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Social inequalities in higher education participation in a period of educational reforms and economic recession: Evidence from an Italian province

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Abstract

In this paper, we analyse the role of social origins in the shaping of university participation in the province of Trento (North-East of Italy) from 2000 to 2012. This long-term view gives us the chance to test the role played by the Bologna process and by the economic crisis. More precisely, this setting allows us to analyse its effects on inequality of educational opportunity in the face of two opposite situations. The first, subsequent to the Bologna process, is characterised by a huge increase in the enrolment rate at the university. In the second situation, subsequent to the economic crisis, a huge decline in higher education participation can be observed. Using data on upper secondary school graduates in the province of Trento and applying logistic models, we find that inequality of educational opportunity tends to diminish during educational expansion, while it increases with the persistence of the economic crisis.

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1   Introduction

The increased participation in higher education and the reduction of inequality of educational opportunity (IEO) is a widely debated topic in many advanced countries due to the positive externalities that a higher level of education can have on the entire society (Hanushek and Woessmann, 2010). Because the enrolment rate in Italian universities is much lower with respect to other EU countries (OECD 2014) and because IEO is still a persistent phenomenon (Marzadro and Schizzerotto 2014), the Italian government implemented the Bologna process to enhance university participation and reduce social inequalities. At the same time, the trend in enrolment rate could also be affected by the economic situation (Schizzerotto and Vergolini 2015).

Given these premises, this paper contributes to the existing literature analysing IEO in the access to tertiary education from 2000 to 2012 using a dataset on upper secondary graduates in the province of Trento (North-East of Italy). As mentioned above, the time spam considered is of particular interest as it comprises the reform of the Italian university under the Bologna process (after 2001) and the incumbency of the economic crisis (from 2009 onwards). This means that we are in the position to test what happens to IEO under different circumstances. More precisely, after the Bologna process there was a huge expansion in university participation (Cappellari and Lucifora 2009). On the other side, the period of the economic crisis has been characterised by a decrease in the transition rate from upper secondary school to university. Moreover, our analysis considers both the vertical (i.e., the university enrolment probability) and the horizontal (i.e., the choice of the field of study) dimension of IEO. Although this study is focused on a particular area, with all the problems it entails regarding the generalisation of the results, it constitutes, to the best of our knowledge, the first analysis on inequality in relation to educational choice at the university level in Italy, considering the influence of both the Bologna process and the economic crisis.

This article is organised as follows. In the next section, we describe the Italian educational system and we supply an overview of the specific context of the province of Trento. In section 3, we present the theoretical framework from which a set of hypotheses are derived. We then describe the data, variables and methods (section 4) and discuss the main empirical results (section 5). The last section is devoted to some conclusive remarks.

2   The Italian educational system and the province of Trento

The Italian educational system[1] is divided into four different stages: primary, lower secondary, upper secondary and tertiary. Primary school corresponds to Isced 1 (International Standard Classification of Education). It lasts for five years and it offers the same curricula to all students. Usually, primary school is intended for children from six to eleven years of age. The secondary stage includes two levels. The lower level (Isced 2) is also compulsory and undifferentiated and it lasts three years. Upper secondary school (Isced 3) presents the choice between three different tracks: the academic (*liceo*), the technical (*istituto tecnico*) and the vocational track (*istituto professionale*). Each track lasts five years and it is concluded by a final exam known as *Esame di maturità*.[2] All students who pass this final exam can enrol at a university independently of which track they completed. Tertiary education (Isced 5A) in Italy was dramatically changed in 2001 with the implementation of the Bologna process. The old system was unitary, undifferentiated and very selective. In fact, it was characterised by its length (4 to 6 years according to the chosen field of study) and by requiring long courses with high workloads. The Bologna process, approved in 1999 and fully implemented in 2001, tried to change this state of affairs to manage the increased heterogeneity of students that began to enter the Italian university system. As a result of this reform, the old system was replaced by a sequential system comprising a 3-year Bachelor's (*laurea triennale*) degree and a 2-year Master's (*laurea magistrale*) degree, which grants access to doctoral programmes that usually take three years to complete. Moreover, another relevant feature of the Italian version of the Bologna process was the definition of the first two cycles (Bachelor's and Master's) in terms of credits. In general, one academic year corresponds to 60 credits, which are equivalent to 1,500 hours of study. The workload allotted to attending the lessons and preparing for the exams cannot exceed this cap. The important difference relative to the old system is that since 2001, the expected student workload is clearly defined and constrained. The overall result of this reform was that the time and effort required to complete university studies decreased substantially, making tertiary education less selective.

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[1] For a more detailed description of the Italian educational system see the Eurydice page (https://webgate.ec.europa.eu/fpfis/mwikis/eurydice/index.php/Italy:Overview).

[2] In Italy, there are also some vocational schools that offer three-year qualifications, but these qualifications do not grant access to university.

Figure 1. Italy, North-East and province of Trento at a glance: some macro indicators.
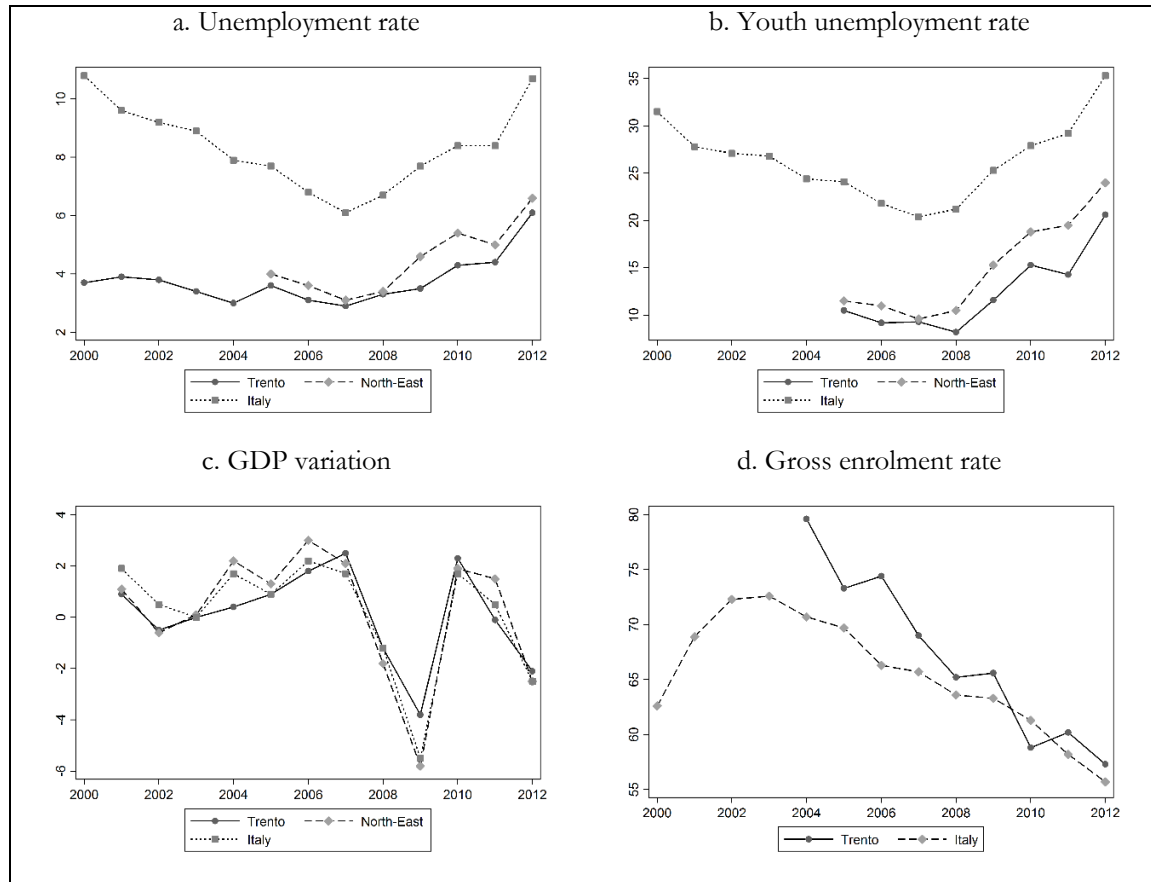
Note: Panel *a* reports the general unemployment rate for people aged xx-xx; panel b shows the unemployment rates for people aged 15–24; panel c reports the variation in real GDP, and in panel *d* gross enrolment rates are calculated as the ratio between students enrolled at the university in year *t/t+1*— independently of the year in which they obtained a high-school diploma— and high school graduates in year *t-1/t*.
Source: Province of Trento Statistical Office.

The analyses presented in the next sections are based on data from the province of Trento. We rely on these data because a long series of data are not available for the whole country.[3] Given the focus on this particular area, we provide some information about the social and economic context of this province as a contrast with the rest of the country. First, it should be stressed that the province of Trento is located in the North-East of Italy and enjoys a large degree of autonomy in the field of welfare, health and education. This autonomy, however, does not reflect in changes in the implementation of the Bologna

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[3] The Italian Statistical Office (ISTAT) conducts a survey on Italian upper secondary school graduates every three years. Currently, data are available for the following cohorts: 1995, 1998, 2001, 2004 and 2007. With these data it is not possible to analyse IEO trends subsequent to the economic crisis.

process. In fact, this reform has been implemented uniformly at a national level. In general, the province of Trento is a small but well developed area. In fact, we can see how the general unemployment rate is much lower in this area than in the rest of the country, even if it is increasing over time, particularly after the economic crisis (Figure 1, panel a). The same picture emerges when we look at youth unemployment rate (Figure 1, panel b). It should be stressed that differences between the province of Trento and the surrounding regions (North-East) are less evident, these geographical areas showing some similarities. On the other hand, GDP variation rate is very similar all over the country and the trend is still negative for the last years (Figure 1, panel c). Eventually, university enrolment began to decrease beginning in 2004, both in the province of Trento and in Italy (Figure 1, panel d). In general, the economic crisis became evident in the province of Trento beginning in 2009. Moreover, it seems that the economic crisis has been less severe in the province of Trento, leading us to estimate a lower bound of the crisis' effect with respect the rest of the country.

3   Previous studies and theoretical framework

In Italy, the literature on the IEO trend over time is very rich, in particular concerning the vertical dimension. Given the aims of this paper, we review the main contributions that have focused their attention on IEO in terms of university participation in Italy. Previous studies that have looked at long-term IEO trends have found a stability in the relationship between students' social origins and enrolment chances (Triventi and Trivellato 2009; Ballarino and Schadee 2010; Barone et al. 2010; Marzadro and Schizzerotto 2014) or only a modest decrease (Recchi 2007). The studies that showed a certain degree of IEO reduction are those which focused their attention on inequality trends in more recent periods (Bratti et al. 2008) or after the implementation of the Bologna process (Cappellari and Lucifora 2009; Di Pietro 2012; Ballarino and Panichella 2014).[4] Regarding the relationship between students' social origin and choice of field of study, it seems clear that students from higher social background tend to choose more profitable fields of study (Pisati 2002; Triventi 2013; Vergolini and Vlach 2016) and that IEO increased with the expansion caused by the Bologna process (Argentin and Triventi 2011).

The theoretical perspective adopted by previous studies is based on rational action theory (RAT) through the mechanism of relative risk aversion (Boudon 1974; Breen and Goldthorpe 1997). According to this approach, enrolment probability is influenced by cost-benefit

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[4] While it is well accepted that the Bologna process in Italy has increased enrolment rate, the same is not true for its effect on IEO. In fact, Argentin and Triventi (2011) have not observed this reduction.

calculations made by students and their families. The idea is that if expected benefits exceed the various costs, then students decide to enrol. This approach predicts that IEO is generated mainly by economic constraints that children of lower socio-economic background have to face. At the same time, having parents with low education levels means that they cannot help in the supply of reliable information about costs and economic returns of university participation (Abbiati and Barone 2015).

The same framework can also be applied to the choice of the field of study once students have decided to enrol. More precisely, lower-class children might think that less demanding fields of study or shorter courses will lower their chances of dropping out. At the same time, students from higher social-backgrounds could be more willing to enrol in more demanding and remunerative fields of study to avoid downward social mobility. The choice of a given field of study is also influenced by knowledge of the functioning of the higher education system. Obviously, students whose parents are highly educated will also have more information about the profitability and the workload of a given field of study (Bourdieu 1979; Bourdieu and Passeron 1990).

Following an approach based on RAT, we test the role played by institutional context and by economic situation on IEO in its vertical and horizontal dimension. We will begin our argument with the vertical dimension of IEO. As described in the previous section, the Bologna process has reduced the costs of participation by having simplified the Italian university system and having shortened the duration of the courses. Therefore, we expect to find not only an overall increase in probability of enrolment but also that this growth has also been greater for individuals from lower socio-economic backgrounds (*Hypothesis 1*).

On the other side, the effects of the economic crisis could go, at least in principle, in two opposite directions. First, the crisis has increased the unemployment rate and so it has reduced the income of families, particularly working class families. This could be translated into an increase of direct costs connected to university participation thus implying an increase in IEO (Schizzerotto and Vergolini 2015). At the same time, the crisis has also raised youth unemployment rate and, in this way, it has caused a decrease in opportunity costs of university participation leading to a reduction in IEO. According to the last argument, university enrolment could be seen as a sort of "parking lot" that students use waiting for an improvement in the economic situation (Barbagli 1974). The idea is that people from lower socio-economic backgrounds are more likely to opt for working after graduation from upper secondary school. Hence, the increase in youth unemployment rate could lead them to decide to enrol at the university, at least while the economic situation is not favourable. From this

discussion we are not in the position to derive an unambiguous hypothesis for the effect of the economic crisis. Hence, we refer to the first scenario (increase in IEO) as *Hypothesis 2a* and to the second one (decrease in IEO) as *Hypothesis 2b*.

As explained above, the horizontal dimension of IEO regards the association between social background and choice of field of study. In particular, after the Bologna process, Italy, and the province of Trento, has experienced a remarkable educational expansion at the tertiary level. This means that a tertiary degree itself would not be enough to ensure a good occupational position because employers could start to look at the field of study and the type of institution attended (Gerber and Cheung 2008; Macmillan et al. 2014). It is possible that students from higher social backgrounds will try to maintain their advantages by enrolling in more prestigious and demanding fields of study, according to the effectively maintained inequality (EMI) thesis (Lucas 2001). The idea behind this concept is that, in a situation of educational expansion, obtaining a degree is no longer sufficient to maintain an advantage in the labour market. Therefore, upper class children will tend to differentiate their choices from a qualitative point of view (i.e., choosing a remunerative field of study). Given these arguments, and as a result of the introduction of the Bologna process, we expect an increase in the association between students' social origins and choice of the most remunerative fields of study (*Hypothesis 3*).

In this case, predictions about the influence of the economic crisis are also ambiguous and strictly depend on what happens with variations in the probability of enrolment. If the argument about the increase in direct costs is true and there is a subsequent increase in IEO at the vertical level, we can suppose that there will not be an increase in IEO in the choice of the field of study (*Hypothesis 4a*). The reason for this would be because the distance between the various social groups in enrolment rate has remained stable. Therefore, students from upper social strata do not need to change their educational choices to maintain a competitive advantage. Otherwise, if there is a decrease in IEO in the enrolment probability, individuals from advantaged backgrounds are likely to act according to the EMI thesis and, therefore, could try to overcome the effects of educational expansion by choosing more remunerative and demanding fields of study (*Hypothesis 4b*).

4   Data, variables and methods

The data used in this paper come from an ad hoc survey that was been carried out from 2000 to 2012 on the population of upper secondary school graduates in the province of Trento. Because of a funding shortage, it was not implemented in 2001, 2002 and 2008, and it is no

longer administered. The fieldwork was carried out by the Department of Sociology and Social Research of the University of Trento using a Computer-Assisted Telephone Interviewing (CATI) procedure. More precisely, the reference population is made up of all the qualified upper secondary school students in a given scholastic year (t-1/t) that are entitled to access the university system in the next academic year (t/t+1).

The questionnaire collects a rich set of information about the following: a) educational choices (enrolment and field of study); b) socio-demographic characteristics (gender, residence area); c) school career (final exam marks for upper secondary school, grade retention, school track and remedial exams); and f) students' social origins (parental education and parental social class).

The main dependent variables are enrolment probability and, once enrolled, the choice of field of study. Enrolment probability is a dummy variable that assumes a value of "1" if enrolled and "0" otherwise. Field of study is a categorical variable composed of six groups: a) Humanities (arts, languages and educational sciences); b) Social sciences (psychology, social sciences and political sciences); c) Natural Sciences (mathematics, physics, geology, biology and agriculture); d) Economics and technical fields (engineering, architecture and economics and statistics[5]); e) Liberal professions (medicine and law); and f) Health (subjects related to medicine, such as nursing, physiotherapy and midwifery).[6]

The main 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 upper secondary degree; and d) both parents with less than a lower secondary degree. Following Triventi (2013), we adopted this combination of qualifications to better capture the educational constellation of the family of origin and to differentiate more precisely at the top the distribution of the students' social origins. As control variables we use: sex, marks for the *Esame di maturità*, grade retention, remedial exams, school track and parental social class.[7]

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[5] We opted to include "economics and statistics" in the technical field due to the relevance granted to them by departments in those fields.

[6] This classification is slightly different from the one proposed by Ballarino and Bratti (2009), who present the following fields: Hard sciences; Medicine (with health professions); Technical; Hard social sciences; Soft social sciences; Law; Humanities. In the appendix we show that the results using this proposal are not so different from the those in our paper.

[7] Unfortunately, parental social class has not been measured following the same procedures in all the waves. Therefore, we are not able to build this variable in a detailed way. Hence, we prefer to use it only as a coded control variable, using a dominance criterion and mimicking the ESEC class scheme (Rose and Harrison 2010), as follows: a) Service class; b) Routine non-manual; c) Self-employed; d) Working class.

To estimate the effects of parental education on enrolment probability, we rely on a binomial logistic regression:

$$\ln\left(\frac{p_i}{1-p_i}\right) = \alpha_0 + \beta_1 \cdot ParEdu_i + \delta_1 \cdot Cohort_i + \lambda_1 \cdot (ParEdu \times Cohort)_i + v_j \cdot X_i \qquad (1)$$

Considering that field of study is a discrete categorical variable assuming six possible values, we modelled the odds that student i falls in the field j (j =1, …, J-1) as opposed to a baseline field (j = J) using a multinomial logistic regression as follows:

$$\ln\left(\frac{p_{ij}}{p_{iJ}}\right) = \alpha_j + \beta_j \cdot ParEdu_i + \delta_j \cdot Cohort_i + \lambda_j \cdot (ParEdu \times Cohort)_i + v_j \cdot X_i \qquad (2)$$

In both expressions, α is a constant; β is the vector of coefficients of parental education; δ are the regression coefficients of ten dummy variables for the cohort; λ is an array of coefficients of the interaction of parental education and interview wave; v is a vector of regression coefficients associated with the control variables. The results for both models are obtained using log-likelihood maximization and are graphically presented in the next section in form of predicted probabilities.

Notably, our models only consider people who have reached an upper secondary school qualification of five years. Hence, students who have obtained three-year vocational qualifications are not considered here. These students are mainly from lower socio-economic backgrounds (Panichella and Triventi 2014). This means that we are not able to supply unbiased estimates of the association between social origins and educational choices at the tertiary level; however, given the type of selection, we are able to identify a lower bound of the true estimate.

5   Results

In this section, we present the main findings emerging from the empirical analyses.[8] More precisely, we show the results regarding the trend in IEO enrolment probability and how the association between students' social origins and choice of field of study evolves over time. Before looking at the results coming from the logistic models, it is useful to look at some

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[8] The results are presented graphically. See the appendix for the full models.

descriptive statistics about the trend in net enrolment rate in the province of Trento from 2000 to 2012 (Figure 2).

Figure 2. Net enrolment rate according to upper secondary school graduation cohort in the province of Trento.
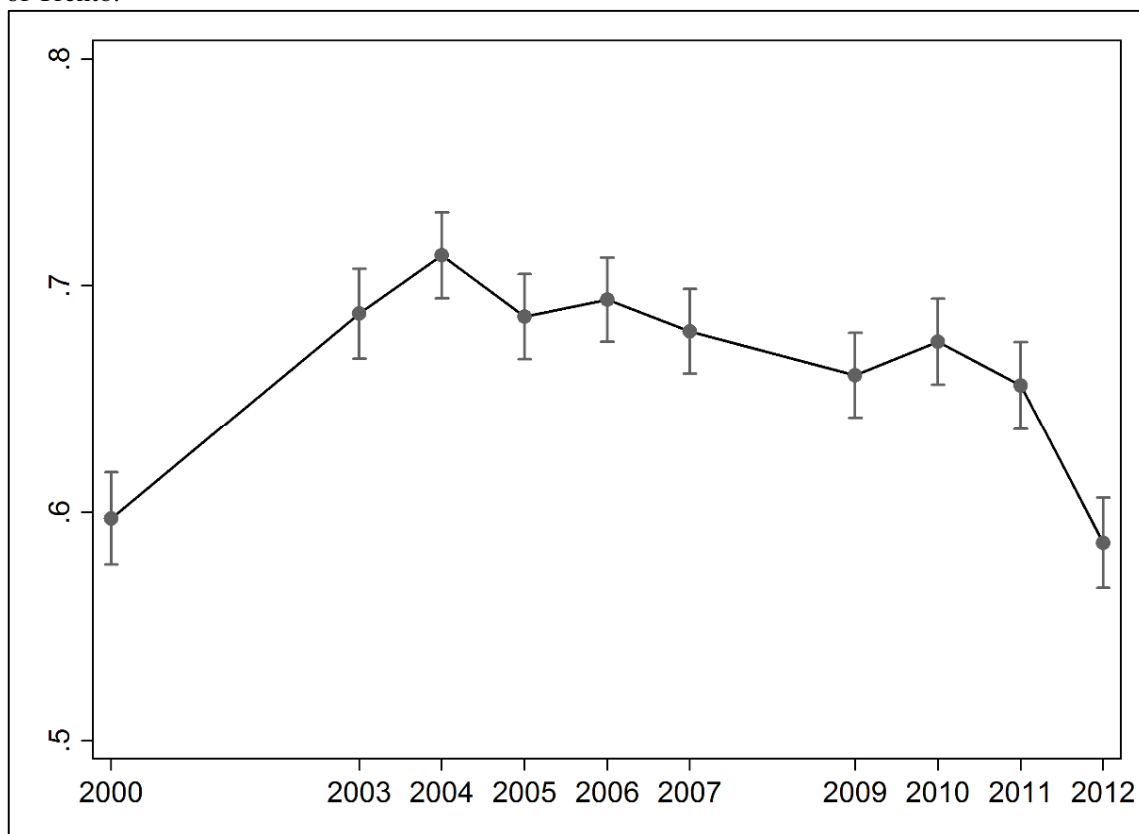
Note: enrolment rate is measured differently with respect to Figure 1 (panel d). In fact, this figure shows a net enrolment rate because we consider those students who enrolled at the university in the year *t/t+1* conditional on having earned their upper secondary degree in year *t-1/t*.
Source: Survey on upper secondary school graduates in the province of Trento.

As can be observed quite clearly, after the Bologna process there is a remarkable increase in enrolment rate. As is also evident from Figure 1 (panel d), it seems that the decrease in the enrolment rate started before the economic crisis, which reached the province of Trento from 2009 onwards. To explain this evidence, it should be noted that the economic return of a Bachelor's degree is quite unsatisfactory. In fact, the unemployment rate of graduates holding a Bachelor's degree increased from 11.2% in 2007 to 26.0% in 2013, while their first job salary, in the same period, fell from 1,302 € to 1,013 € (AlmaLaurea 2015). In any case, regarding net enrolment rate— which is what we use for this study— the dramatic reduction occurs in 2012, as a sort of reaction to the persistence of the economic crisis. Finally, it should

be stressed that the decreasing trend is less dramatic than that observed for gross enrolment rates (Figure 1, panel d). This means that the decline is more relevant for the so-called "delayed students" (i.e., students who do not enrol at the university immediately after obtaining their upper secondary school degree). In other words, while the net enrolment rate is more affected by the persistence of the economic crisis, the decline in gross enrolment rate seems to be much more influenced by other macro characteristics.

Figure 3. Net enrolment predicted probabilities according to upper secondary school graduation cohort and parental education.
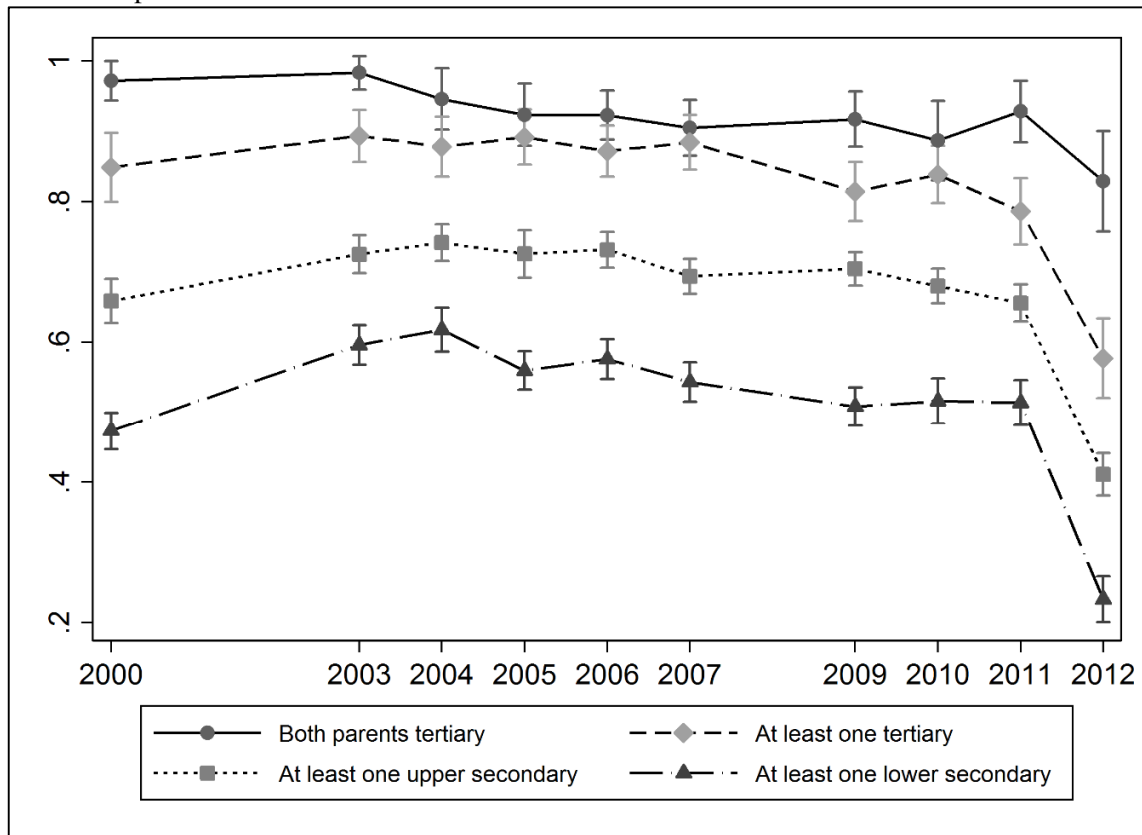
Note: the predicted probabilities come from model (1) described in the previous section.
Source: Survey on upper secondary school graduates in the province of Trento.

In figure 3, we report the trend of the (net) enrolment predicted probabilities according to parental education by cohorts. *Hypothesis 1* claims that, after the Bologna process, we should observe a reduction in IEO and, as a consequence, an increase in the enrolment probabilities of students from lower social background with respect to students from higher social strata. From Figure 3, we actually notice a statistically significant increase in enrolment probability only for students with poorly educated parents (at least one lower secondary). For

people with at least one parent with an upper secondary qualification, the growth is very small and for persons from well-educated families (i.e., having one or both parents with a tertiary degree), the lines are flat, indicating the absence of any significant variations. Obviously, for this group of students there is a clear ceiling effect. In fact, the enrolment probability for students who have two parents with a university degree is very close to 1, and, for people with at least one parent with a tertiary degree, this probability is higher than 0.8. The analysis of Figure 3 shows that there is some empirical evidence for an egalitarian effect of the Bologna process, even though it should be stressed that the differences between the various social strata remain very high. In particular, there is a clear polarisation between students whose parents earned a tertiary degree and all the other students.

Figure 4. Net enrolment predicted probabilities according to upper secondary school graduation cohort, parental education and upper secondary school track.
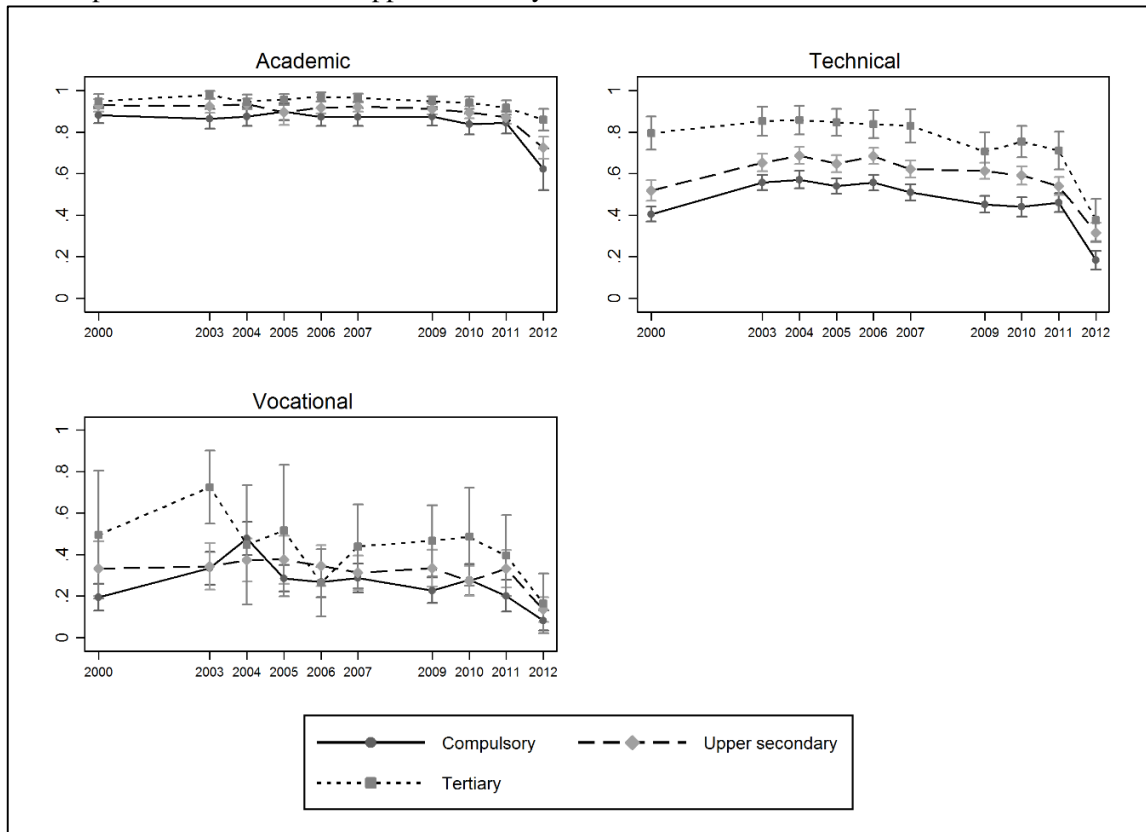
Note: the predicted probabilities come from model (1) described in the previous session, with the difference that the models have been run separately for each track.
Source: Survey on upper secondary school graduates in the province of Trento.

From 2003 to 2011, the trend in enrolment probabilities is not subjected to dramatic changes and it mirrors what happen for the general enrolment probability (Figure 2). The main change can be observed in 2012, where a sharp decline for all social strata is evident, with the only exception being the offspring of parents with tertiary degrees. In fact, for these students, the decrease is not very sharp and it is not statistically significant. According to the depicted picture, we find support for *hypotheses 2a,* which argues for an increase in the IEO. More precisely, it seems that the persistence and the intensification[9] of the economic crisis has had remarkable effects on the enrolment probability of the vast majority of students. Therefore, for graduates of upper secondary education in the province of Trento, there is no evidence that an adverse economic conjuncture could lead to an increase in the enrolment rate according to the "parking" thesis. On the contrary, we find evidence about its negative influence, confirming the idea that in this context, the economic crisis could have dramatically increased educational costs thereby worsening the financial conditions of several families. What is surprising is the size of the negative role played by the economic crisis. In fact, the reduction in university participation occurs also for students from advantaged social backgrounds (at least one parent with tertiary education).

Before looking at what happens to horizontal inequalities (i.e., the choice of the field of study), it is worth deepening our analysis by looking at the role played by tracking and prior school performance. Although every student with an upper secondary degree can enrol at the university, graduates from an academic track have a higher probability of continuing on to the university system (Azzolini and Vergolini 2014, Ballarino and Panichella 2014). In figure 4, we analyse the association between parental education[10] and cohort showing separate models for each upper secondary school track. Interestingly, for the academic track, there are practically no differences between the various educational levels of parents until 2012. In 2012, the drop in enrolment rate is much more evident for the children of less educated parents, and the gap between these students and the offspring of tertiary degree parents becomes statistically significant. If we look at the technical track, the gap is more evident and students from more educated backgrounds show a higher probability of enrolling in the university. For this case, the significant increase in the enrolment probability for students whose parents obtained an upper secondary or a compulsory qualification becomes

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[9] In fact, from figure 1 (panels a, b) it is clear that, in 2012, there was a sharp increase in both general and youth unemployment rate. The GDP also showed a further decrease.

[10] Due to small sample size, we are required to slightly change the definition of parental education, relying on the dominance approach (Erikson 1984) and considering the following categories: i) tertiary degree; ii) upper secondary degree; and iii) compulsory education (primary and lower secondary school).

interesting. Moreover, there is a huge reduction for all social backgrounds, even if the more dramatic decrease is observed for the students from less educated background (i.e., parents with compulsory education only).[11]

Some interesting results emerge by looking at the trend in IEO in relation to marks obtained at the *Esame di maturità* (Figure 5). We find that two distinct groups benefit more from the implementation of the Bologna process: low-skilled children of well-educated families and medium-high skilled students whose parents possess only a compulsory education. Focusing on this last result, the effect is stronger for medium skilled students than for the high skilled ones because, for the latter, the enrolment probability is already quite high (more than 0.6), while for the medium skilled, the enrolment probability changed from approximately 0.4 to approximately 0.6. In this case, the simplification of the university system together with the reduction in costs has favoured two very different groups of students. It is realistic to think that good students from lower social background are able to take advantage of the costs reduction, while poor performing students with well-educated parents can exploit the simplification of the university system. It is also interesting to note that those students who benefit more from the Bologna process are the same that experienced the most dramatic reduction in enrolment probability in 2012. This evidence is in line with the predictions of *hypotheses 1* and *2a*.

The last part of the empirical results is devoted to the analysis of IEO in connection with the choice of field of study.[12] In figure 6, we report the predicted probabilities deriving from the multinomial logistic regression specified in the previous section. The emerging trend for Natural Sciences and for Liberal professions highlights a substantial stability in the influence of parental education along the time span considered. We can observe some discontinuities after the Bologna process only for the Social sciences field, where there is a (marginally significant) decrease in enrolment probability for students with highly educated parents. This empirical evidence could be understood as a sign of the presence of EMI, in the sense that, in a period of educational expansion, people from the upper strata tend to avoid fields of study with lower educational returns.[13] However, the results for the other fields do not support this hypothesis; in fact, we are not able to observe any increase in enrolment

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[11] We do not comment on the results for the vocational track because the trends are quite erratic and the standard errors are very large.

[12] Given the small sample size, for all empirical analyses, we use the three-category version of parental education. Moreover, we were not able to produce reliable estimates for separate models for track and marks in upper secondary school.

[13] It has been shown for the Italian case that the less remunerative fields of study are those connected with Humanities and Social sciences (Ballarino and Bratti 2009; Vergolini and Vlach 2016).

probabilities in less remunerative fields for students from disadvantaged social backgrounds and, at the same time, there is no increase in remunerative faculties for people from upper strata. This means that, at least in the province of Trento, the increase in the enrolment rate after the Bologna process has not been translated into an intensification of social inequalities.

Figure 5. Net enrolment predicted probabilities according to upper secondary school graduation cohort, parental education and marks for the *Esame di maturità*.
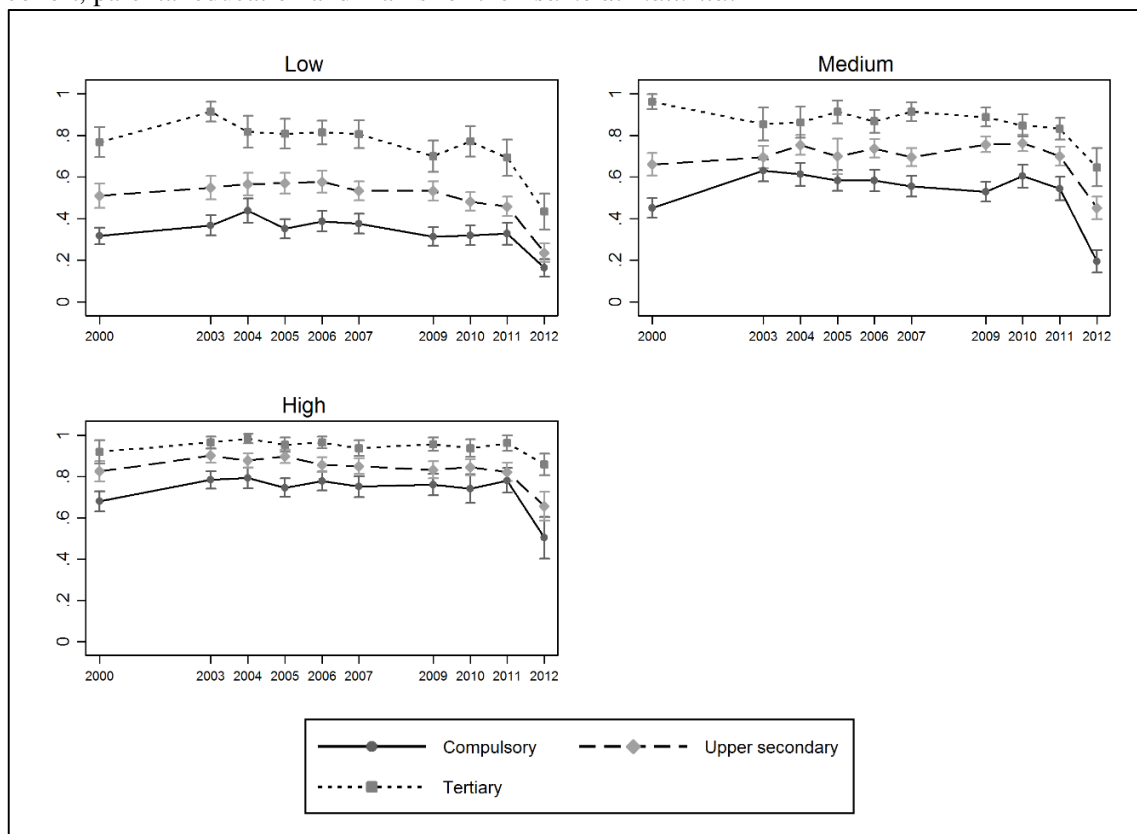
Note: the predicted probabilities come from model (1) described in the previous session, with the difference that the models have been run separately according to received mark for the *Esame di maturità*. This mark has been coded in three categories according to the tertiles distribution.
Source: Survey on upper secondary school graduates in the province of Trento.

The next step concerns the analysis of what happen with the association between parental education and the choice of field of study with the persistence of the economic crisis. Our results are compatible with *Hypothesis 4a,* which states that a growth of IEO at vertical level does not produce an increase in IEO at the horizontal one. In fact, for all the fields considered, there are no differences between different parental educational levels. One exception is observed for the Humanities field, for which there is an increase in the enrolment probability for students whose parents obtained only a compulsory education. An interesting trend that

we observed concerns the monotonic decline in the enrolment probabilities for all social strata in the technical fields combined with an increase in the health fields. The increase in the latter field could be a sign of a sort of reaction to both the economic crisis and the decrease in the economic returns of a Bachelor's degree. In fact, the choice of health professions guarantees a good employability without having to also earn a Master's degree.

Figure 6. Predicted probabilities of enrolling in different fields of study according to upper secondary school graduation cohort and parental education.
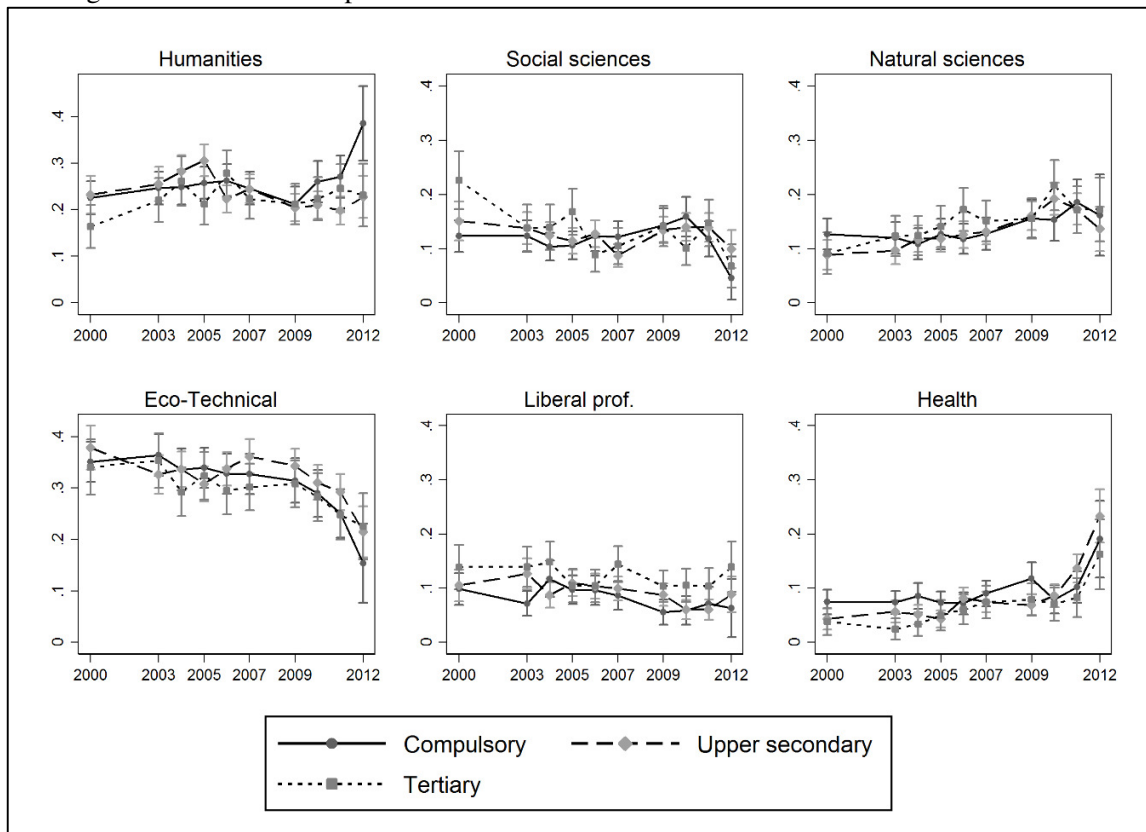
Note: the predicted probabilities come from model (2) described in the previous session.
Source: Survey on upper secondary school graduates in the province of Trento.

6   Concluding Remarks

In this paper, we have analysed the trend in IEO in a local area in Italy following a theoretical approach based on rational action theory. More precisely, we have focused the attention on vertical and horizontal dimensions of IEO, finding that students from the most disadvantageous social backgrounds have greatly benefitted from the implementation of the Bologna process, but also that, at the same time, these students have been the most stricken

by the general decline observed as a result of the persistence of the economic crisis. Therefore, we have enough evidence to corroborate the prediction made according to *Hypotheses 1* and *2a*. This means that the Bologna process succeeded in enhancing university participation of students from lower socio-economic backgrounds, but this positive effect has been totally upended by the persistence of the economic crisis. These results suggest the presence of liquidity constraints in enrolment choice, in particular for students from the lowest social strata independent of their marks and track in upper secondary school.

Regarding the choice of field of study, we do not find support for the EMI thesis (*Hypothesis 3*). In fact, we do not observe any increase in social inequality after the Bologna process and we do not find any relevant differences between the various levels of parental education. This result is consistent with the life-course hypothesis (Müller and Karle 1993) and with the differential social selection argument (Mare 1981). In the first case, the idea is that individuals become more and more independent from their parents as they grow up, which could translated into more autonomy regarding choices associated with higher education. The latter argument simply states that only motivated and talented students from lower socio-economic backgrounds decide to enrol in the university and, hence, they are quite similar to upper strata students. Finally, the empirical results show that, in general, the economic crisis, coherently with *Hypothesis 4a*, has not aggravated IEO in the choice of field of study but it has had an effect on the desirability of some fields of study across all the social strata considered.

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Appendix

In this appendix, we report the complete models that have been presented only graphically in the main text and a set of additional analysis concerning the operationalisation of field of study (note 8 in the main text).

Complete models

Table A1. Net enrolment rate according to upper secondary school graduation cohort in the province of Trento.

Cohort	Proportion	S.E.
2000	0.586	0.011
2003	0.695	0.010
2004	0.711	0.010
2005	0.675	0.010
2006	0.687	0.010
2007	0.662	0.010
2009	0.649	0.010
2010	0.667	0.010
2011	0.651	0.010
2012	0.582	0.010

Note: this table reports the numerical values regarding figure 2.

Table A2. Binomial logistic regression on enrolment probability.

	Coefficient	S.E.	p-value
Cohort			
2003	0.935	0.978	0.339
2004	-0.603	0.786	0.443
2005	-1.048	0.701	0.135
2006	-0.966	0.646	0.135
2007	-1.033	0.649	0.111
2009	-1.014	0.658	0.124
2010	-1.503	0.669	0.025
2011	-1.257	0.691	0.069
2012	-2.100	0.678	0.002
Parental education			
At least one tertiary	-1.443	0.623	0.021
At least one upper secondary	-2.048	0.579	0.000
At least one lower secondary	-2.533	0.576	0.000
*Parental education*Cohort*			
At least one tertiary*2003	-0.359	1.039	0.730
At least one tertiary*2004	0.956	0.867	0.270
At least one tertiary*2005	1.582	0.787	0.044

At least one tertiary*2006	1.299	0.725	0.073
At least one tertiary*2007	1.569	0.738	0.033
At least one tertiary*2009	1.046	0.730	0.152
At least one tertiary*2010	1.688	0.741	0.023
At least one tertiary*2011	0.873	0.759	0.250
At least one tertiary*2012	0.654	0.744	0.379
At least one upper secondary*2003	-0.609	0.987	0.537
At least one upper secondary*2004	1.103	0.797	0.166
At least one upper secondary*2005	1.357	0.718	0.059
At least one upper secondary*2006	1.421	0.659	0.031
At least one upper secondary*2007	1.286	0.661	0.052
At least one upper secondary*2009	1.238	0.670	0.065
At least one upper secondary*2010	1.649	0.681	0.015
At least one upper secondary*2011	1.194	0.702	0.089
At least one upper secondary*2012	1.101	0.691	0.111
At least one upper secondary*2003	-0.409	0.984	0.677
At least one lower secondary*2003	1.354	0.793	0.088
At least one lower secondary*2004	1.556	0.709	0.028
At least one lower secondary*2005	1.511	0.655	0.021
At least one lower secondary*2006	1.499	0.657	0.023
At least one lower secondary*2007	1.225	0.667	0.066
At least one lower secondary*2009	1.860	0.679	0.006
At least one lower secondary*2010	1.548	0.701	0.027
At least one lower secondary*2011	1.136	0.692	0.101
At least one lower secondary*2012	-0.359	1.039	0.730
At least one lower secondary*2003	0.956	0.867	0.270
Parental social class			
Routine non-manual	-0.125	0.059	0.034
Self-employed	-0.304	0.066	0.000
Working class	-0.546	0.058	0.000
Final grade	0.061	0.002	0.000
Failure			
No	0.194	0.048	0.000
Remedial exam			
No	0.094	0.046	0.040
Track			
Technical	-1.764	0.050	0.000
Vocational	-2.933	0.068	0.000
Sex			
Male	-0.229	0.038	0.000
Constant	-0.423	0.588	0.472
Pseudo-R^2	0.284		
N	20,928		

Note: this table reports the complete model from which are derived the predicted probabilities presented in figure 3. The reference categories are respectively: 2000; Both tertiary; Both tertiary*2000; Service class; Yes; Yes; Academic; Female.

Table A3. Binomial logistic regression on enrolment probability according to the different tracks at upper secondary school.

	Academic			Technical			Vocational		
	Coeff.	S.E.	p-value	Coeff.	S.E.	p-value	Coeff.	S.E.	p-value
Parental education									
Upper secondary	0.296	0.321	0.357	0.455	0.152	0.003	0.684	0.410	0.095
Tertiary	0.452	0.429	0.292	1.569	0.303	0.000	1.375	0.735	0.061
Cohort									
2003	-0.203	0.304	0.503	0.635	0.128	0.000	0.721	0.314	0.022
2004	-0.200	0.307	0.516	0.768	0.135	0.000	1.315	0.299	0.000
2005	0.018	0.321	0.956	0.599	0.127	0.000	0.570	0.290	0.050
2006	-0.218	0.294	0.458	0.703	0.130	0.000	0.499	0.318	0.116
2007	-0.043	0.294	0.884	0.505	0.128	0.000	0.665	0.305	0.029
2009	-0.162	0.296	0.585	0.237	0.132	0.071	0.379	0.304	0.211
2010	-0.311	0.287	0.278	0.392	0.142	0.006	0.717	0.313	0.022
2011	-0.383	0.300	0.202	0.415	0.141	0.003	0.399	0.348	0.252
2012	-1.477	0.315	0.000	-0.959	0.186	0.000	-0.765	0.408	0.061
*Parental education*Cohort*									
Upper secondary#2003	0.084	0.465	0.856	-0.123	0.207	0.551	-0.748	0.541	0.166
Upper secondary#2004	0.239	0.452	0.597	-0.055	0.213	0.798	-1.213	0.520	0.020
Upper secondary#2005	-0.446	0.545	0.413	-0.095	0.205	0.644	-0.214	0.526	0.684
Upper secondary#2006	-0.034	0.428	0.936	0.025	0.208	0.902	-0.363	0.520	0.484
Upper secondary#2007	0.048	0.424	0.909	-0.109	0.204	0.593	-0.734	0.501	0.143
Upper secondary#2009	-0.156	0.418	0.709	0.139	0.203	0.493	-0.282	0.502	0.575
Upper secondary#2010	-0.114	0.407	0.780	0.007	0.214	0.974	-0.971	0.500	0.052
Upper secondary#2011	-0.325	0.413	0.431	-0.338	0.212	0.110	-0.323	0.531	0.543
Upper secondary#2012	-0.131	0.424	0.758	0.221	0.255	0.386	-0.435	0.595	0.465
Tertiary#2003	1.102	0.669	0.099	-0.118	0.443	0.790	0.058	0.921	0.950
Tertiary#2004	0.019	0.595	0.974	-0.112	0.455	0.805	-1.330	1.005	0.186
Tertiary#2005	-0.024	0.584	0.968	-0.078	0.421	0.853	-0.711	1.083	0.512
Tertiary#2006	0.749	0.598	0.210	-0.265	0.423	0.530	-1.806	0.894	0.043
Tertiary#2007	0.342	0.566	0.545	0.021	0.443	0.962	-0.887	0.886	0.317
Tertiary#2009	0.052	0.537	0.923	-0.419	0.399	0.294	-0.505	0.842	0.549
Tertiary#2010	0.026	0.545	0.963	-0.483	0.392	0.218	-0.790	0.920	0.390
Tertiary#2011	-0.245	0.535	0.647	-0.735	0.403	0.068	-1.021	0.895	0.254
Tertiary#2012	0.238	0.540	0.659	-0.776	0.422	0.066	-1.079	0.995	0.278
Parental social class									
Routine non-manual	-0.173	0.142	0.222	-0.136	0.071	0.055	-0.114	0.163	0.484
Self-employed	-0.425	0.165	0.010	-0.303	0.079	0.000	-0.199	0.177	0.260
Working class	-0.697	0.151	0.000	-0.530	0.069	0.000	-0.490	0.152	0.001
Final grade	0.055	0.005	0.000	0.062	0.003	0.000	0.064	0.005	0.000
Failure: No	0.607	0.114	0.000	0.273	0.058	0.000	-0.351	0.112	0.002
Remedial exam: No	0.075	0.110	0.493	0.133	0.056	0.017	-0.010	0.120	0.935
Sex: Male	0.195	0.095	0.041	-0.362	0.046	0.000	-0.185	0.109	0.089
Constant	-2.251	0.414	0.000	-4.904	0.218	0.000	-5.813	0.467	0.000
Pseudo-R^2	0.121			0.159			0.123		
N	7,937			10,439			2,552		

Note: this table reports the complete model from which are derived the predicted probabilities presented in figure 4. The reference categories are respectively: Tertiary; 2000; Tertiary*2000; Service class; Yes; Yes; Female.

Table A4. Binomial logistic regression on enrolment probability according to marks for the *Esame di maturità.*

	Low			Medium			High		
	Coeff.	S.E.	p-value	Coeff.	S.E.	p-value	Coeff.	S.E.	p-value
Parental education									
Upper secondary	0.421	0.198	0.033	0.547	0.193	0.004	0.354	0.243	0.145
Tertiary	1.052	0.293	0.000	2.775	0.540	0.000	0.604	0.443	0.173
Cohort									
2003	0.235	0.178	0.186	0.819	0.180	0.000	0.564	0.196	0.004
2004	0.637	0.185	0.001	0.876	0.179	0.000	0.707	0.221	0.001
2005	0.315	0.172	0.067	0.834	0.173	0.000	0.346	0.193	0.073
2006	0.418	0.174	0.016	0.703	0.176	0.000	0.503	0.202	0.013
2007	0.388	0.172	0.024	0.555	0.171	0.001	0.431	0.207	0.037
2009	-0.043	0.182	0.815	0.300	0.171	0.078	0.315	0.219	0.150
2010	-0.078	0.183	0.669	0.753	0.188	0.000	0.211	0.254	0.407
2011	0.137	0.189	0.470	0.404	0.186	0.030	0.269	0.244	0.272
2012	-0.987	0.230	0.000	-1.082	0.233	0.000	-0.916	0.291	0.002
*Parental education*Cohort*									
Upper secondary#2003	0.027	0.278	0.924	-0.594	0.281	0.034	0.126	0.347	0.717
Upper secondary#2004	-0.125	0.280	0.655	-0.279	0.279	0.317	-0.156	0.353	0.660
Upper secondary#2005	0.024	0.267	0.927	-0.664	0.341	0.051	0.293	0.340	0.388
Upper secondary#2006	0.073	0.272	0.787	-0.143	0.271	0.597	-0.267	0.331	0.420
Upper secondary#2007	-0.296	0.263	0.261	-0.193	0.262	0.460	-0.052	0.337	0.878
Upper secondary#2009	0.252	0.268	0.348	0.061	0.260	0.815	-0.348	0.340	0.306
Upper secondary#2010	-0.040	0.269	0.881	-0.275	0.277	0.321	-0.039	0.370	0.916
Upper secondary#2011	-0.403	0.276	0.145	-0.289	0.274	0.293	-0.314	0.366	0.391
Upper secondary#2012	-0.222	0.323	0.492	0.248	0.313	0.428	0.024	0.411	0.954
Tertiary#2003	1.268	0.473	0.007	-2.170	0.664	0.001	0.606	0.650	0.351
Tertiary#2004	-0.009	0.462	0.985	-2.505	0.676	0.000	0.921	0.867	0.288
Tertiary#2005	0.181	0.428	0.673	-1.796	0.689	0.009	0.362	0.631	0.565
Tertiary#2006	-0.060	0.398	0.880	-1.993	0.626	0.001	0.474	0.650	0.466
Tertiary#2007	0.185	0.418	0.659	-1.561	0.651	0.017	-0.116	0.604	0.847
Tertiary#2009	-0.028	0.405	0.944	-1.705	0.615	0.006	0.427	0.658	0.516
Tertiary#2010	0.312	0.422	0.461	-2.278	0.611	0.000	0.019	0.637	0.977
Tertiary#2011	-0.747	0.418	0.074	-2.130	0.603	0.000	0.472	0.768	0.539
Tertiary#2012	-0.391	0.431	0.364	-1.839	0.630	0.004	0.238	0.590	0.687
Parental social class									
Routine non-manual	-0.159	0.087	0.067	-0.158	0.106	0.134	-0.063	0.121	0.599
Self-employed	-0.299	0.102	0.003	-0.434	0.113	0.000	-0.205	0.138	0.137
Working class	-0.561	0.086	0.000	-0.623	0.104	0.000	-0.480	0.120	0.000
Failure: No	0.324	0.065	0.000	0.093	0.084	0.264	0.126	0.161	0.431
Remedial exam: No	0.272	0.086	0.001	0.251	0.065	0.000	0.037	0.106	0.727
Track									
Technical	-1.884	0.071	0.000	-1.641	0.088	0.000	-1.781	0.111	0.000
Vocational	-3.014	0.114	0.000	-2.855	0.110	0.000	-2.984	0.140	0.000
Sex: Male	-0.330	0.060	0.000	-0.266	0.063	0.000	0.009	0.079	0.914
Constant	1.162	0.154	0.000	1.613	0.179	0.000	2.634	0.245	0.000
Pseudo-R^2	0.242			0.220			0.197		
N	7,093			7,203			6,632		

Note: this table reports the complete model from which are derived the predicted probabilities presented in figure 5. The reference categories are respectively: Tertiary; 2000; Tertiary*2000; Service class; Yes; Yes; Female.

Table A5. Multinomial logistic regression on the choice of the field of study.

	Humanities			Social sciences			Natural sciences			Liberal professions			Health		
	Coeff.	S.E.	p-value	Coeff.	S.E.	p-value	Coeff.	S.E.	p-value	Coeff.	S.E.	p-value	Coeff.	S.E.	p-value
Parental education															
Upper secondary	-0.043	0.193	0.825	0.130	0.228	0.568	-0.438	0.234	0.061	-0.010	0.253	0.968	-0.622	0.310	0.045
Tertiary	-0.278	0.245	0.257	0.653	0.248	0.008	-0.299	0.287	0.297	0.385	0.272	0.156	-0.626	0.404	0.122
Cohort															
2003	0.057	0.178	0.750	-0.030	0.219	0.892	-0.098	0.212	0.644	-0.361	0.259	0.163	-0.041	0.248	0.867
2004	0.165	0.183	0.368	-0.114	0.224	0.612	-0.111	0.220	0.614	0.232	0.253	0.359	0.199	0.250	0.426
2005	0.185	0.175	0.292	-0.104	0.220	0.638	0.030	0.204	0.884	0.030	0.246	0.902	0.030	0.245	0.902
2006	0.257	0.176	0.144	0.103	0.218	0.635	-0.004	0.208	0.985	0.059	0.246	0.811	0.064	0.248	0.795
2007	0.185	0.178	0.298	0.085	0.218	0.695	0.074	0.209	0.723	-0.053	0.256	0.837	0.288	0.242	0.235
2009	0.071	0.196	0.719	0.284	0.223	0.202	0.312	0.214	0.144	-0.459	0.301	0.127	0.598	0.249	0.016
2010	0.395	0.203	0.052	0.503	0.229	0.028	0.384	0.227	0.091	-0.299	0.318	0.346	0.306	0.272	0.262
2011	0.588	0.213	0.006	0.353	0.252	0.161	0.726	0.227	0.001	0.051	0.311	0.870	0.710	0.269	0.008
2012	1.576	0.363	0.000	0.012	0.571	0.983	1.100	0.425	0.010	0.486	0.591	0.411	1.947	0.421	0.000
*Parental education*Cohort*															
Upper secondary#2003	0.226	0.260	0.384	0.123	0.309	0.690	0.339	0.322	0.293	0.722	0.345	0.036	0.493	0.408	0.227
Upper secondary#2004	0.181	0.257	0.481	0.061	0.307	0.842	0.519*	0.314	0.098	-0.286	0.345	0.408	0.121	0.406	0.766
Upper secondary#2005	0.357	0.251	0.155	0.081	0.307	0.792	0.478	0.304	0.116	0.254	0.333	0.445	0.223	0.406	0.583
Upper secondary#2006	-0.176	0.250	0.481	-0.151	0.301	0.616	0.473	0.304	0.120	0.049	0.332	0.882	0.695	0.383	0.069
Upper secondary#2007	-0.102	0.251	0.684	-0.604	0.309	0.050	0.367	0.302	0.224	0.035	0.339	0.919	0.296	0.381	0.437
Upper secondary#2009	-0.125	0.266	0.640	-0.322	0.300	0.283	0.377	0.301	0.210	0.366	0.376	0.329	-0.044	0.385	0.909
Upper secondary#2010	-0.309	0.273	0.258	-0.388	0.309	0.210	0.589	0.311	0.059	-0.070	0.400	0.862	0.584	0.401	0.145
Upper secondary#2011	-0.465	0.286	0.103	-0.152	0.329	0.644	0.207	0.315	0.510	-0.343	0.399	0.390	0.734	0.393	0.062
Upper secondary#2012	-0.916	0.436	0.036	0.238	0.644	0.711	-0.083	0.511	0.871	-0.038	0.666	0.954	0.424	0.529	0.423
Tertiary#2003	0.177	0.324	0.585	-0.529	0.354	0.135	0.359	0.376	0.340	0.318	0.372	0.394	-0.466	0.615	0.449
Tertiary#2004	0.490	0.326	0.133	-0.196	0.355	0.582	0.575	0.378	0.128	0.014	0.363	0.969	-0.159	0.559	0.776
Tertiary#2005	0.122	0.317	0.700	-0.151	0.339	0.656	0.453	0.361	0.210	-0.271	0.365	0.458	0.285	0.534	0.593
Tertiary#2006	0.432	0.315	0.170	-0.890	0.361	0.014	0.788	0.358	0.028	-0.192	0.364	0.597	0.552	0.505	0.274
Tertiary#2007	0.244	0.316	0.440	-0.744	0.351	0.034	0.553	0.362	0.127	0.218	0.361	0.546	0.493	0.494	0.319
Tertiary#2009	0.287	0.327	0.380	-0.658	0.342	0.055	0.321	0.362	0.376	0.261	0.402	0.516	0.225	0.490	0.647
Tertiary#2010	0.080	0.337	0.811	-1.150	0.357	0.001	0.670	0.370	0.070	0.200	0.419	0.633	0.477	0.516	0.356
Tertiary#2011	0.188	0.349	0.590	-0.424	0.376	0.260	0.230	0.381	0.545	-0.004	0.424	0.993	0.423	0.520	0.416
Tertiary#2012	-0.766	0.496	0.123	-0.766	0.703	0.276	-0.038	0.549	0.945	-0.035	0.675	0.959	-0.037	0.627	0.953

Parental social class															
Routine non-manual	0.355	0.070	0.000	0.117	0.081	0.146	0.260	0.075	0.001	-0.031	0.084	0.717	0.414	0.103	0.000
Self-employed	0.137	0.090	0.130	-0.140	0.108	0.194	0.100	0.104	0.337	-0.297	0.127	0.020	0.108	0.131	0.412
Working class	0.436	0.080	0.000	0.101	0.094	0.286	0.372	0.089	0.000	-0.013	0.104	0.901	0.834	0.111	0.000
Final grade	-0.010	0.003	0.000	-0.021	0.003	0.000	0.007	0.003	0.026	0.011	0.004	0.003	-0.034	0.004	0.000
Failure: No	-0.333	0.089	0.000	-0.469	0.096	0.000	-0.154	0.101	0.127	-0.267	0.123	0.030	-0.304	0.114	0.008
Remedial exam: No	-0.463	0.066	0.000	-0.432	0.077	0.000	-0.304	0.073	0.000	-0.151	0.088	0.084	-0.140	0.089	0.114
Sex: Male	-2.180	0.060	0.000	-1.777	0.067	0.000	-0.242	0.059	0.000	-1.182	0.071	0.000	-1.543	0.079	0.000
Track															
Technical	-0.108	0.055	0.052	0.216	0.066	0.001	-0.324	0.060	0.000	-0.665	0.072	0.000	-0.060	0.077	0.437
Vocational	0.498	0.124	0.000	0.260	0.148	0.080	-0.769	0.176	0.000	-1.488	0.251	0.000	-0.146	0.178	0.412
Constant	1.504	0.256	0.000	1.829	0.299	0.000	-1.124	0.286	0.000	-0.929	0.341	0.006	1.828	0.362	0.000
Pseudo-R^2	0.082														
N	13,683														

Note: this table reports the complete model from which are derived the predicted probabilities presented in figure 6. The reference categories are respectively: Tertiary; 2000; Tertiary*2000; Service class; Yes; Yes; Female; Academic. The Eco-Technical field acts as reference category for the dependent variable.

Additional analysis

As robustness check we report here the analyses regarding the choice of the field of study using the operationalisation proposed by Ballarino and Bratti (2009), who present the following fields: Hard sciences; Medicine (with health professions); Technical; Hard social sciences; Soft social sciences; Law; Humanities.

Figure A1. Predicted probabilities of enrolling in different fields of study according to upper secondary school graduation cohort and parental education.