mentioned above, in Italy, social origin is positively associated with the upper secondary field of study, meaning that children from a lower social background have a higher probability of choosing a technical or vocational education (Ballarino and Checchi 2006). Because access to an Italian university is granted to all students with a five-year secondary education *Diploma*, regardless of the field of study, the technical track represents a less risky option (Panichella and Triventi 2014). Not only can it provide access to tertiary education, but it also enables direct entry into the labour market without any additional qualification. Applying our path approach with these considerations in mind, we argue that worthy students from families that are risk-averse and who are over-represented in the lower social strata may see the technical upper secondary degree as a safety net to the risk of dropping out from a prestigious and demanding university course. This argument leads us to formulate our second hypothesis:

H2: *High-performing students from a disadvantaged social background will more frequently follow the path that combines a vocational secondary education with a high-profile university degree than any other path available.*

4 Data, variables and methods

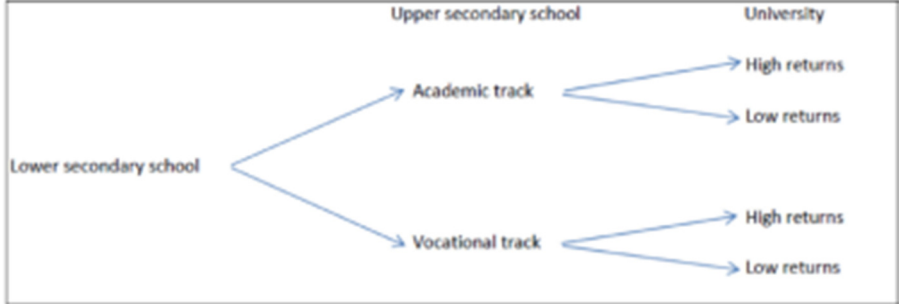
The data used in this study are provided by the last five editions of the “Survey on the Transition to work of University Graduates” (STUG, henceforth). STUG is a repeated cross-sectional study of wide samples of Italian college graduates conducted by the National Statistical Office (Istat). The first survey we use was carried out in 1998 and was repeated every three years since then. By means of CATI, each STUG collects information on the school and work careers of university graduates who earned their degrees the three years before the survey in 1995, 1998, 2001, 2004, and 2007. To have comparable estimates between the considered surveys, we limit our analyses of the post-reform surveys to graduates in courses that give access to doctoral programs, similar to the pre-reform degrees. In other words, we exclude post-reform Bachelor’s graduates.

4.1 Dependent variable: educational path

As mentioned above, we conceptualise the educational path (our dependent variable) as a combination of the specific degrees obtained at both the secondary and tertiary level. It jointly considers two different phases that we, for simplicity, consider as dichotomous (figure 1). The student, in the first step, completes an academic or a vocational track at a high school, and in the second step, he/she earns a degree in a particular field of study at the university level. We differentiate university fields of study according to their occupational returns in terms of

expected earnings, as suggested by Davies and Guppy (1997) and Zarifa (2012). Hence, our dependent variable is a typology that identifies four different paths⁶: a) academic-high occupational returns, b) academic-low occupational returns, c) vocational-high occupational returns and d) vocational-low occupational returns.

Figure 1. Graphical representation of the educational paths.



The occupational returns are computed using data from the Survey on Household Income and Wealth (SHIW) carried out by the Bank of Italy starting from the 1970s to today. We use information on the real annual net income of Italian university students after graduation to rank the different degrees.⁷ Calculations were performed on data from 1995 to 2010⁸ on 2,594 individuals aged between 35 and 45 years, in order to consider the long-run potential returns⁹. More precisely, economic returns are the predicted values of an OLS regression model that control for sex, geographic area of residence, age, social class and wave. Thus, it becomes possible to obtain the net average economic return for each academic field. The use of social class as a control variable is necessary because of its correlation with the labour market measures considered here. If we do not take this into account, the occupational returns of field of study could be biased. In figure 2, we report the main results of this analysis.¹⁰ It is clear that the more lucrative fields of study are those connected to STEM fields (science, technology, engineering, and mathematics) and the ones that lead to liberal professions. Conversely, the less remunerative fields are connected to the humanities and social sciences. In figure 2, we see some exceptions to these general results. First, the Scientific and the Agricultural fields, in one case, show returns that are below average. Other exceptions are the fields of Architecture and Economics & Statistics. Architecture, even if it provides access to a liberal profession, yields economic returns that are always below the average income. On the other side, Economics & Statistics yield economic returns that are above the average. Hence, we consider as “high

⁶ Given the structure of our data, we are not able to consider the drop-outs in our typology as done by Breen and Jonsson (2000) and by Reisel (2011).

⁷ Income has been adjusted for the prices index supplied by Istat. By ascertaining, in this way, real income we are able to draw comparisons between various waves.

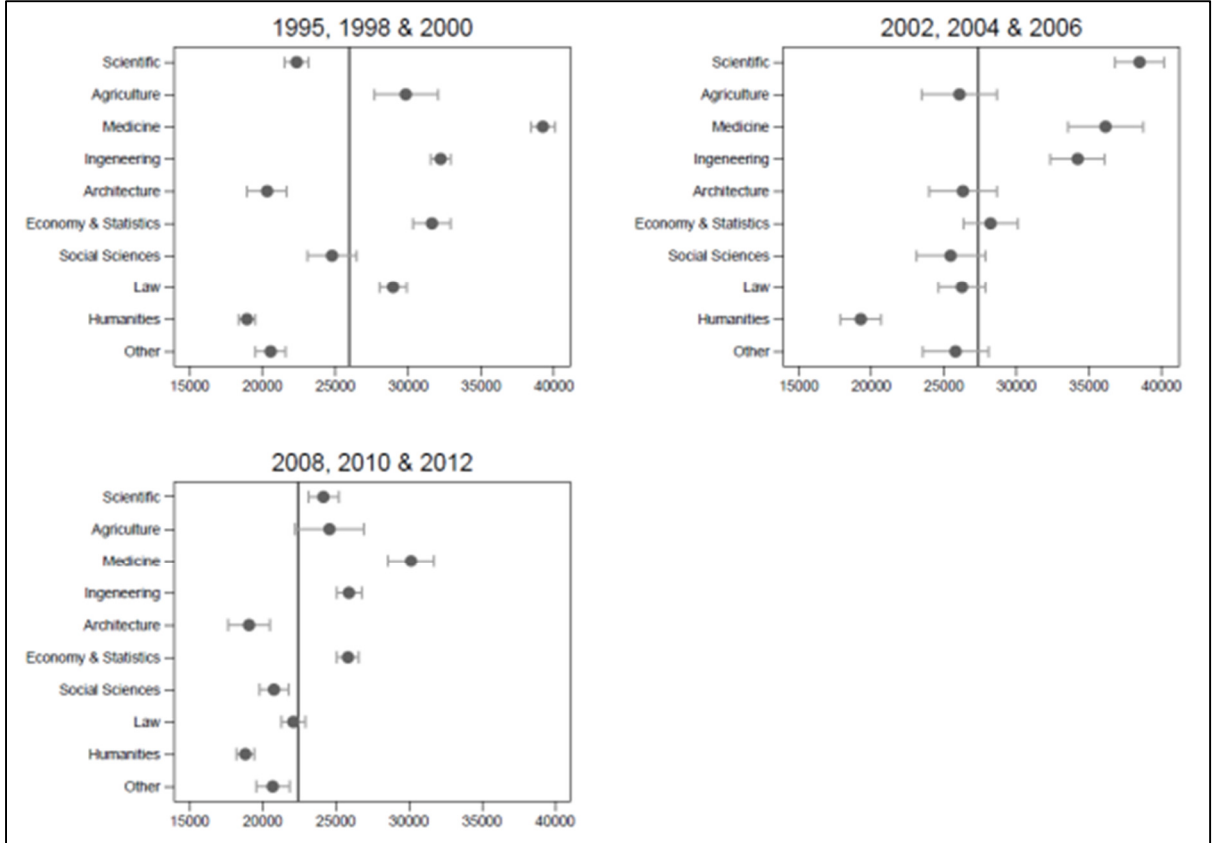
⁸ We choose this observation window for its overlap with the STUG surveys. Moreover, information on the field of study is available in the SHIW only from the 1995 surveys onwards.

⁹ We consider the long-run occupational returns of the fields of study in order to avoid biased estimates caused by the presence of periods of apprenticeship, which lower the short-term average remuneration for some fields such as law and medicine.

¹⁰ In the supplementary materials, we provide more detailed information on how the economic returns of the fields of study are measured.

remunerative” the following fields: Scientific, Agriculture, Medicine, Engineering, Economics & Statistics and Law. The other fields (Architecture, Social Sciences, Humanities and Other) are labelled as “low remunerative”. The general objective is to consider those fields of study that always fall below the average income as not lucrative.¹¹

Figure 2. Net annual income according to field of study and year.



4.2 Independent variables

Our main independent variable is parental education, measured by the degree of education of both parents. This is considered as a proxy for the educational resources of the family, namely the parents’ ability to foster the educational career of their children, to provide a stimulating learning environment, and to provide information on the functioning of the educational system in order to facilitate educational choices (Bukodi and Goldthorpe 2012). Parental education is measured according to the dominance criterion and consists of four categories: a) primary degree, b) lower secondary degree, c) upper secondary degree, and d) university degree. As control variables, we also looked at sex, geographic area of residence (North-West; North-East;

¹¹ Another option is to consider the occupational returns in a dynamic way by letting it vary over time. As seen in the appendix, however, even in this case the main results of the paper are confirmed.

Centre and South and Islands), and parental social class (service class; white collar; self-employed; and working class).¹²

4.3 Methods

Breen and Jonsson (2000) employ a multinomial transition model to estimate the available choices at each transition controlling for previous paths. In this paper, we follow the analytical strategy suggested by Reisel (2011) to estimate a multinomial logistic regression in order to simplify our analysis and to highlight the comparison between the different paths and cohorts considered. This approach also allows us to better measure the effect of social origins on educational paths considered as a whole.

In order to facilitate the interpretation of the results, we present the main parameter graphically, and we compute average marginal effects (AME henceforth) in order to overcome problems that arise in comparing logit coefficients and odds ratios across different groups and cohorts (Allison 1999; Mood 2010). Moreover, AMEs are easy to interpret because they represent the average differences in the probability to complete a particular path between social categories calculated in percentage points.

5 Results

In Figure 3, we show the effect of parental education on educational paths. The results for the academic-high path provide confirmation of our first hypothesis: children of parents with a higher education degree are significantly overrepresented in this path with respect to any other path available. The positive relationship between social origins and the most remunerative path is consistent during the years considered. It remarkable to note that having parents with at least an upper secondary school degree lowers the chance of completing the academic-high path by approximately twenty percentage points in comparison to students whose parents have a tertiary degree. Symmetrical results can be drawn looking at the completion of the vocational-low path. Students from lower social backgrounds tend to graduate through this path significantly more frequently than their better-off peers. These results are in line with our predictions based on rational action theory and the EMI hypothesis: people from well-educated families tend to complete the best path available by choosing the more remunerative options at each educational level and thus avoiding the less prestigious ones.

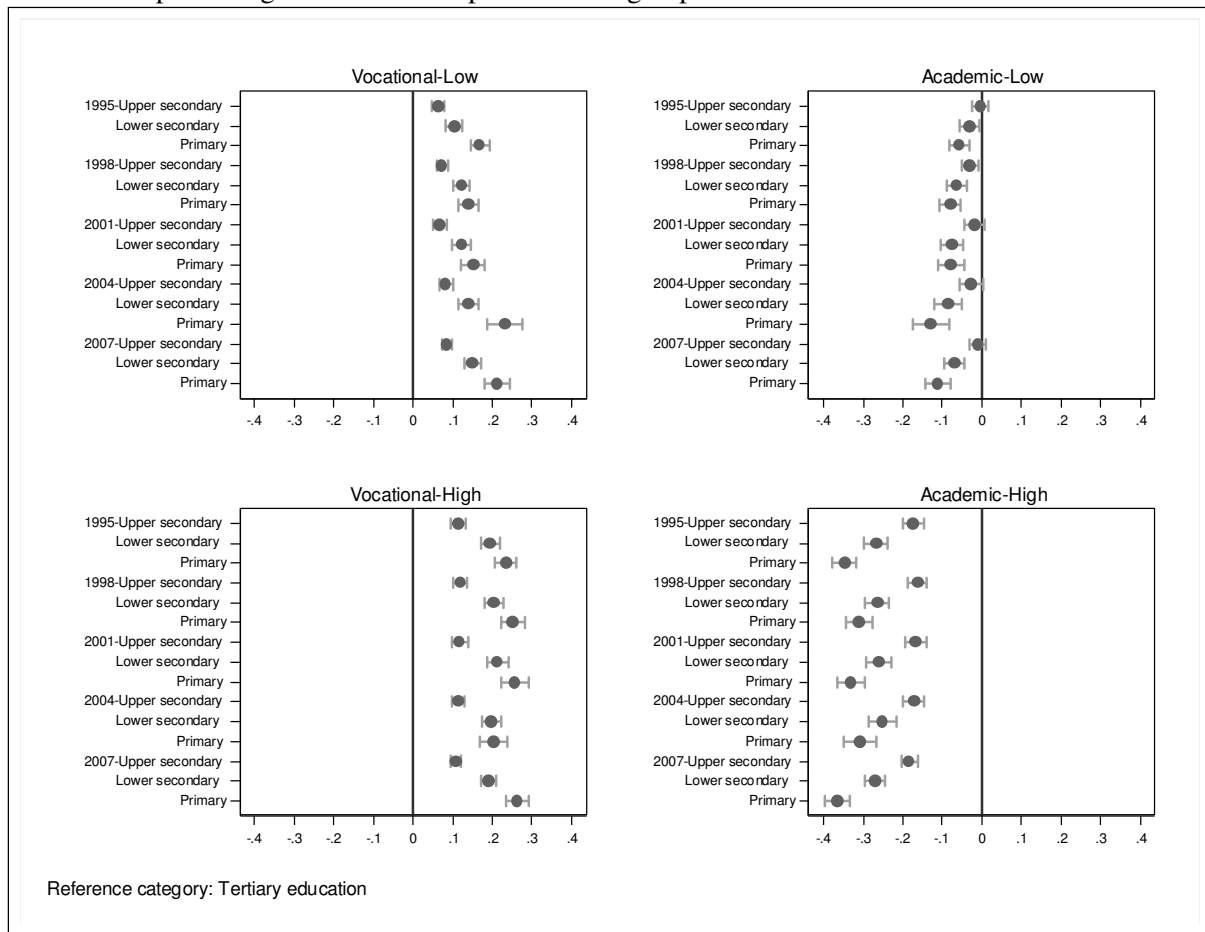
By comparing the estimates for the conclusion of the academic-low path with all the other possibilities, as the AME let us do, we find no significant differences between highly educated families and the ones in which parents have a high school degree. Only students from the lowest social background are significantly under-represented here, which is consistent with their higher tendency to complete either a vocational-low or a vocational-high remunerative path, as figure 3 shows. The effect of less-educated parents on the less prestigious and demanding educational choices (and thus on the competition in the vocational-low path) is in alignment with the predictions of rational action theory and with previous studies of the Italian case

¹² We do not consider social class as the main explanatory variable in our analysis, as the information about parental occupation is supplied in a way that does not permit the construction of a detailed class scheme. To avoid possible problems of miss-classification we code occupation in a few categories and use it only as a control variable.

(Ballarino and Checchi 2006, Panichella and Triventi 2014). However, the evidence provided by our analysis of the vocational-high path tell us that students from lower social backgrounds in particular have a higher chance of completing this path than their peers from higher social origins.

With our second research hypothesis, we argued that high-performing students from risk-averse families may see a vocational secondary degree as a safety net for the risk of dropping out from the prestigious but demanding university course their children would like to take. In other words, we suggest that even when families from lower social strata are inclined to prefigure an educational path that combines the less costly and risky available options for their children, if at the end of upper secondary school the child performs particularly well, the child and the family may perceive it as a signal of possible future academic success – even in academic fields that are highly remunerative and risky – and may adjust their original plans. In this respect, the possibility of relying, maybe even exclusively, on a technical qualification to find a job in case of failure at university will reduce the chance of being risk averse.¹³

Figure 3. Average partial effects and 95% confidence interval from binomial logistic regression predicting the educational path according to parental educational.



¹³ Moreover, continuation to a remunerative field of study can be eased by connections between topics learned in the technical track and topics in some of the most remunerative fields (i.e., engineering and economics).

Table 1. Binomial logistic regression model for the choice of the remunerative fields of study for the various cohorts of university graduates in Italy.

Variables	All sample
Final grade at <i>Esame di maturità</i>	0.039*** (0.0032)
Technical	-0.460*** (0.0569)
Vocational	-0.837*** (0.1587)
Technical*grade	0.007 (0.0079)
Vocational*grade	-0.003 (0.0237)
Upper secondary degree	-0.210*** (0.0319)
Lower secondary degree	-0.185*** (0.0424)
Primary degree	-0.258*** (0.0559)
Upper secondary degree *grade	0.004 (0.0042)
Lower secondary degree *grade	-0.007 (0.0053)
Primary degree *grade	-0.021*** (0.0070)
Technical*Upper secondary degree	0.257*** (0.0662)
Technical*Lower secondary degree	0.309*** (0.0717)
Technical* Primary degree	0.393*** (0.0838)
Vocational*Upper secondary degree	0.265 (0.1835)
Vocational*Lower secondary degree	0.337* (0.1826)
Vocational* Primary degree	0.315 (0.1954)
Technical*Upper secondary degree *grade	0.012 (0.0093)
Technical*Lower secondary degree *grade	0.034*** (0.0010)
Technical* Primary degree *grade	0.043*** (0.0115)
Vocational*Upper secondary degree *grade	0.002 (0.0268)
Vocational*Lower secondary degree *grade	-0.007 (0.0270)
Vocational* Primary degree *grade	-0.006 (0.0286)
Constant	0.594*** (0.0457)
N	93,593
Pseudo-R ²	

Note: Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The reference categories are: academic track and primary degree. The model control also for: sex, geographical area, and cohort.

In order to test this idea, we use a logistic model¹⁴ that considers as dependent variable the likelihood to complete a high-remunerative field of study and as main predictor the three-way interaction between the upper secondary school track, parental education, and the final grade at the *Esame di maturità*. The results of this model clearly show that high-performing children with both an upper secondary school degree in a technical track and less educated parents are more likely to complete a prestigious university course than their peers from a more advantageous social background who completed an academic high school track (table 1). That similar interaction parameters are not statistically significant for the vocational track might be because some technical competencies that are more strongly connected to the most lucrative fields of study (such as economics or engineering) are only offered by upper secondary technical schools and not by schools that offer vocational training.

6 Concluding Remarks

Our aim in this paper was two-fold: first, to conceptualise the upper secondary and tertiary educational choices as a unique entity and to construct a typology that comprises four possible educational paths: academic-high; academic-low; vocational-high and vocational-low, and second, to analyse the role of family background, in terms of parental education, on the completion of these paths. Our empirical evidence supports our research hypotheses, which were derived from the theoretical framework of rational action. At least with respect to the Italian case, social origins play a pivotal role in guiding students towards different paths. Moreover, children of upper strata have a higher probability of choosing the path that combines the best qualitative options available at each educational level (the academic-high path) while avoiding other less remunerative combinations. In general, parental education has a direct influence on the paths decision that is constant across the considered cohorts of students. After analysing graduates from 1995 to 2007, we did not find any substantial decrease in the importance of family educational resources on the educational path followed by students. The only exception to this general pattern of stability is a slight worsening of the situation of children with the least educated parents with respect to the completion of the most prestigious path together with their higher chance to complete the worst possible path. In accordance with our second research hypothesis, it deserves to be highlighted that worthy students from a lower socio-economic background consider the vocational track at upper secondary school as a chance to improve their condition and as a security net that gives them the possibility to invest in a lucrative and demanding field of study at university. Thus, the perception of the risk of failure connected to a high-remunerative faculty may be less extreme. In addition, because the vocational secondary degree provides direct access to the labour market without the necessity of any additional qualification, students might use it as a means to find a temporary job to support their education in case of lacking economic resources within their own family.

To conclude, we find remarkable inequalities in the various choices between educational paths. According to previous analyses of the Italian case, one possible concrete action by policy makers could be to implement the orientation process during the last year of the lower

¹⁴ In this case, we present the logit parameters, because we are interested in the significance of the coefficients rather than the comparison across cohorts or groups.

secondary school to weaken the association between social origins and educational path choices. Such actions may spread information on the profitability and workload of the various fields of study (Azzolini and Vergolini 2014; Barone et al. 2015). These informational issues may turn out to be crucial if we keep in mind the strong effect of family educational resources. Consequently, such actions should be extended also to the parents because it has been proven that educational decisions occur within the family. In this way, people from lower strata will also have reliable information on the functioning of the educational system and on the actual difficulties of the more lucrative fields of education.

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Supplementary material

In this appendix we report some supplementary results regarding the definition of the remunerative fields of study, some descriptive analyses, and a set of robustness check regarding the empirical results. More precisely, in the first sub-section we show some information about the measurement of occupational returns. In the second sub-section, we report the descriptive analyses for the main variables and the complete models regarding figure 3. Eventually, the last sub-section is reserved for a set of robustness checks in which we use a different definition of high and low occupational returns for the field of study as stated in note 12 of the main text.

Measuring occupational returns

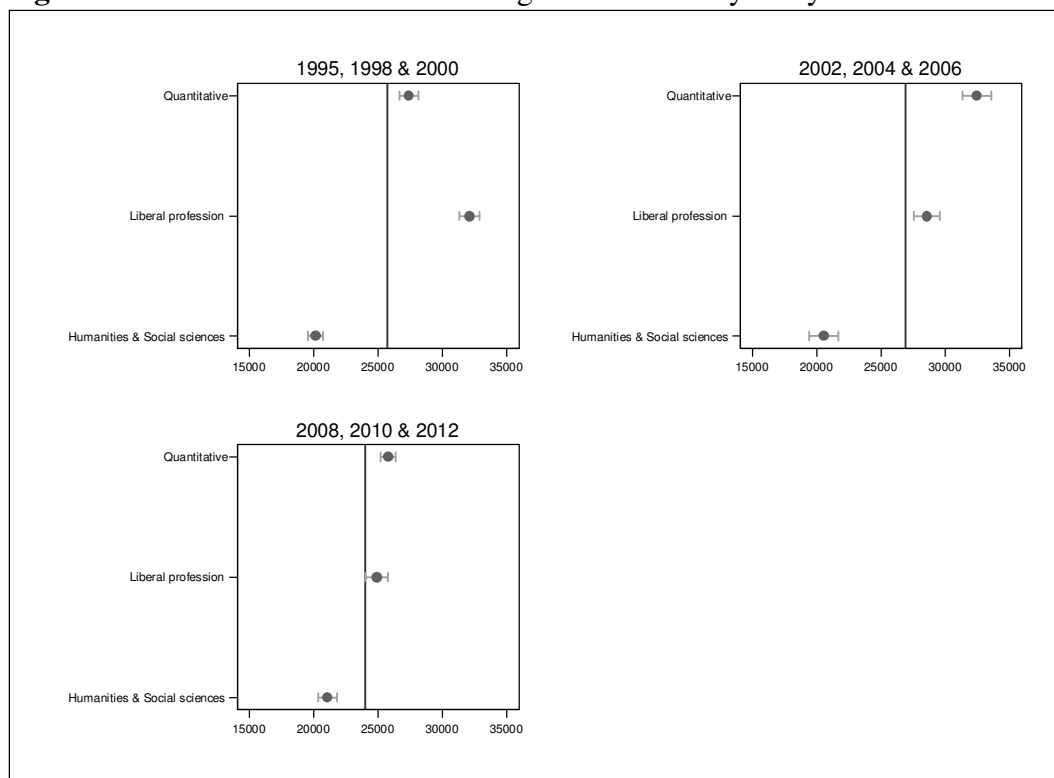
In the main text we chose to measure occupational returns using data coming from the Survey on Household Income and Wealth (SHIW) carried out by the Bank of Italy for detecting the long-run economic returns of the various field of study. The main problem in using SHIW data is connected to the sample size and, for this reason, we have been obliged to pool together some contiguous wave (table A1). An option to maximise the number of observations is to recode the field of study in a three-category variable that considers the quantitative fields (Scientific, Agriculture, Engineering, and Economy & Statistics), faculties that can lead to the liberal profession (Medicine, Law, and Architecture), and the fields connected to social sciences and humanities (Social Sciences, Humanities, and Other). In figure A1, we report the net annual income for the field of study coded in three categories. The findings substantially confirm what has been shown in the main text with the only exception of Architecture that in this setting is driven to the top by Medicine and Law.

Table A1. Distribution of field of study according to various SHIW waves, absolute values.

	1995, 1998, 2000	2002, 2004, 2006	2008, 2010, 2012	N
Scientific	141	101	113	355
Agriculture	27	37	20	84
Medicine	102	85	58	245
Engineering	85	89	106	280
Architecture	45	59	40	144
Economy & Statistics	63	118	164	345
Social Sciences	34	48	73	155
Law	113	126	171	410
Humanities	247	183	229	659
Other	74	92	104	270
N	931	939	1,078	2,947

Source: SHIW survey
Weighted data

Figure A1. Net annual income according to field of study and year.



Descriptive analyses and complete models

Table A2. Distribution of educational paths according to graduation cohort, percentages.

	1995	1998	2001	2004	2007	Total
Vocational-Low remunerative	13.35	15.00	15.86	16.53	15.69	15.51
Academic-Low remunerative	19.18	20.52	22.17	26.57	24.41	23.06
Vocational-High remunerative	21.70	23.68	23.20	19.16	18.43	21.05
Academic-High remunerative	45.77	40.80	38.77	37.74	41.47	40.37
Total	100.00	100.00	100.00	100.00	100.00	100.00
N	12,072	16,343	21,683	22,821	20,675	93,593

Source: STUG survey
Weighted data

Table A3. Parental education according to graduation cohort, percentages.

	1995	1998	2001	2004	2007	Total
Tertiary	25.54	25.59	25.90	26.91	25.30	25.91
Upper secondary	35.78	37.36	39.02	42.17	45.92	40.60
Lower secondary	19.98	23.28	23.28	21.82	20.99	21.99
Primary	18.70	13.77	11.80	9.09	7.79	11.49
Total	100.00	100.00	100.00	100.00	100.00	100.00
N	12,072	16,343	21,683	22,821	20,675	93,593

Source: STUG survey
Weighted data

Robustness checks

In section 4 of the main text, we consider a static vision of the educational paths. This means that we consider as lucrative those fields of study that always fall above the average income. As said in footnote 12, another possibility is to consider the occupational return in a dynamic way. This implies that to for each cohort of Italian graduates we consider a different set of rewarding fields. Figure A2 reports the results in a dynamic way. For the 2007 graduates we use estimates of the long-run returns derived from the 2008 and 2010 SHIW waves, for the 2004 graduates we use data from the 2004 and 2006 SHIW waves, for the 2001 graduates we use data from the 2000 and 2002 SHIW surveys and for the 1998 & 1995 graduates we use data from the 1995 and 1998 SHIW waves. Figure A3 reports what we find using this dynamic configuration and it is clear that the results do not change substantially.

Figure A2. Net annual income according to field of study and year.

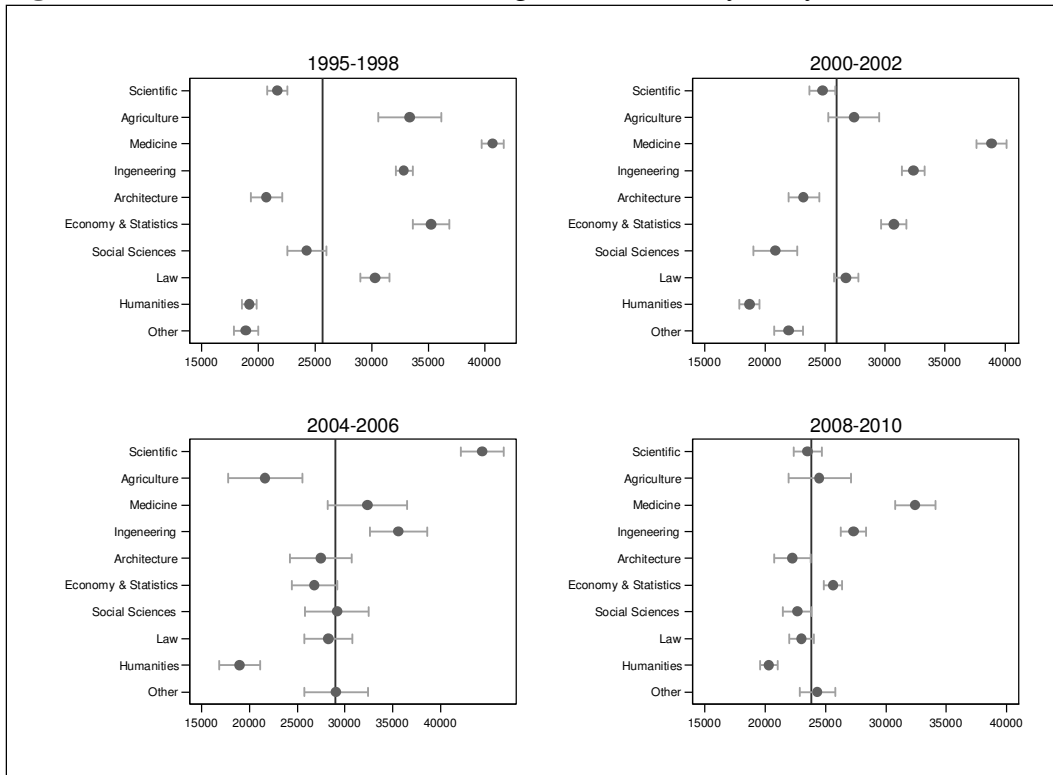
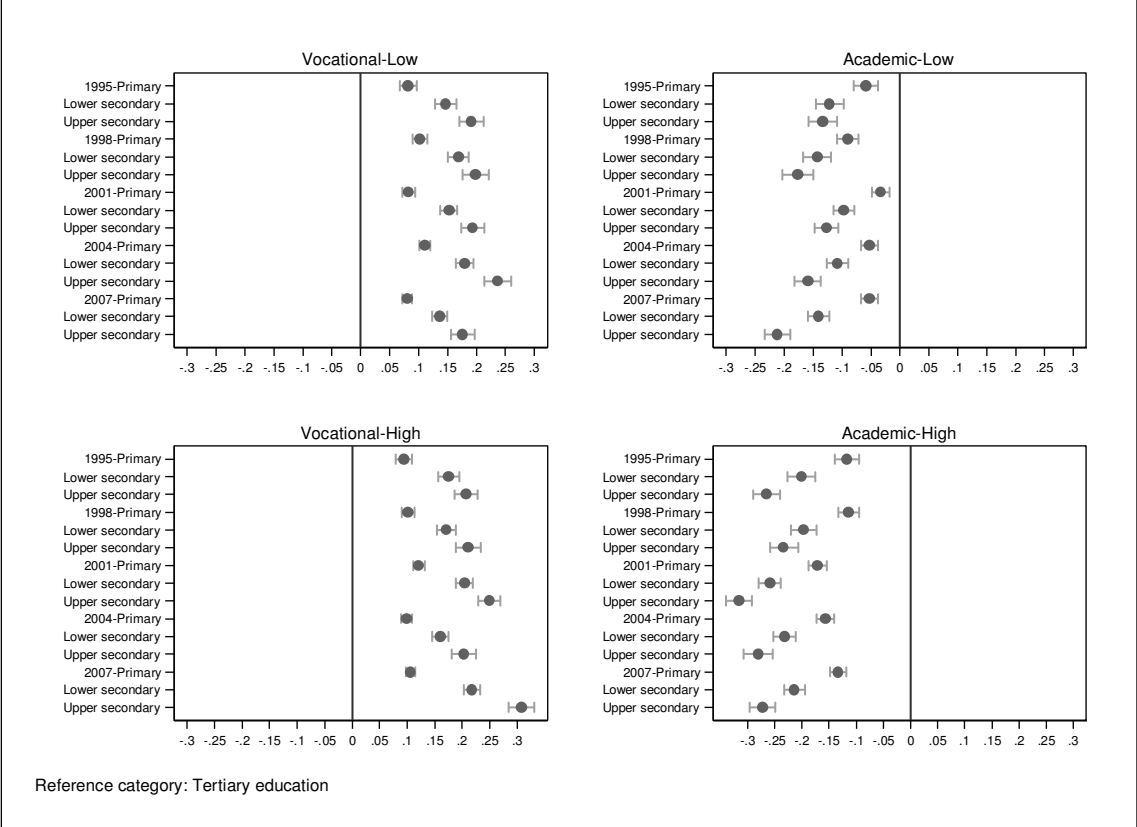


Figure A3. Average partial effects and 95% confidence interval from binomial logistic regression predicting the educational path according to parental education.



Complete models

In this section we report the complete models from which is derived the figure 3 in the main text.

Table A4. Average partial effects and 95% confidence interval from binomial logistic regression predicting the educational path according to parental educational, sex and geographic area of residence, 1995 cohort.

	Vocational - Low			Academic - Low			Vocational - High			Academic - High		
	AME	S.E.	p-value	AME	S.E.	p-value	AME	S.E.	p-value	AME	S.E.	p-value
Parental class												
White collars	0.009	0.009	0.308	0.016	0.010	0.108	-0.002	0.011	0.839	-0.023	0.013	0.065
Self-employed	-0.008	0.018	0.633	0.006	0.022	0.774	0.015	0.022	0.506	-0.013	0.027	0.631
Working class	0.024	0.010	0.019	-0.007	0.013	0.589	0.017	0.012	0.159	-0.034	0.016	0.033
Parental education												
Upper secondary	0.063	0.008	0.000	-0.004	0.011	0.726	0.114	0.010	0.000	-0.173	0.014	0.000
Lower secondary	0.103	0.010	0.000	-0.030	0.013	0.019	0.195	0.013	0.000	-0.268	0.016	0.000
Primary	0.170	0.012	0.000	-0.057	0.013	0.000	0.235	0.014	0.000	-0.348	0.016	0.000
Sex	-0.068	0.007	0.000	-0.196	0.009	0.000	0.122	0.008	0.000	0.142	0.010	0.000
Geographic area												
North-East	0.000	0.011	0.994	-0.022	0.012	0.055	0.056	0.012	0.000	-0.034	0.014	0.017
Centre	-0.025	0.010	0.012	0.010	0.012	0.397	0.012	0.012	0.321	0.003	0.015	0.816
South and Islands	-0.017	0.009	0.067	-0.011	0.010	0.278	0.001	0.011	0.920	0.027	0.013	0.038
N	10514											
Pseudo-R2	0.0783											

Note: the reference categories are respectively: service class, tertiary education, female, and North-West.

Table A5. Average partial effects and 95% confidence interval from binomial logistic regression predicting the educational path according to parental educational, sex and geographic area of residence, 1998 cohort.

	Vocational - Low			Academic - Low			Vocational - High			Academic - High		
	AME	S.E.	p-value	AME	S.E.	p-value	AME	S.E.	p-value	AME	S.E.	p-value
Parental class												
White collars	0.021	0.009	0.013	0.006	0.009	0.544	0.001	0.011	0.926	-0.028	0.011	0.015
Self-employed	0.037	0.011	0.001	-0.005	0.013	0.699	0.021	0.014	0.124	-0.053	0.016	0.001
Working class	0.049	0.010	0.000	-0.028	0.012	0.016	0.030	0.013	0.021	-0.051	0.014	0.000
Parental education												
Upper secondary	0.073	0.007	0.000	-0.030	0.010	0.002	0.120	0.009	0.000	-0.163	0.012	0.000
Lower secondary	0.122	0.010	0.000	-0.063	0.012	0.000	0.205	0.013	0.000	-0.264	0.015	0.000
Primary	0.139	0.013	0.000	-0.081	0.014	0.000	0.252	0.016	0.000	-0.311	0.017	0.000
Sex	-0.069	0.006	0.000	-0.178	0.007	0.000	0.118	0.007	0.000	0.129	0.008	0.000
Geographic area												
North-East	0.004	0.009	0.615	-0.027	0.009	0.004	0.062	0.011	0.000	-0.039	0.012	0.001
Centre	-0.028	0.008	0.001	0.021	0.010	0.028	0.001	0.010	0.958	0.006	0.011	0.578
South and Islands	-0.027	0.008	0.001	-0.003	0.009	0.719	-0.001	0.010	0.958	0.030	0.011	0.006
N	14617											
Pseudo-R2	0.0743											

Note: the reference categories are respectively: service class, tertiary education, female, and North-West.

Table A6. Average partial effects and 95% confidence interval from binomial logistic regression predicting the educational path according to parental educational, sex and geographic area of residence, 2001 cohort.

	Vocational - Low			Academic - Low			Vocational - High			Academic - High		
	AME	S.E.	p-value	AME	S.E.	p-value	AME	S.E.	p-value	AME	S.E.	p-value
Parental class												
White collars	0.026	0.009	0.004	-0.012	0.011	0.270	0.018	0.012	0.126	-0.031	0.012	0.011
Self-employed	0.057	0.014	0.000	-0.031	0.017	0.068	0.039	0.016	0.019	-0.065	0.019	0.000
Working class	0.074	0.013	0.000	-0.044	0.016	0.004	0.030	0.015	0.040	-0.060	0.017	0.000
Parental education												
Upper secondary	0.067	0.009	0.000	-0.018	0.012	0.143	0.118	0.010	0.000	-0.168	0.014	0.000
Lower secondary	0.122	0.012	0.000	-0.075	0.015	0.000	0.213	0.014	0.000	-0.260	0.017	0.000
Primary	0.151	0.015	0.000	-0.078	0.018	0.000	0.256	0.018	0.000	-0.330	0.018	0.000
Sex	-0.077	0.007	0.000	-0.196	0.009	0.000	0.129	0.008	0.000	0.144	0.009	0.000
Geographic area												
North-East	0.013	0.012	0.263	-0.023	0.013	0.075	0.042	0.013	0.001	-0.032	0.014	0.025
Centre	-0.022	0.010	0.034	0.021	0.013	0.095	0.007	0.012	0.554	-0.006	0.014	0.632
South and Islands	-0.035	0.009	0.000	-0.038	0.011	0.001	0.060	0.011	0.000	0.013	0.013	0.309
N	19418											
Pseudo-R2	0.083											

Note: the reference categories are respectively: service class, tertiary education, female, and North-West.

Table A7. Average partial effects and 95% confidence interval from binomial logistic regression predicting the educational path according to parental educational, sex and geographic area of residence, 2004 cohort.

	Vocational - Low			Academic - Low			Vocational - High			Academic - High		
	AME	S.E.	p-value	AME	S.E.	p-value	AME	S.E.	p-value	AME	S.E.	p-value
Parental class												
White collars	0.024	0.012	0.039	0.026	0.014	0.061	-0.022	0.010	0.027	-0.028	0.013	0.030
Self-employed	0.014	0.014	0.345	0.012	0.020	0.562	0.046	0.014	0.001	-0.071	0.019	0.000
Working class	0.061	0.014	0.000	-0.010	0.017	0.538	0.038	0.012	0.002	-0.089	0.016	0.000
Parental education												
Upper secondary	0.084	0.009	0.000	-0.027	0.015	0.085	0.115	0.008	0.000	-0.172	0.014	0.000
Lower secondary	0.139	0.013	0.000	-0.086	0.018	0.000	0.198	0.012	0.000	-0.251	0.017	0.000
Primary	0.233	0.023	0.000	-0.129	0.023	0.000	0.204	0.018	0.000	-0.308	0.021	0.000
Sex												
	-0.086	0.009	0.000	-0.198	0.011	0.000	0.120	0.007	0.000	0.164	0.009	0.000
Geographic area												
North-East	0.029	0.013	0.021	0.031	0.015	0.041	-0.015	0.011	0.152	-0.045	0.013	0.001
Centre	-0.003	0.013	0.833	0.039	0.017	0.019	-0.010	0.011	0.359	-0.027	0.014	0.051
South and Islands	-0.023	0.011	0.030	-0.013	0.013	0.304	0.009	0.010	0.347	0.027	0.012	0.026
N	18986											
Pseudo-R2	0.0872											

Table A8. Average partial effects and 95% confidence interval from binomial logistic regression predicting the educational path according to parental educational, sex and geographic area of residence, 2007 cohort.

	Vocational - Low			Academic - Low			Vocational - High			Academic - High		
	AME	S.E.	p-value	AME	S.E.	p-value	AME	S.E.	p-value	AME	S.E.	p-value
Parental class												
White collars	0.016	0.009	0.080	0.025	0.010	0.014	-0.007	0.008	0.414	-0.034	0.010	0.001
Self-employed	0.040	0.011	0.000	-0.008	0.015	0.602	0.018	0.011	0.097	-0.050	0.015	0.001
Working class	0.048	0.010	0.000	-0.022	0.012	0.070	0.040	0.009	0.000	-0.065	0.013	0.000
Parental education												
Upper secondary	0.086	0.007	0.000	-0.011	0.010	0.288	0.108	0.006	0.000	-0.183	0.010	0.000
Lower secondary	0.149	0.010	0.000	-0.071	0.013	0.000	0.191	0.009	0.000	-0.269	0.013	0.000
Primary	0.213	0.016	0.000	-0.111	0.016	0.000	0.264	0.015	0.000	-0.365	0.016	0.000
Sex	-0.078	0.006	0.000	-0.140	0.007	0.000	0.111	0.005	0.000	0.106	0.007	0.000
Geographic area												
North-East	0.023	0.010	0.027	-0.014	0.012	0.235	0.001	0.009	0.923	-0.010	0.012	0.383
Centre	0.001	0.011	0.934	0.008	0.013	0.530	-0.016	0.009	0.061	0.007	0.012	0.546
South and Islands	-0.001	0.008	0.941	-0.025	0.009	0.008	0.008	0.007	0.242	0.017	0.009	0.076
N	30058											
Pseudo-R2	0.0718											