

University performance and dropout risk, family background and wealth: evidence from the new UNITO micro-data

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Abstract

Dropout and students performance before it are notorious critical factors for Italian universities striving to achieve the E.U. strategic goals concerning education and schooling; these difficult issues have been tackled by a vast research literature in recent years, most often using data not fully suitable to the task. To dig deeper into the possible connections between the social, cultural and economic environment young people live at home and the outcomes of their higher education efforts, since 2014/15 the collection of specific information regarding the family background on enrolled students was implemented at UNITO, through a joint initiative with the university administrative offices. Providing information regarding both parents' education and jobs is actually optional for incoming students, but a proper organization of the enrollment form allows to reach high levels of compliance (90% in 2015/16). Such data had never been collected before and are generally unavailable in Italy for whole cohorts of university students; they will allow to obtain a clearer outlook on social inequalities among university students in Turin. In the long run it will also be possible to monitor how such inequalities and their relationship with students careers evolve.

Here the analysis is restricted to the 2015/16 incoming students cohort, and will delve into their background characteristics, first year performance and persistence through second year. When appropriate, bachelor and master degrees will be distinguished, as well as the chosen fields of study.

The full dataset created for the task combines information from ANS (*Anagrafe Nazionale Studenti*, the national census of university students in Italy) with that regarding students families obtained from UNITO administrative staff, including the value of ISEE (*Indicatore della Situazione Economica Equivalente*, an index that summarizes the family's income and wealth level) when available (being required only when applying for scholarships, a large minority of students do not disclose it). Assuming that nondisclosure implies a high ISEE value, it could be used as a proxy for the actual budget constraints students must cope with. This approach, however, has some limitations that we will try to assess here.

1. Introduction

Education is nowadays the pathway to adult life for all individuals in most societies, lasting many years (from ten to twenty in European countries) and having a large impact on the subsequent outcomes in terms of jobs and quality of life. It is also the field where social mobility, i.e. the ability of the individual to reach any level of social and economic status thanks to his/her intelligence and effort, whatever the family background, is shaped. When school choices and performance are strongly dependent on families social class, this paves the way for a low level of social mobility, given the strong correlation between education and jobs types and retributions. Due to this, research work on how, when and to what extent family background affects the education experience of young individuals has a long history and remains to this day one of the most debated topics among social scientists.

The seminal work by Boudon (1974) on the decomposition of how social class background affects educational careers established the distinction between primary and secondary effects as one the keys to better understand these mechanisms. Primary effects end up in differing pupils performances induced by parents be-

haviour, culture and attitudes in their home environment; secondary effects bring about different choices in educational careers, related to class, even when students with equal performance levels are compared. And while primary effects are implicit in the family's child rearing role and relatively difficult and expensive to tackle, secondary effects can potentially be affected and limited by policies through counseling (Barone *et al.* 2017), incentives, merit-based regulations. Moreover, differences caused by primary effects do not explicitly contradict a meritocratic paradigm, even if they expose its partial fallacy precisely because what it is implied is that "merit" is easier to get when you come from an affluent, successful family.

This classification has been commonly and extensively evaluated looking at the moment of upper secondary track choice, a step that has, in many countries, deep implications on the future of the individual. Potentially the concept can be extended to consider the further choice to enter tertiary education, considering as "primary effects" all previous career, while the secondary effects are represented by the differences in enrollment propensity related to social class given equal choices and performance in previous school history. In Contini and Scagni (2013) this was applied to the university enrollment choice in Italy via data from ISTAT sample surveys. Results showed that Italy is a strong "secondary effect country" when considering upper secondary track choice as well as the university enrollment decision. Most other western countries have lower secondary effects (Jackson, 2013).

Of course, although the educational parable is nearing its highest reaches, further choices *and* performance efforts are to be made after university enrollment as well. The two factors are closely intertwined as the main choice remaining, i.e. whether to achieve graduation or give up without obtaining a degree, can be made any-time during tertiary studies and usually follows a sustained period of poor performance.

The decision of dropping out of university studies after enrollment is quite common in Italy (although the dropout rate appears to be slightly decreasing in recent years, see ANVUR, 2018), and is considered a significant inefficiency problem for the Italian tertiary education system, contributing to the still too low rate of graduates in the general population when compared with the EU targets. It is therefore an appropriate target of analysis for social inequality evaluation (see for example Ghignoni, 2017; Aina, 2013; Vignoles e Powdthavee, 2009; Di Pietro, 2004).

While university careers are today very efficiently recorded by the *Anagrafe Nazionale degli Studenti* national database (ANS), data on tertiary students social background are not included; nor it is possible to exploit AlmaLaurea¹ data since these, while including detailed indications on family background, are by definition restricted to graduates only.

At Turin University, one of the largest mega-institutions in Italy with a community of over 75.000 students, the *EqualEducToEmploy* (<http://www.equaleductoemploy.unito.it/>) research project has in recent years examined social inequalities in higher education students careers, with specific reference to dropouts, time to degree and then job entry (Contini *et al.*, 2018; Contini *et al.*, 2017). In this context, to gain a deeper understanding of the possible "secondary-effects" link between the outcome of their studies and the family origin, allowing to extend the analysis described above, starting from the year 2014-15 and thanks to a joint initiative with the university administrative management, the missing data have been collected within the framework of the freshmen enrolment procedure. Answering the related questions was optional for students, but the response rate has been fairly satisfactory right from the start, with 89% of responses obtained in 2015-16.

This kind of data, never previously collected and in general not available in Italy for complete cohorts of university students in terms of social background, allows to shed light in a straightforward and reliable way on social inequalities in university studies at the University of Turin. In addition, the accumulation over time of such information for multiple cohorts will make monitoring the evolution of these inequalities and their relation to students performance possible.

The present analysis focuses on the 2015-16 enrolment cohort, starting from a look at the characteristics of these students, their performance during the first year and the (possible) continuation of their studies in 2016-17. When appropriate, the master's and three-year degrees will be distinguished, as well as the field of study.

The database created for the purpose combines information derived from National Student Registry (ANS - *Anagrafe Nazionale Studenti*) with the recorded details on the family background obtained directly from the University administrative offices. It also includes, for the students who optionally disclose it, the value of the ISEE index (*Indicatore Situazione Economica Equivalente*), a standardized measure of family wealth, in-

¹ AlmaLaurea is a consortium of more than 60 Italian universities that collects data about their graduates, promoting their entry into the job market and monitoring their work histories up to 5 years after graduation, as related to the university experience. It is now part of the *Italian National Statistical System*.

cluding all members incomes and assets. ISEE could be considered as an approximate measure of the economic well-being, helping to better define the status of students families, assuming that in non-disclosure cases its value is always large enough not to allow any enrolment fee reduction. In Section 4, issues related to the use of ISEE in this context will be examined in more detail.

2. A snapshot of the 2015/16 enrolment cohort

Students considered include both those enrolled in undergraduate courses, or in five years degrees, as well as those in master courses, who answered (at least in part) the questions regarding their parents' educational qualifications and profession, with the distribution shown in the Table 1.

Table 1. 2015/16 enrolled cohort by course type

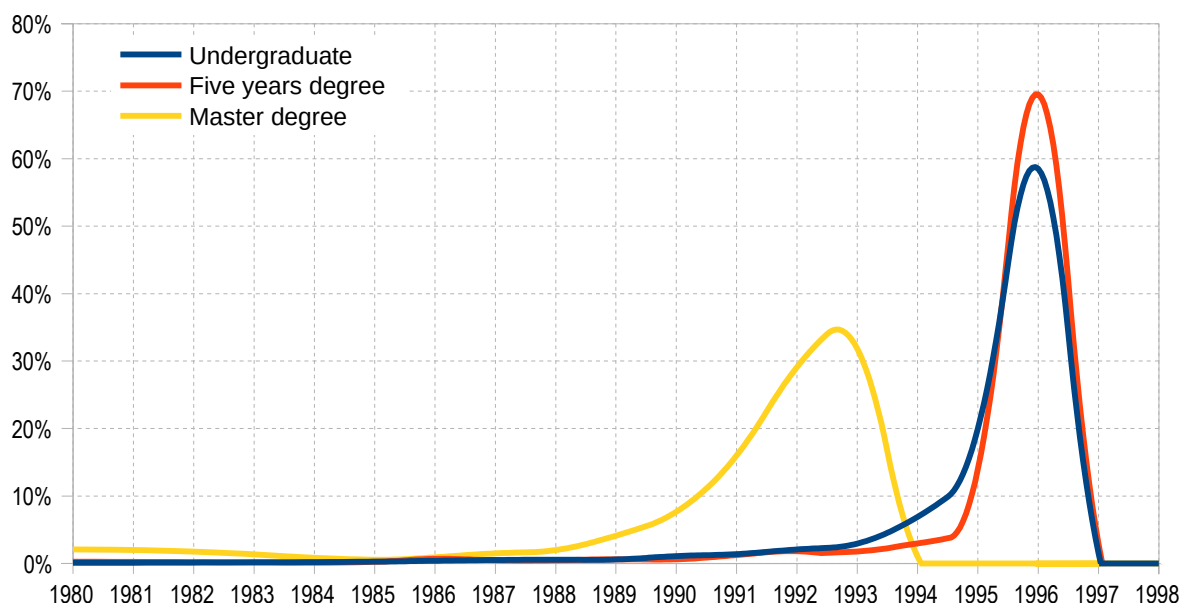
	<i>N. students</i>	<i>%</i>
Undergraduate	10.699	66,0%
Five years degree	1.422	8,8%
Master degree	4.089	25,2%
<i>Total</i>	<i>16.210</i>	<i>100,0%</i>

Their gender and age distribution are shown in Table 2 and Figure 1. As common nowadays, females are prevalent, very strongly so for five years degrees (i.e. Law, Education, Medicine and Pharmacy). The age range of students of master degrees appears broader and heterogeneous, while five years degrees are those with the more homogeneous age of entry, even more than for undergraduates.

Table 2. 2015-16 enrolled cohort - gender

	<i>Undergraduate</i>	<i>Five years degree</i>	<i>Master degree</i>	<i>Total</i>
Male	40,6%	29,8%	40,3%	39,6%
Female	59,4%	70,2%	59,7%	60,4%
<i>Total</i>	<i>100,0%</i>	<i>100,0%</i>	<i>100,0%</i>	<i>100,0%</i>

Figure 1. 2015-16 enrolled cohort by year of birth and course type



Classifying by broad fields of study, as done in Table 3, a quite balanced share is obtained among the sci-

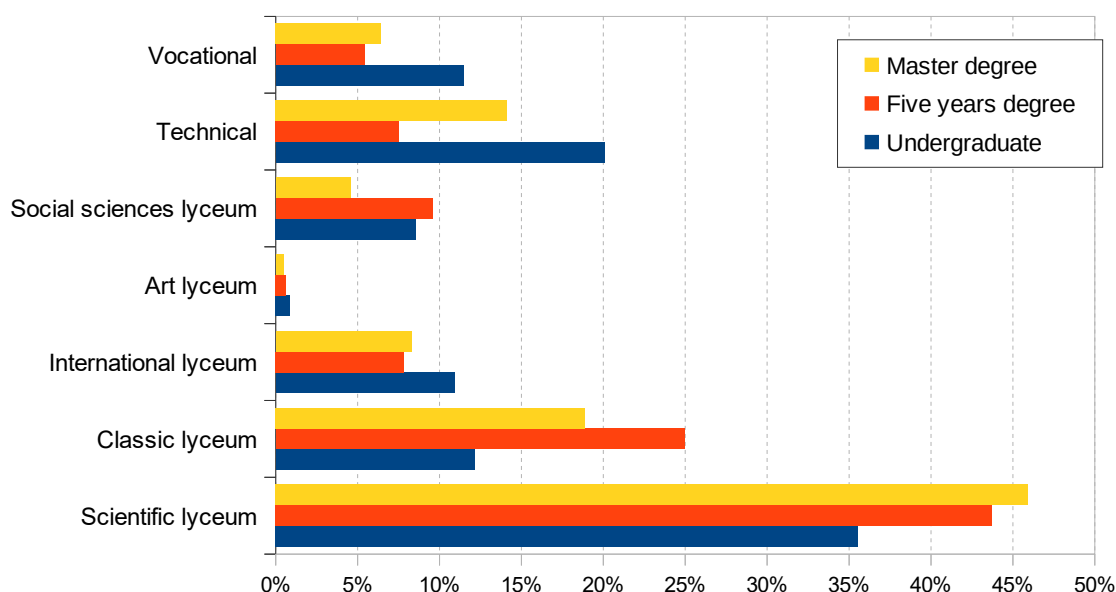
entific, humanities and socio-economic fields, all close to 30%, complemented by the more specific medical and law sectors of smaller size.

Table 3. The 2015-16 enrollment cohort by fields of study

	Number of Students				% by fields of study			
	Under-graduate	Five years degree	Master degree	Total	Under-graduate	Five years degree	Master degree	Total
Medical	970	226	80	1276	9,1%	15,9%	2,0%	7,9%
Scientific	3009	312	959	4280	28,1%	21,9%	23,5%	26,4%
Political sciences	1882	0	627	2509	17,6%	0,0%	15,3%	15,5%
Law	208	575	0	783	1,9%	40,4%	0,0%	4,8%
Humanities	2796	309	1398	4503	26,1%	21,7%	34,2%	27,8%
Economics and statistics	1834	0	1025	2859	17,1%	0,0%	25,1%	17,6%
<i>Totale</i>	10699	1422	4089	16210	100,0%	100,0%	100,0%	100,0%

Previous school history is characterized by a marked prevalence of lyceum diplomas, especially for five years and master degrees; again the entry selection depending on previous experiences is clear – there are twice as many enrolled from professional diplomas in undergraduate courses than the other two categories, falling from 12 to 6%. The distribution for Turin is however in line with the rest of the country on the whole university system (comparing it with the ANS aggregated data).

Figure 2. High school track of enrolled by degree type



The final diploma exam mark of enrolled students also shows a certain entry selection at the entrance: Table 4 compares the distribution of marks for Piedmont upper secondary students 2014-15 (MIUR – Education Ministry - data) with that for those enrolling in UniTO undergraduate courses the following year. The lowest marks are halved, while marks in the range 61-70 are also less present than in the regional cohort; conversely marks over 80 are more frequent, and top marks (100) especially so.

Table 4. High school final exam mark for the 2015-16 enrolled cohort – undergraduate courses

Marks	% UniTO	% MIUR Piedmont
60	4,5	9,0
61-70	24,4	32,1
71-80	31,7	29,4
81-90	23,0	18,5
91-99	10,1	6,9
100 - 100 laude	6,3	4,1
<i>Total</i>	100	100

3. The family background of the enrolled cohort

The parents educational qualifications and jobs were collected using response categories similar to those used by the AlmaLaurea consortium in their graduates survey, to ensure comparability. Figures 3-6 show the results.

Some significant differences in the background composition for the three types of degrees courses arise:

- parents with unskilled jobs (especially fathers) are more frequent among undergraduates;
- clerical and teaching-related jobs are prevail among mothers, while the picture is more heterogeneous for fathers (with a greater incidence of freelance professionals);
- the frequency of housewives is rather limited, particularly for five years degrees;

Figure 3. 2015-16 enrolment cohorts – mother education

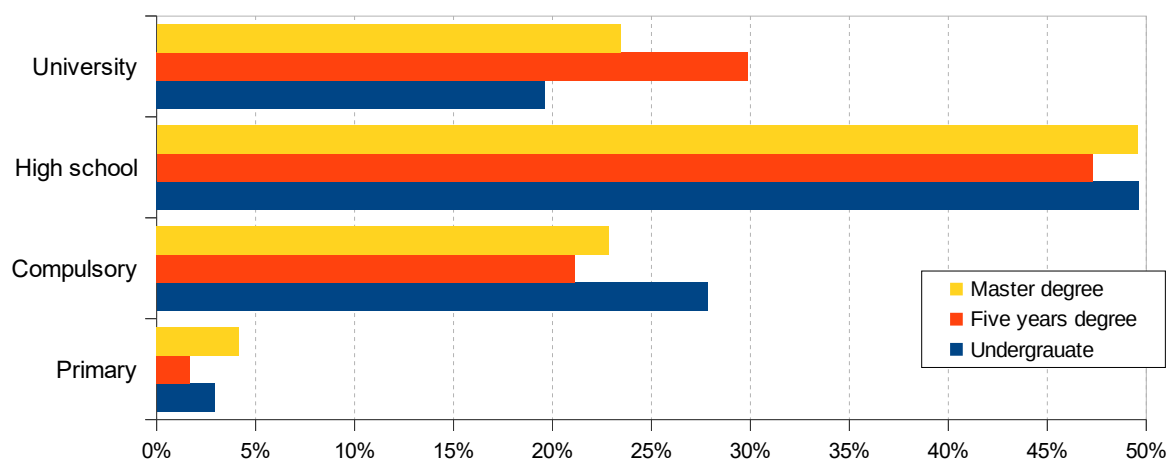


Figure 4. 2015-16 enrolment cohorts – father education

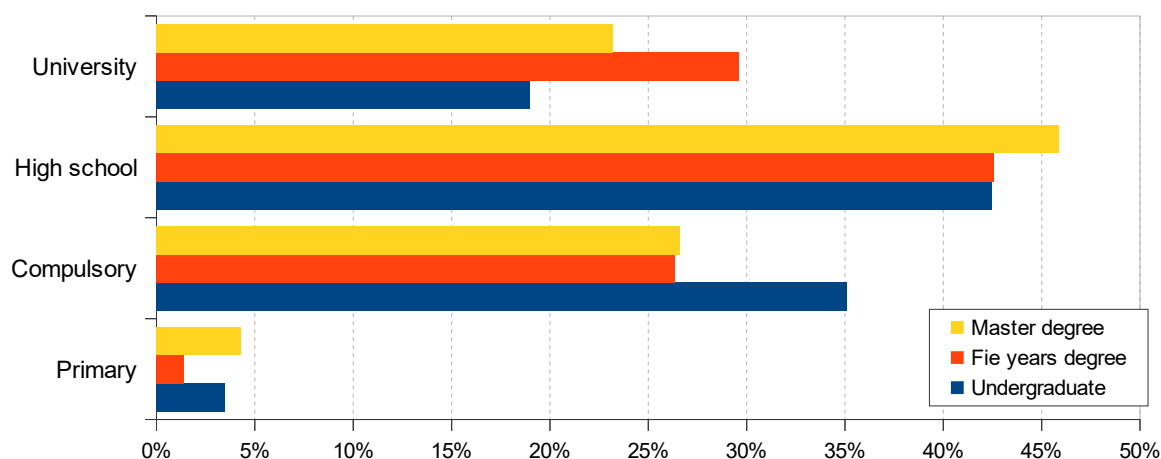
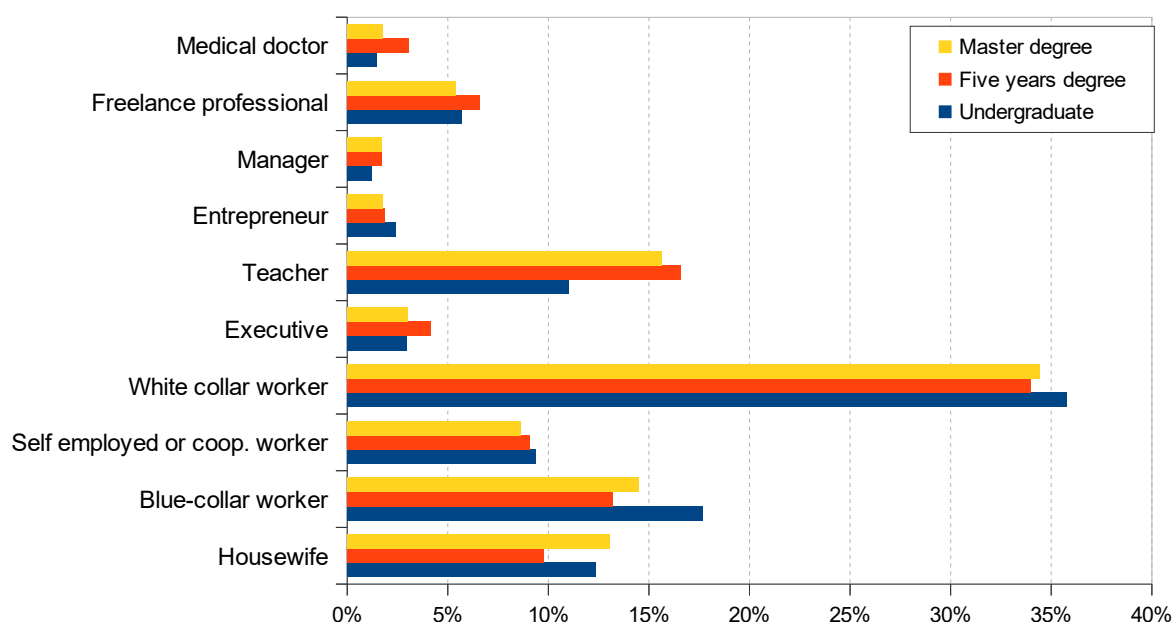
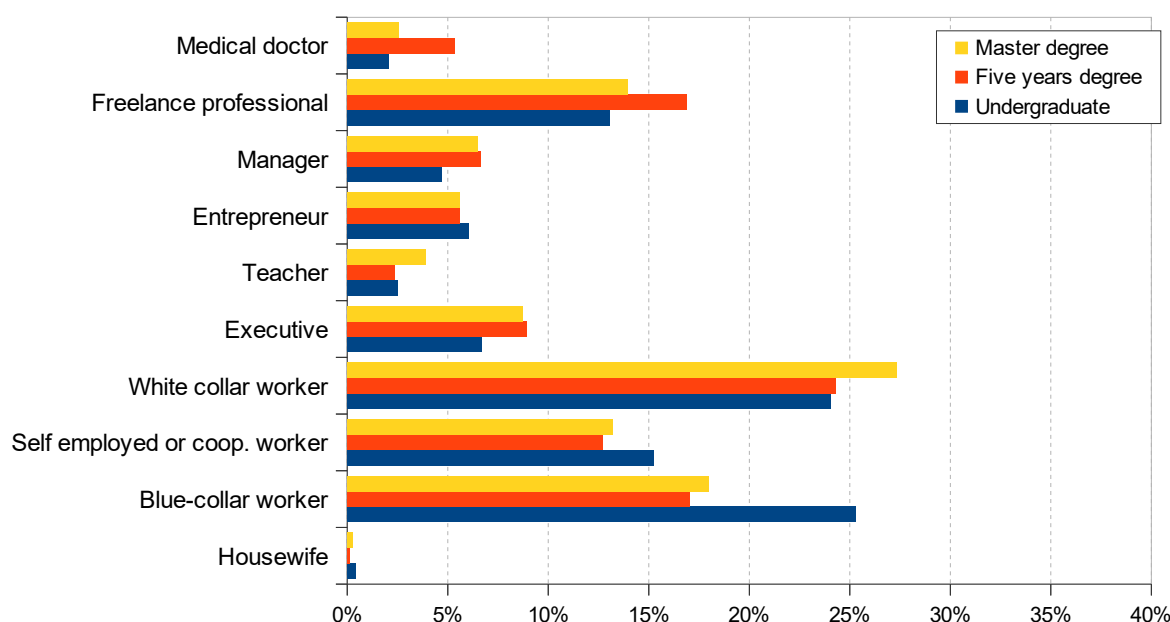


Figure 5. 2015-16 enrolment cohorts – mother job



- fathers who are freelance professionals are more frequent among students enrolling in five years degrees, which are mostly devoted to prepare for the same jobs, confirming the traditional social immobility in this area;
- there are no strong differences between mother and father education distributions, while they change somewhat comparing students entering three-year degrees rather than a master degree; the disparity is even sharper between three-year degrees and five years degrees;
- comparing these data with educational qualifications in Piedmont for the reference demographic group of parents of the 2015/16 enrolled cohort (age 20 to 40, i.e. born between 1956 and 1976 - 2011 Census data) a prevalence of more educated families can be detected, with a graduate rate of 19% compared to 14% for the reference population. Even parents with upper secondary diplomas are more frequent in enrolling students families, at 45% against 32% for the general population (note the difference between mothers and fathers in Tabs. 5 and 6: 49.6% of mothers have upper secondary education, against the lower 42.5% figure for fathers).

Figure 6. 2015-16 enrolment cohorts – father job



It is interesting to note that the gender prevalence highlighted in Table 2 comes together with a certain difference of origin in terms of parents' education: male students tend more than females to come from families with a high cultural background (Table 5). For example, females have fathers with compulsory education in 35% of cases, against 28% of males, and the opposite holds for graduate fathers (present in 19% of families of new female students but in 24% of those of males). This is similar for mothers education, and happens for all types of courses (not shown in Table 5). In other words, females appear to be at the forefront of social mobility more than males in terms of education.

Table 5. Parents education by students gender

Genere dello studente	Male	Female	Male	Female
<i>Educational qualification of...</i>	<i>mother</i>		<i>father</i>	
Primary	3,1%	3,1%	3,3%	3,6%
Compulsory	23,3%	27,8%	28,5%	34,6%
High school	50,2%	48,9%	44,5%	42,6%
University	23,5%	20,2%	23,7%	19,2%
Total	100,0%	100,0%	100,0%	100,0%

Among students enrolled in 2015-16, the correlation between parents education and the high school track of their children is very strong, as shown in Figure 7: 46% of those coming from families with at least one graduate parent attended a scientific lyceum, compared to 15% among families with the minimum level of parental education. The opposite holds for professional and technical diplomas: for the latter, the same figures stand at 8% against 38%. The choice of upper secondary school track, therefore, appears as expected to be the crucial turning point where socio-cultural background inequalities define the school - and life - trajectories of young people.

The situation is rather different if we look at the performance in high school, as expressed by the final diploma exam mark. Figure 8, in fact, shows that for the examined cohort the average marks do not differ significantly among students when classifying them by parents education: there is no relevant trend that sees the average grade increase as the parents' education increase. In general, the average marks of students coming from classical lyceum are slightly higher (although this is not so for scientific lyceum²), but the differences between parents' different school backgrounds are very small.

² The vertical differences between the lines are affected by the different approaches in the assignment of the grades followed in each track and are therefore not a fully reliable.

Figure 7. 2015-16 enrolled cohort - high school track by parents highest education

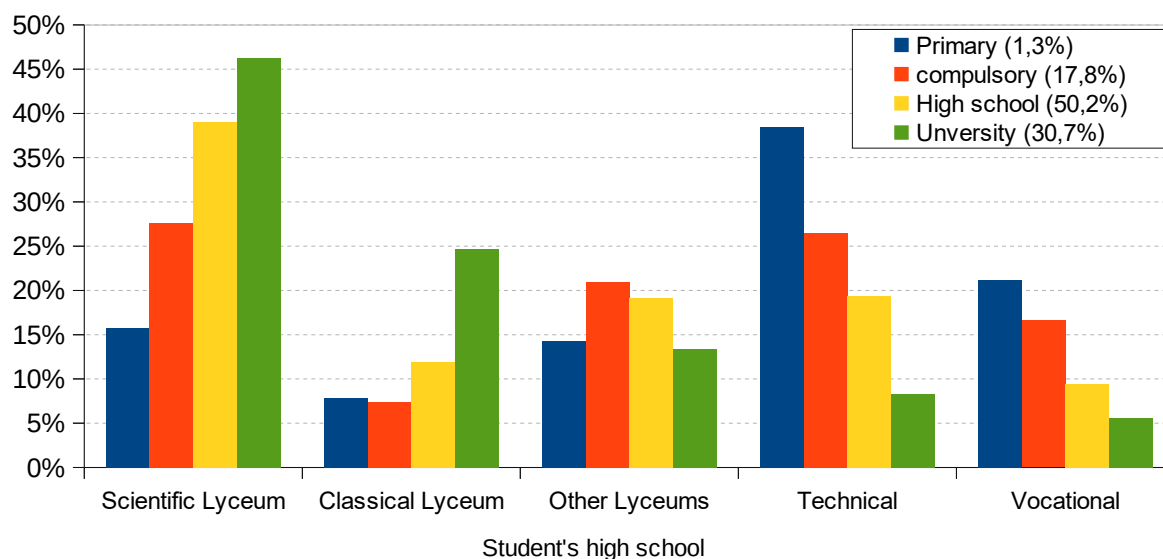
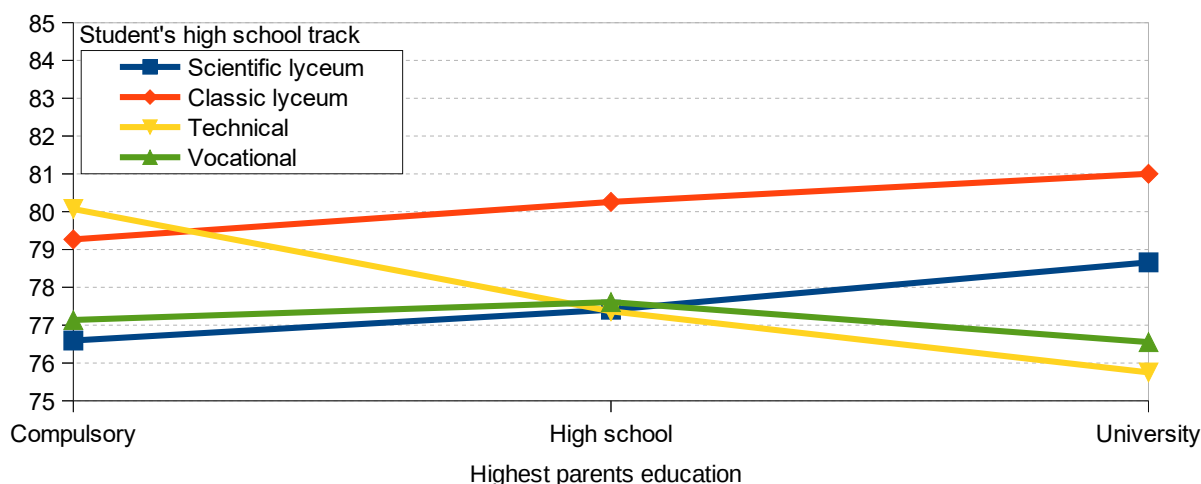


Figure 8. High school final exam mark by track and parents highest education



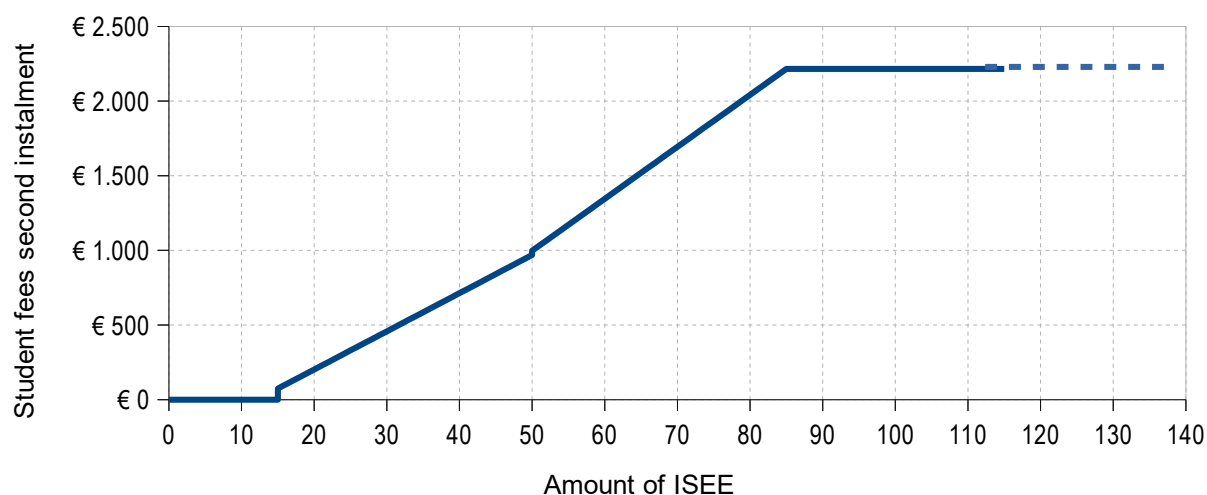
University enrollment appears thus to filter students based on performance, since the average high school final exam mark for the general population of high school students is more strongly linked to the parents' educational qualification³.

4. ISEE, family income and wealth

After having paid a flat first instalment at the beginning of the academic year, the second instalment of student fees for UniTO has an amount that is directly related to the ISEE. Over time the algorithm determining the second instalment have slightly changed, and is currently based on four bands, with different treatments, as described in Figure 9.

³ See for example the ISTAT Survey "Percorsi di studio e lavoro dei diplomati", 2015

Figure 9. Students fees second instalment by ISEE value (thousands of €)



For ISEEs up to € 15,000 no fee is due; for higher values fees increase linearly, by € 26 for each additional € 1,000 of ISEE (up to € 50,000) and then by € 35 for every € 1,000 up to ISEE values of € 85,000. Beyond this threshold fees stay constant at a level of approximately € 2,200. The lower the ISEE, therefore, the more the student is encouraged to disclose its value.

As already mentioned, in fact, ISEE disclosure is optional, and students who do not reveal it are automatically required to pay the maximum fee. However, in some cases students who are considering to quit during their first year will decide to do so before the second instalment paying deadline, thus avoiding payment but making the ISEE disclosure useless (for 2015-16, 4.8% of the first year cohort did not pay the second instalment). This behaviour emerges clearly considering the ISEE non-disclosure rates and the rates of students who do not continue to the 2nd year among students who do not pay the full fees⁴, both shown in Table 6. The percentage of students not declare their ISEE goes from 30 up to 82% among those who have not paid the entire contribution; at the same time, the rate of first year dropouts among the latter is around 89%, while it does not exceed 10% for those who pay full fees.

Table 6. First year dropout, fees payment and ISEE*

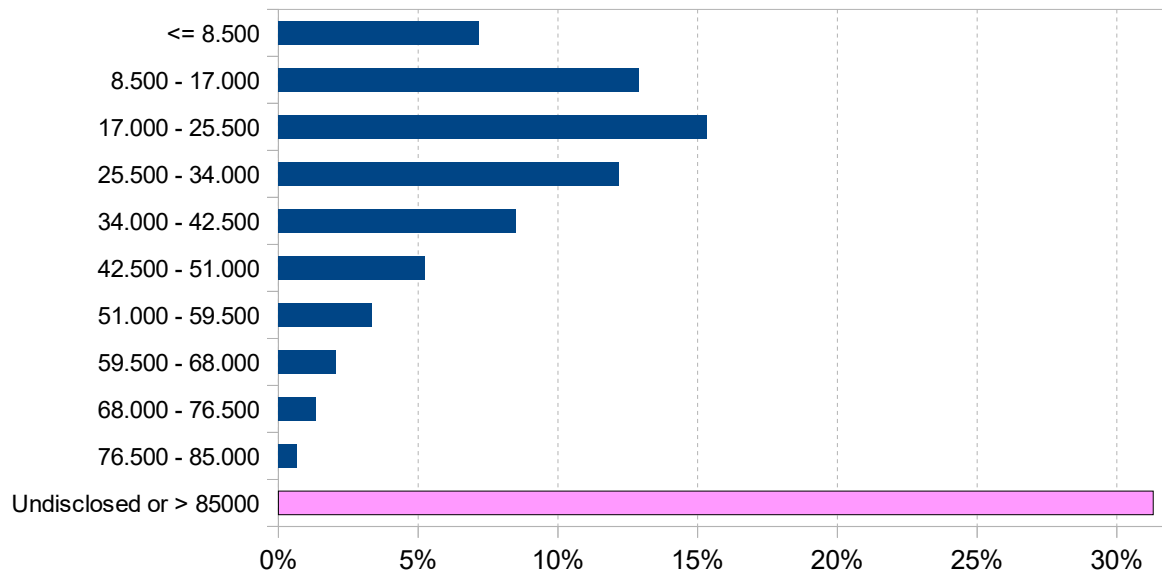
Fees payment	ISEE undisclosed	ISEE disclosed	Total	First year dropout	Continuing to 2° year	Total
Paying the full amount	30,6%	69,4%	100%	9,9%	90,1%	100%
Not paying second instalment	82,2%	17,8%	100%	88,8%	12,2%	100%
Total	33,2%	66,8%	100%	13,3%	86,7%	100%

*Data regarding students not fully exempted from fees payment only.

It follows that the assumption that an undisclosed ISEE is due to high income values that would not allow any fees reduction is plausible only among those who have paid the full fees. Due to this, Table 9 presents the distribution of ISEE values only for the latter students (95.2% of the cohort).

⁴ The data is available from ANS.

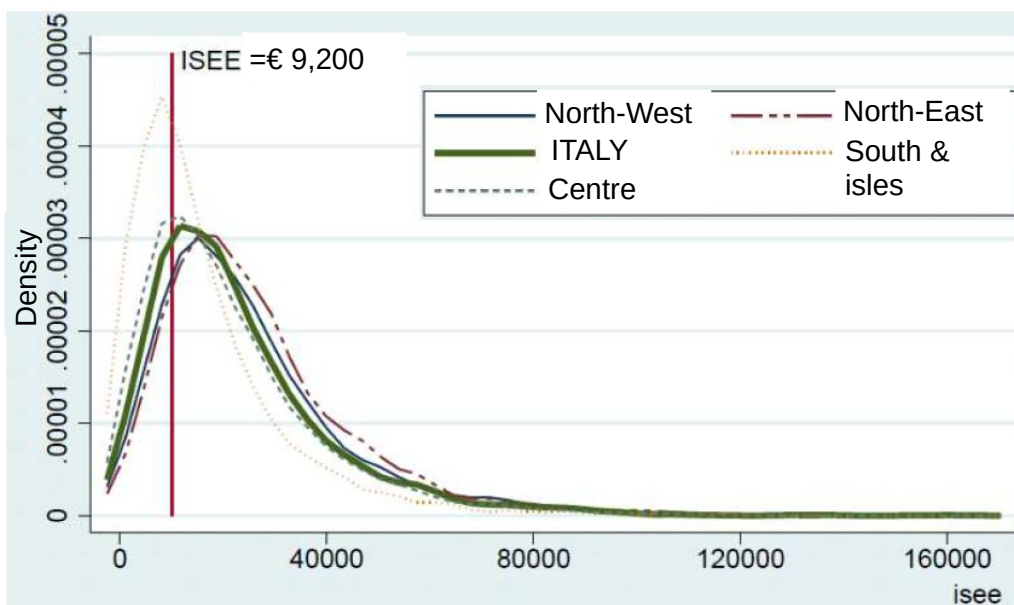
Figure 9. ISEE values declared by students paying full fees (relative frequencies)



*Data regarding students not fully exempted from fees payment only.

Overall, almost 28% of those disclosing ISEE obtain a complete exemption of the second instalment (this being 18% of the entire cohort). Clearly the observed ISEE distribution cannot be considered an estimate of the distribution of family income for university students: first of all, because students with an ISEE exceeding € 85,000 are expected not to declare it. It is not plausible, however, to assume that all the students not disclosing have a value above the threshold, and attribute to them a reference value (such as € 100,000), as an approximation: this would mean that 30.6% of the students cohort who paid full fees are above the threshold. In fact, appears unlikely that with just the 7.6% of ISEE values between € 50,000 and € 85,000, the frequency will *quadruple* for values over € 85,000 that represent the extreme right tail of the distribution. Compare this with the general 2008 ISEE distribution in Italy and in the north-west in particular (Buccioli et al., 2014, Figure 10): even taking into account that ISEEs for families of university students could be somewhat greater than for the general population, it is starkly clear that values above 85,000 do not even remotely come close to 30% of the whole distribution.

Figure 10. ISEE distribution in Italy, by macro-area - year 2008 (Buccioli et al., 2014)



The actual ISEE values for the non-disclosure cases are, in the end, unknown and difficult to identify, also

because the reasons motivating the non-disclosure for students who could declare values below € 85,000 are not easy to conceive.

To better assess the meaning of this quantity in terms of students family background, we examine the relationship it displays with the family characteristics described in Par. 3. A significant correlation between family wealth and its cultural and professional status should, in general, be expected. Figure 11 shows the average ISEE trend based on each parent education. The relationship is clear as the average ISEE almost doubles passing from parents with basic school titles to university graduates. This is even slightly more accentuated for fathers. Figure 12 shows similar data, this time classifying by job type. Again, strong differences emerge: the jobs associated with the highest ISEE averages are those expected to be at the top, as doctor, manager, entrepreneur, freelance professional.

These analyses, however, leave those not disclosing their ISEE out: how do the two factors relating to the family background behave for this sub-group? The more they are concentrated on the same modes that prevail among the students declaring high ISEE values, the stronger is the possibility that a significant part among undeclared ISEEs are actually high values themselves⁵.

Figure 11. ISEE averages by parents education (students paying full fees only)

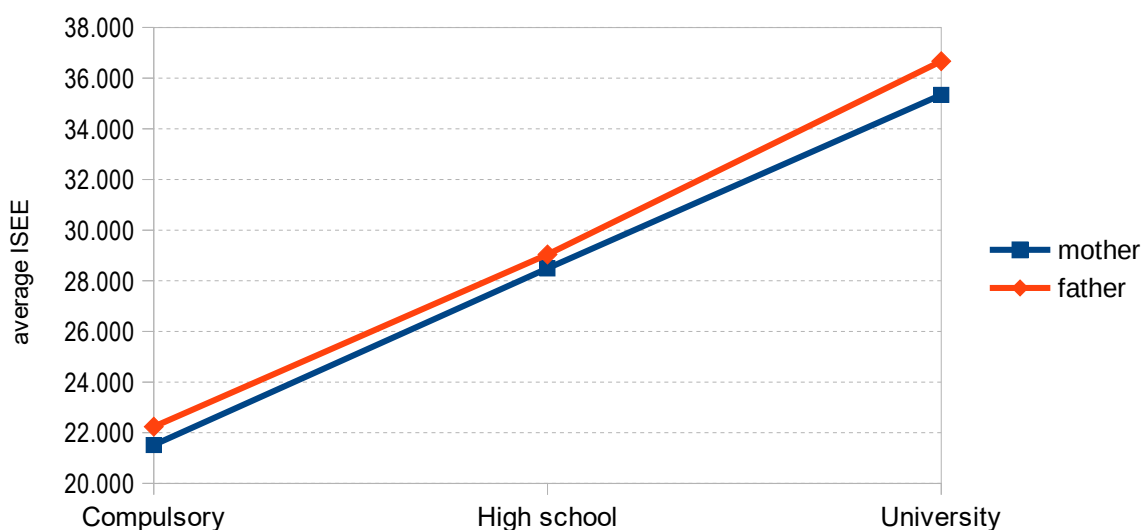
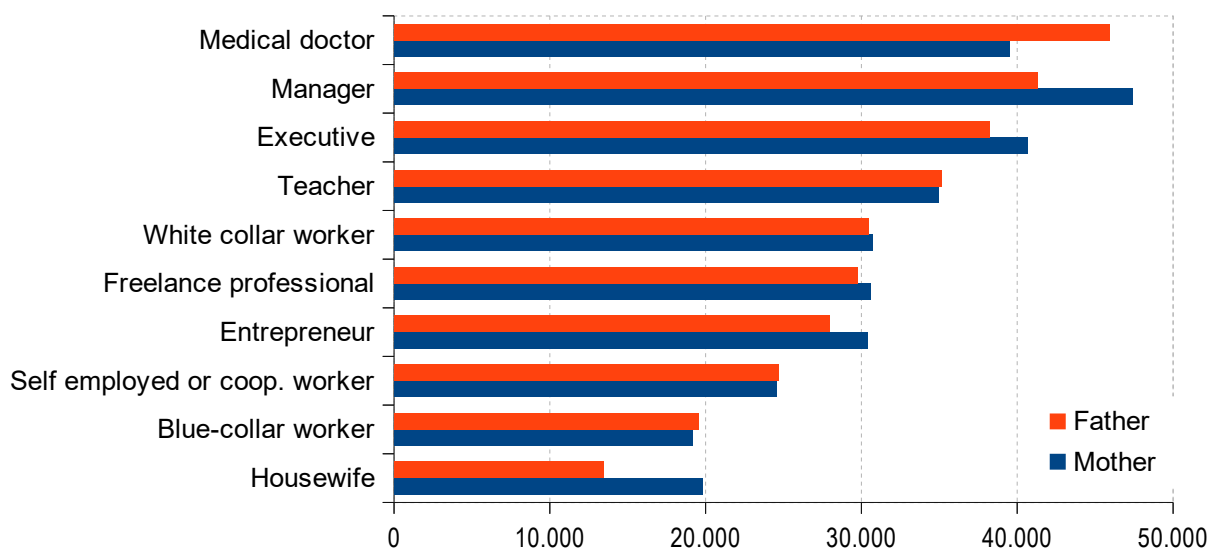


Figure 12. ISEE averages by parents' job (students paying full fees only)



This hypothesis is partly, but not entirely, confirmed by results shown in Figures 13, 14 and 15. The first one

⁵ All cases not paying the full fees for first year are again excluded.

shows a more than double share of fathers who are university graduates among non-disclosers, and conversely a much lower presence of families with low education parents; however the situation is somewhat ambiguous as there remains a 20% of families with compulsory education even among non-disclosers. Figure 14 looks at this from a different point of view by computing the split between disclosures and non-disclosures for each family type in terms of parents maximum education. For this display an additional category is included, grouping the families in which *both* parents are university graduates. Again, differences are significant but not exhaustive; note also that the double university education cases differ markedly from those where a degree is coupled to a lower education level, with the non-disclosers share rising from 40 to 55%.

Similarly, Figure 15 shows strong disparities in the frequencies for children of blue- and white-collar worker fathers (much more frequent among disclosers, especially for blue collar workers), and an opposite difference for jobs where high incomes are plausibly expected (jobs are ordered by the magnitude of the discrepancy between the two shares).

Figure 13. Father education by ISEE disclosure or non-disclosure (full fees paying students only)

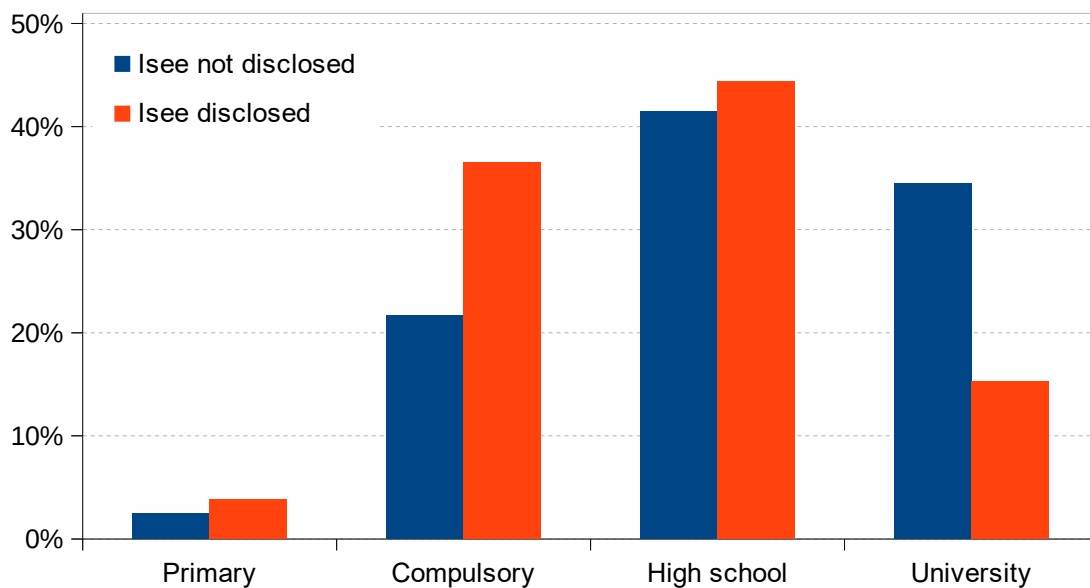


Figure 14. Shares of students disclosing ISEE by maximum parents education level (or double university) (full fees paying students only)

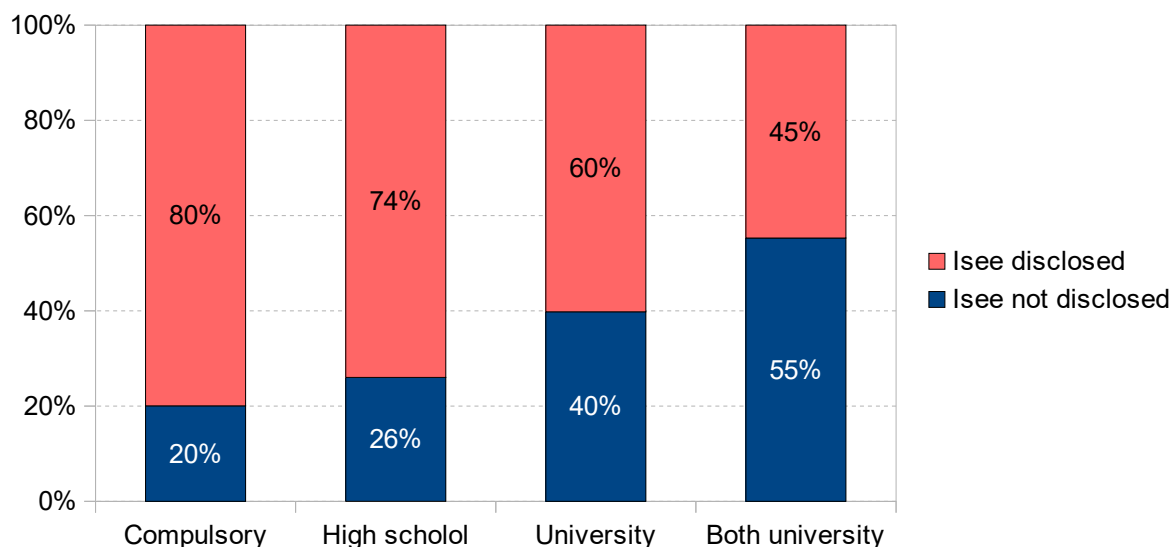


Fig. 16 relates to the same data of Fig. 15, however here they are displayed in terms of quotients: each bar

shows, for a specific father's job type, the ratio between ISEE non-disclosers and disclosers. For example, it is 5.56 times more frequent to find students whose father is a doctor between those who did not disclose ISEE than among those who did; on the contrary, among children of blue collar workers the non-disclosers, are only 37% of the disclosers.

Again, despite the clear differentials, it seems difficult (perhaps even more than concerning education, since the job type could be more directly related to income) to assume that all ISEE non-disclosers actually have values above 85,000 €. For example, non-discloser students with a blue collar worker, low-educated father are 18% of this subset; but it hard to imagine that 18% of families with such a profile enjoy such high incomes and/or valuable assets. Therefore, in all likelihood the non-disclosers subgroup mixes cases with values actually above 85,000€, certainly significantly present, with families with ISEEs well below it; for the latter, the reasons for non-disclosure may be linked to information asymmetries, fears on the confidentiality of the data, or other unknown motives. A direct survey of this issue in the near future would certainly be beneficial to better understand behaviour here.

Figure 15. Father's job by ISEE disclosure or non-disclosure (full fees paying students only)

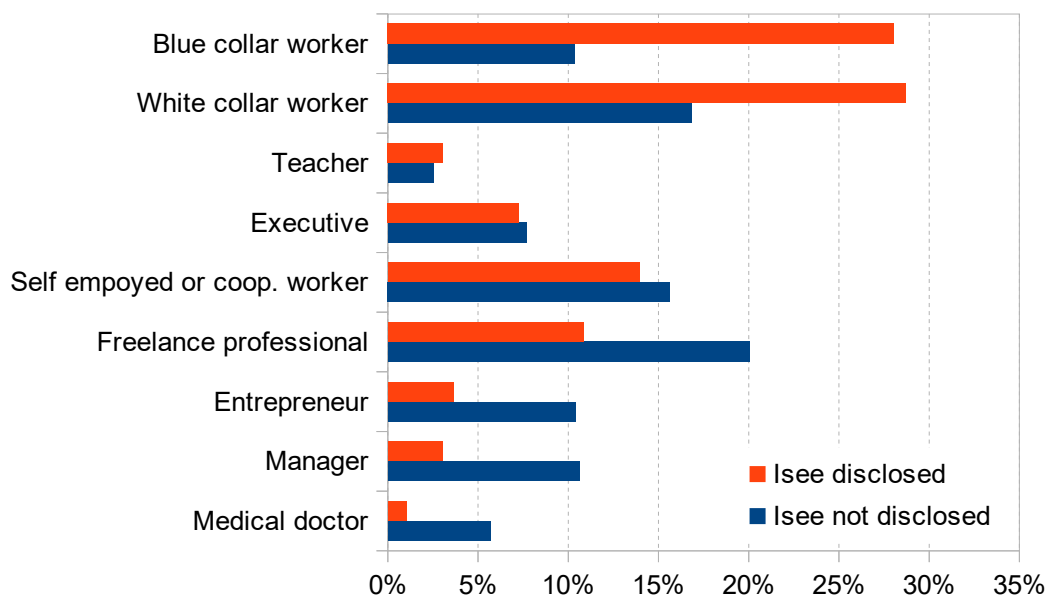
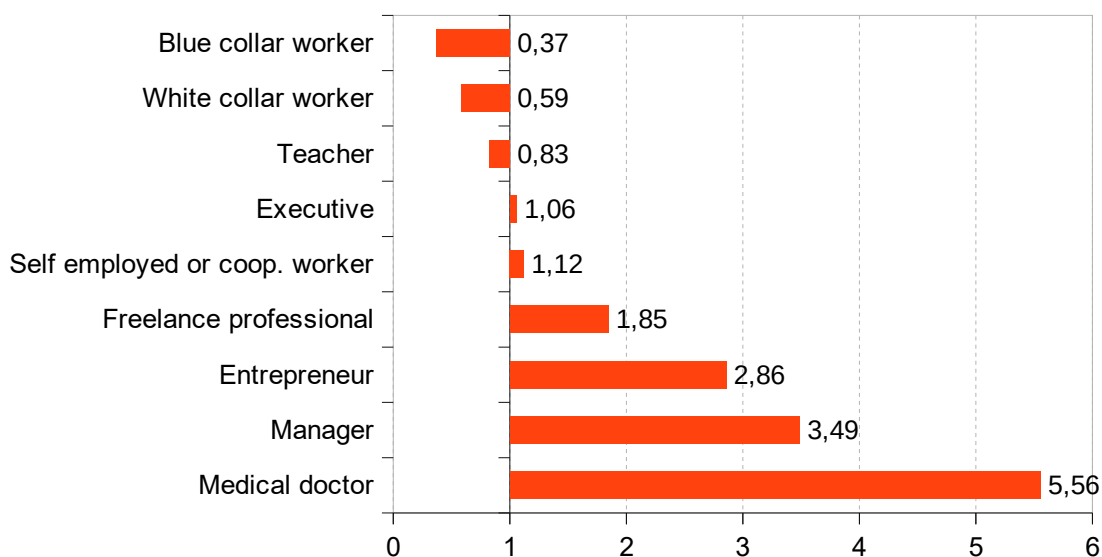


Figure 16. ISEE non-disclosers vs. disclosers ratio for father's single job types (full fees paying students only)



5. First year dropout and family background

As well known, the dropout phenomenon in tertiary education is particularly significant in Italy compared to other European countries, and has long been identified as a critical inefficiency factor for Italian universities, making it difficult to achieve the EU goals in the field (Horizon 2020). The problem is multifaceted, as it concerns:

- the inefficiency in the use of human and structural resources, both needed to manage the first years of a "funnel" system with a large gap between the numbers of enrolled and graduates;
- the actual role of the dropout mechanism as a filter for qualitative student selection;
- the inequalities among the enrolling students who affect the dropout risk;
- the possible policy tools that allow to decrease the number of dropouts without compromising courses quality and rigour.

Furthermore, if we move beyond the generic meaning of the dropout concept, the complex nature of the phenomenon and the various ways to measure it emerge:

- Potentially, being a dropout is not necessarily a definitive condition: those who dropped out can obviously decide to reverse course and resume their studies after a certain amount of time. Students who leave but then resume their tertiary studies are far from an insignificant number (around 3.3% of those enrolled in the years 2005-2010 at UniTo, of which 44% after a year off, 24% after two years and the remaining 32% after an even longer break).
- The dropouts count can be made with reference to the institution, or to the individual student status. For example, a student who moves from Turin University to Turin Polytechnic (or vice-versa), is a dropout case for the originating university, but not for the individual, who actually continues his studies.
- The incidence of drop-outs can be assessed only over time; in order to have an overall picture on the behaviour of a given enrolment cohort you have to wait a considerable number of years, even more than the official course duration, given the longer average time to graduation.
- Since the factors that affect the decision to drop out may differ between first-year and following years students, it is useful not only to study the overall dropout probability, but also the timing of the phenomenon.

The reference data for the analysis of dropouts in Italian universities are today those obtainable from the National Student Registry (ANS). At the national aggregate level, ANVUR (the national monitoring agency for tertiary education and research) assesses the performance of the university system using the ANS data with an eye on dropouts as well. Table 7, taken from the 2016 ANVUR Report on the Status of the University System (ANVUR, 2016), provides a quantitative overview of university careers progress for the cohorts that are included in the ANS database, classifying students among those still enrolled, those who graduated and the dropouts up to the year 2014/15. It shows that, assuming a stationary dropout rate among cohorts (not always realistic), dropout rate 11 years after enrolment should be around 37-38% for three-year courses and 17-18% for master courses.

Table 7. University careers outcomes by cohort and course type (source: ANVUR)

Enrollment cohort for year:	Years spent studying:	Outcome at the beginning of 2014/15								
		Three years courses			Five years courses			Master courses		
		Degrees	Dropouts	Still enrolled	Degrees	Dropouts	Still enrolled	Degrees	Dropouts	Still enrolled
2003/2004	After 11 years	57,8	38,7	3,5	69,4	20,8	9,8	78,8	20,4	0,8
2004/2005	After 10 years	57,0	38,5	4,5	66,7	20,8	12,5	83,3	16,0	0,7
2005/2006	After 9 years	56,8	36,8	6,4	67,0	17,8	15,2	82,1	16,9	1,0
2006/2007	After 8 years	56,8	35,8	7,4	53,5	26,1	20,4	81,1	17,4	1,5
2007/2008	After 7 years	55,8	34,0	10,2	47,8	24,2	28,0	79,1	18,4	2,5
2008/2009	After 6 years	53,1	32,8	14,0	39,0	22,3	38,7	78,6	18,1	3,4
2009/2010	After 5 years	49,3	31,0	19,7	20,7	21,5	57,8	77,5	17,4	5,1
2010/2011	After 4 years	42,4	28,1	29,4	5,6	20,3	74,1	76,6	15,6	7,7
2011/2012	After 3 years	26,8	24,7	48,5	0,5	16,7	82,8	70,6	13,1	16,3
2012/2013	After 2 years		19,6	80,3		12,7	87,3	44,4	11,3	44,4
2013/2014	After 1 year		13,7	86,3		9,2	90,8	0,3	8,0	91,8

To follow the dropout trend over time, ANVUR provides some descriptive statistics that show the cumulative dropout rates over time for students in the same cohort within one, two, three and four years from enrolment. Table 8 is taken from the 2018 Report (ANVUR, 2018) and shows the results for three-year degree courses.

Table 8. Dropout (and completion) rates after one to four years by enrolment cohort (source: ANVUR)

Cohort enrolled in the year:	DROPOUT RATE				COMPLETION RATE		
	After the first year:	After two years:	After three years:	After four years:	After three years:	After four years:	After five years:
2003/2004	16,8	23,1	27,0	29,9	19,0	33,3	42,0
2004/2005	16,9	23,7	27,6	30,5	19,7	33,2	41,7
2005/2006	15,9	22,4	26,5	29,4	19,2	33,1	42,1
2006/2007	16,3	22,8	26,6	29,6	21,1	36,4	45,4
2007/2008	15,9	22,2	26,2	29,1	21,3	37,6	46,7
2008/2009	15,6	22,3	26,4	29,5	22,4	38,8	48,0
2009/2010	16,0	22,4	26,7	29,4	23,7	40,6	49,5
2010/2011	15,2	21,3	24,9	27,6	26,2	43,0	51,6
2011/2012	14,8	20,5	24,1	26,6	27,4	44,5	53,3
2012/2013	13,6	19,2	22,8	25,3	29,2	46,7	
2013/2014	13,4	18,9	22,3		30,8		
2014/2015	13,3	18,4					
2015/2016	12,2						

The drop-out rate for the same number of years after enrolment shows, in the decade considered, a slightly improving trend. The decrease in completion times is more significant, with a share of three-year graduates on schedule exceeding 30% in recent years, even though the target values to reach EU standards should be much higher.

In the present work only first year dropout choices for the 2015-16 cohort of Turin University are analysed, using administrative records on the possible renewal of student status for the second year in 2016-17 obtained from the offices who manage students careers. Recalling, as noted, that around 3% of students return to university after a break, a phenomenon that cannot be observed here.

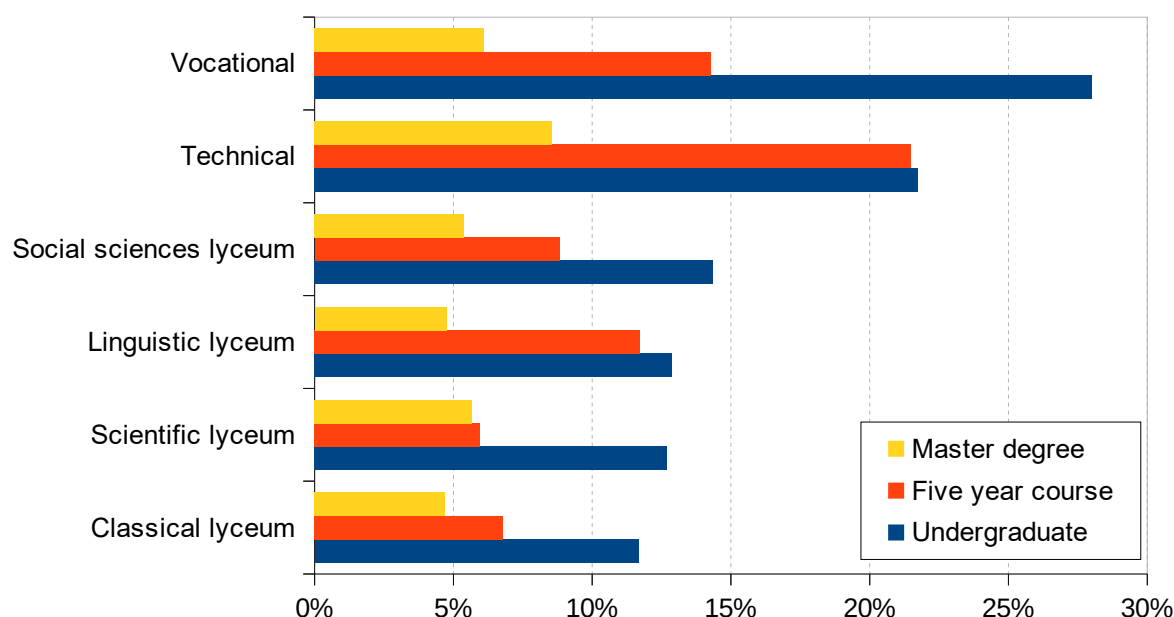
The re-enrollment rates shown in Table 9 clearly differ by type of course. Among undergraduates, over 16% leave university after the first year; among master degrees, the share is only 6%, with an intermediate quota for five years courses. The odds are higher for males than for females (18.5% compared to 15.2% for undergraduates, but also 7.8% vs. 5.2% for master courses). Females, therefore, not only outnumber males at enrolment; their prevalence as a larger group tends to be further accentuated up to the degree, due to the higher dispersion rates of male colleagues.

Table 9. Dropout and continuation rates in 2016/17 for the 2015/16 enrolment cohort, by course type

	<i>Undergraduate</i>	<i>Five years courses</i>	<i>Master degrees</i>	<i>Total</i>
Dropout	16,6%	8,6%	6,2%	13,3%
Continuing to 2 nd year	83,4%	91,4%	93,8%	86,7%
Total	100,0%	100,0%	100,0%	100,0%

As well known in the literature, one of the main features of the previous scholastic career, i.e. the upper secondary track, is highly correlated with the dropout rate. Figure 17 shows, in fact, that undergraduates students with a vocational school background suffer from a more than twice larger dropout rate than those coming from a classical Lyceum, and the gap is still wide when moving to those coming from technical schools. Differences for master degrees are less marked, probably because only the most brilliant students from the technical and vocational high schools get there.

Figure 17. First year dropout rates by course type and upper secondary track



Previous scholastic performance, as assessed in terms of upper secondary final exam mark, again affects the dropout propensity (Table 10). The link is not so strong, however, to allow to say that dropping out is an option for low performance students only: 8% of the students dropout in the first year even among those with a grade of 90 or higher (on the 60-100 scale) in the exam.

Table 10. Dropout and continuation rates in 2016/17 for the 2015/16 enrolment cohort, by final secondary school exam mark

	Upper secondary school final exam mark			
	<= 69	70 - 79	80 - 89	90 - 100
Dropout	18,6%	14,1%	10,7%	8,1%
Continuing to 2 nd year	81,4%	85,9%	89,3%	91,9%
Total	100,0%	100,0%	100,0%	100,0%

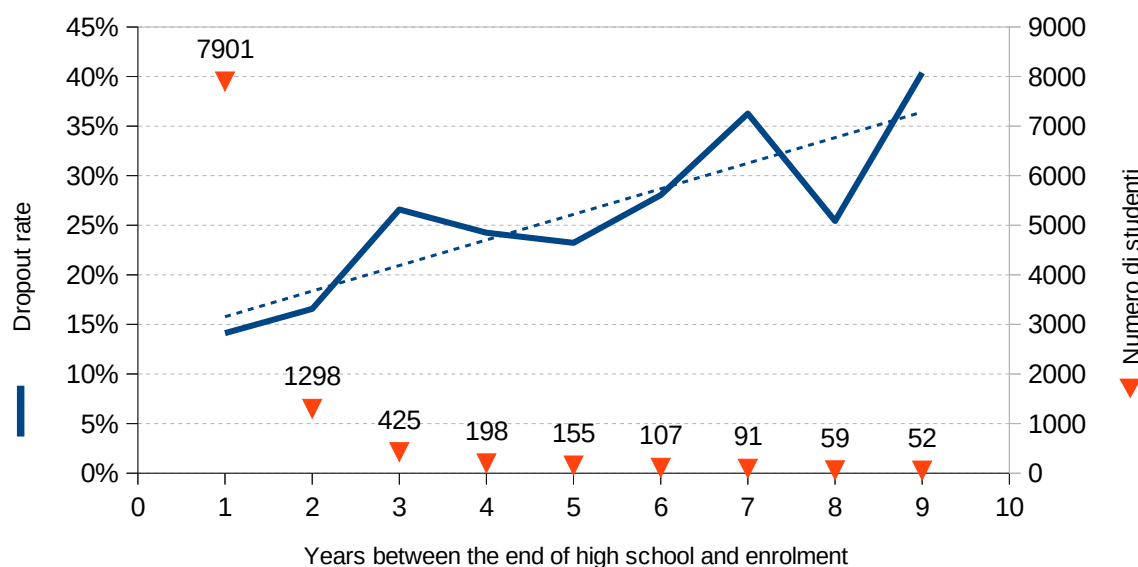
Finally, another factor affecting the dropout propensity is having some sort of job while studying: among those who declared to work at the time of enrolment (ANS source data) the dropout rate in the first year is 23%, compared to 11% among those who are engaged in university studies only. And the field of study most crowded with working students, i.e. Political-Social (24% of students who work, while the rest of the University never exceeds 18%), is also the one with the highest dropout rate, as shown in Table 11. On the other extreme, the students most likely to persevere are those in the Medical and Economics-Statistics fields.

Table 11. First year dropout and continuation rate for the 2015/16 enrolment cohort, by fields of study

	Medical	Scientific	Political-social	Law	Humanities	Economics-statistics
Dropout	8,8%	12,5%	18,5%	16,5%	14,0%	9,8%
Continuing to 2 nd year	91,2%	87,5%	81,5%	83,5%	86,0%	90,2%

It may be interesting also to relate the dropout propensity with any delay between the end of high school and university enrolment students may choose to have: in fact, the dropout rate increases among those who postpone enrolment by one or more years. Figure 18 shows a clear positive trend, with an average increase of 2.6 percentage points in the drop-out rate for each additional year of delay.

Figure 18. First year dropout rates and numbers of enrolled in 2015/16 by enrolment delay (undergraduates)



We now come to the main topic of the analysis, i.e. the strength and shape of the possible effect of the family background, as assessed by parents education, job and wealth, on the dropout propensity. Table 12 shows how this varies for all combinations of educational qualifications of the two parents, adding to each data the size of the associated group of students (small groups lead to more unreliable rates). Values differ by some percentage points, with a maximum difference between the extreme of 22.7% for those who have both parents with primary education only and around 10% for those with tertiary educated parents (at least for the mother). The relationship is not always linear, but overall lower educational qualifications lead to higher drop-out rates, while parents' degrees and high school diplomas imply lower values (the top left four cells display rates between 16 and 23%, while in the opposite area rates lie between 10% and 12%)⁶.

Table 12. Dropout rates of the 2015/16 enrolment cohort by parents education (the number of cases for each combination is in *italics*)

Father education	Mother education				Total
	<i>Primary</i>	<i>Compulsory</i>	<i>High school</i>	<i>University</i>	
<i>Primary</i>	22,7% <i>207</i>	18,3% <i>230</i>	21,0% <i>105</i>		20,3% <i>561</i>
<i>Compulsory</i>	21,6% <i>199</i>	15,9% <i>2407</i>	13,6% <i>2250</i>	13,7% <i>313</i>	15,0% <i>5169</i>
<i>High school</i>	14,1% <i>78</i>	13,5% <i>1336</i>	12,2% <i>4308</i>	10,3% <i>1238</i>	12,2% <i>6960</i>
<i>University</i>		14,6% <i>192</i>	12,5% <i>1287</i>	10,6% <i>1876</i>	11,6% <i>3371</i>
Total	21,2% <i>500</i>	15,2% <i>4165</i>	12,8% <i>7950</i>	10,8% <i>3446</i>	13,2% <i>16061</i>

A quicker glimpse is obtainable from Figure 19, showing the average first year drop-out rates by course type and parents maximum educational qualification. Students with parents whose education is limited to compulsory education display a somewhat higher rate: for undergraduates and five year courses there is a 4 percentage points gap. Differences are less pronounced when the parents' educational background is higher: for undergraduates, a university-educated parent lowers the average dropout risk by less than one percentage point lower compared with having high school parents, and the difference vanishes completely for the other two course types. It is instead interesting to note that children of *both* tertiary educated parents studying in five years courses have the lowest possible dropout rate, three percentage points lower in the case of a single

⁶ Values on the opposite extreme cells, associated with very small numbers of students (<20 units), are omitted, given the high risk of obtaining unreliable estimates.

graduate parent, and even lower than in the case of master courses. The choice of a five year degree, very often aimed at forming freelance professionals, doctors, lawyers and the like, in a family context with (graduates) parents most likely working in the same job context, is the typical situation where children are strongly expected to follow on their parents path, thus making dropout a very unlikely outcome.

Figure 19. First year dropout rates by course type and parents' highest education level

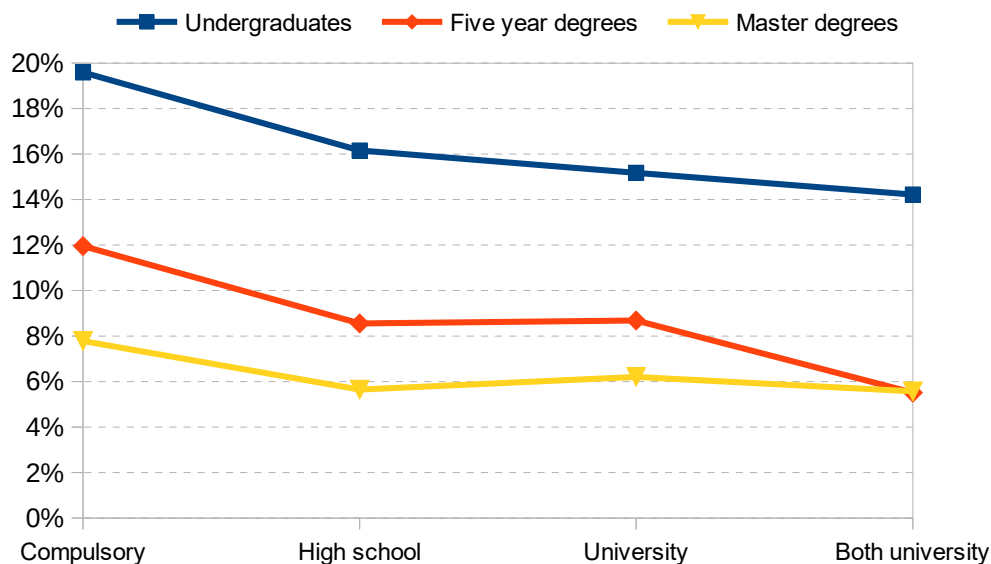


Figure 20, on the other hand, shows drop-out rates by classifying students by their parents job. Heterogeneity is slightly more limited for mothers' jobs, while some father's professions (teacher, manager and doctor) lead to dropout rates below 10%.

Figure 20. First year dropout rates by parents job



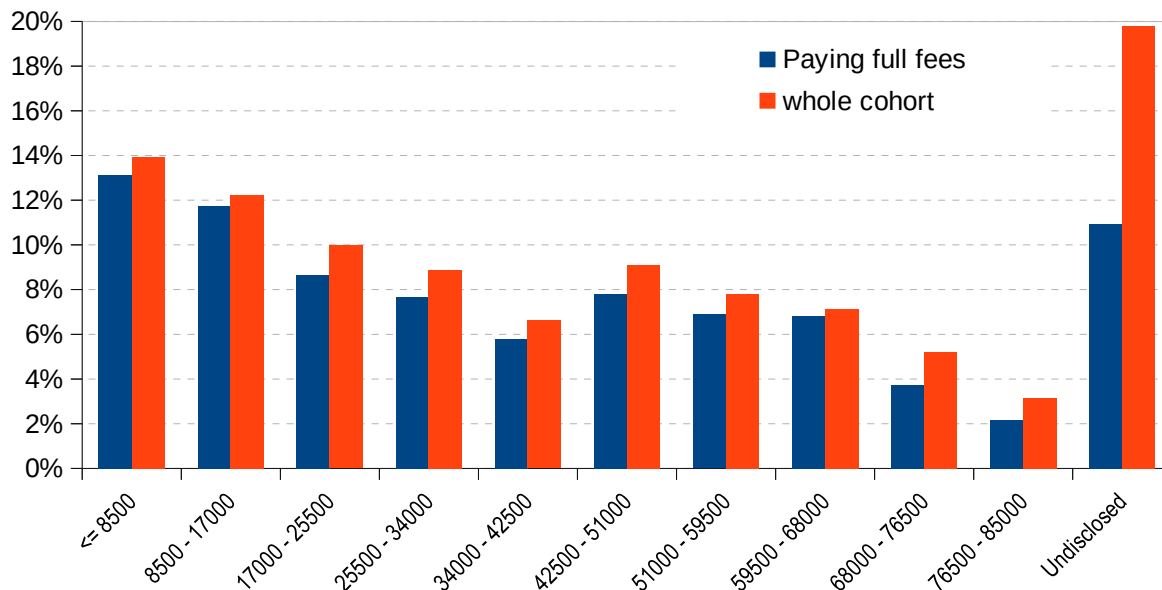
At the other end of the spectrum are entrepreneur parents, associated with the highest dropout rates for both parents (around 18%). This could be due to the group composition, as this includes a majority of small entrepreneurs running family businesses. In such cases, parents could be easily and strongly interested in being helped or even *replaced* by their children as, even without a high level of education.

Finally, let us examine how the dropout propensity changes for different ISEE levels as well as in cases of

non-disclosure.

First of all, students paying full fees must be considered separately. As already mentioned, the ISEE non-disclosure rate among those not paying the full yearly fees is very high, since in this case there is no incentive to disclose. In Figure 21 this is shown by the markedly lower dropout propensity for non-disclosers when excluding only those paying full fees (in blue) compared to the whole cohort (in red). Despite this decrease (from 20 to 11%), the propensity remains however rather anomalous, given that the rest of the histogram shows quite clearly that the dropout risk decreases with the increase in family's wealth. We move from a rate above 12% for the lowest ISEE to 2% for the highest level allowing some fees reduction. The ratio between extreme rates is therefore very pronounced, with a risk 5 to 6 times higher.

Figure 21. First year dropout rates by ISEE level (or non-disclosure)



Among the non-disclosers, the drop-out rate goes up over 10%, and therefore well above the 2% of the highest ISEE interval range, even if we exclude those who have not paid their taxes in full. This confirms the implausibility of attributing to all non-disclosers values above € 85,000. For this reason, in the analysis that follows ISEE will be treated as a categorical variable, considering the non-disclosure group as one additional interval range.

To build an overall picture of the effects that the context in which the student lives has on the dropout risk, with particular reference to social inequalities stemming from the socio-economic and cultural background of the family of origin, a structured set of binary logistic regression models for the dropout indicator after the first year was defined and estimated. The models include some control variables relating to student's characteristics, in socio-demographic terms (gender and geographical macro-area of origin) and in relation to the previous school career (upper secondary track and final exam grade, possible enrolment delays measured by the age at enrolment). The analysis focused on undergraduate and five year courses students, leaving out those enrolled in the first year of the master's degrees. The effects related to family characteristics were assessed by two distinct points of view:

- as *total effects*, estimating three separate models each including only one of the three family factors (parents education, jobs and family ISEE) - with this approach the full influence of family background is harnessed through a single factor, partly also as a proxy of the other two;
- as *partial effects*; estimating a single overall model in which the three factors are included simultaneously, thus highlighting the influence of each within the same level of the other two.

It can be noted that, in all cases, the inclusion of covariates related to previous schooling and the possible time gap in the passage to the university career make the estimated effects of the *secondary type*⁷, i.e. evalu-

⁷ For a detailed definition of primary and secondary effects in Italian education see for example Contini and Scagni (2013).

ated net of the influence that the type and quality of previous school history have on dropout risk. In other words, they answer the question: the family context has affected the type of previous scholastic career of the student and its results, as well as the decision to further proceed to tertiary studies; concerning the risk of dropping out of university studies, the family context exerts a further direct influence, or does it end up determining the previous career, so once we take this into account it no longer counts?

For the estimated models the average marginal effects are reported - in practice the average probability changes⁸ among those expected on all the cases involved in the analysis when the covariate has a unit variation, or in the case of the presence of one characteristic with respect to another (for example the difference in dropout probability for a student coming from the South compared to one coming from Northern Italy).

Figure 22 shows the results with respect to parents' highest education, again distinguishing also families where *both* are tertiary-educated; the same scale as the next Figure (23) is used to facilitate comparison. Considering compulsory education as reference, values are (predictably) negative to indicate that parents with a higher education decrease the dropout risk of the child. However, both partial and total effects are very small, with a decrease - (never statistically different from zero)⁹ - averaging just one percentage point. The partial effect looks more regular than the total one, with a downward trend following the rise of educational qualifications and a maximum dropout risk decrease of 1.6 percentage points for families with two university educated parents. In all, we are facing very modest effects at best.

Figure 22. Partial and total effects of parents highest education level

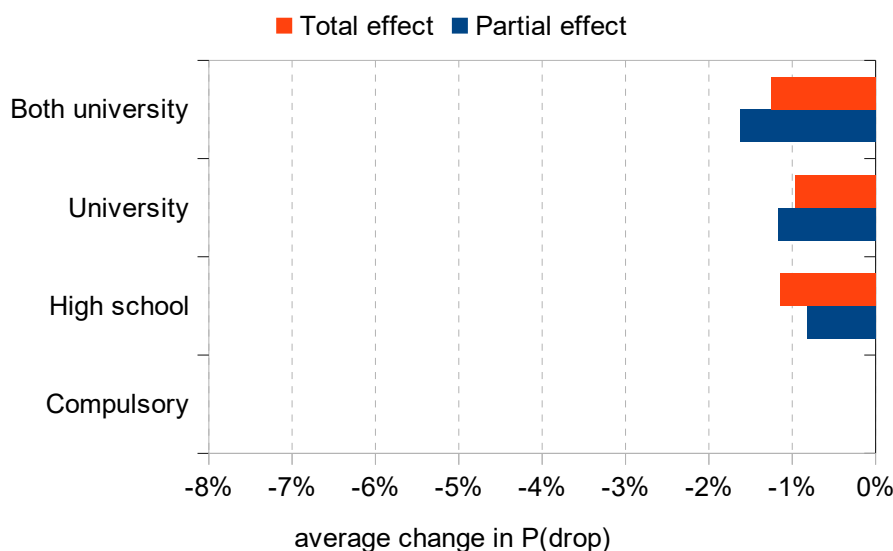


Figure 23 shows the similar estimates, this time for parents' jobs. For simplicity effects estimates for the father's job is displayed; those for mothers are similar but slightly less significant. A more heterogeneous picture emerges, with some relevant effects, as well as some marked differences between total and partial effects.

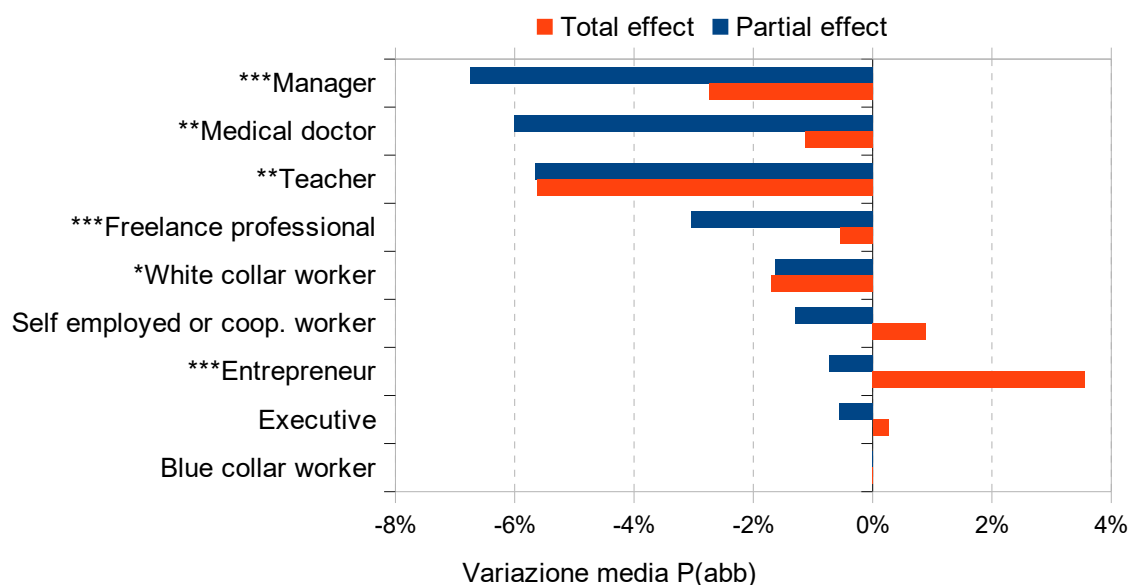
The reference job is blue collar worker; generally the most qualified professions reduce the dropout risk, even though with some peculiarities. Fathers who are teachers or professors have the only strong *and* identical partial and total effect, a sign of a clear and explicit role in decreasing the dropout propensity when parents are themselves part of the school environment. Instead, results for high qualifications jobs (manager, doctor and - to a lesser extent - freelance professional) are rather divergent, with clear negative partial effects but much softer total effects: these are jobs and careers whose effect is stronger if we also take into account the families cultural and wealth context.

⁸ Since these are not linear models, how much the probability changes due to a unit variation in a covariate differs for different covariate levels.

⁹ P-values for estimates are all larger than 0.18

The opposite holds instead in the case of entrepreneurs, where the total effect hints at a sharp increase of the dropout risk, whereas the partial effect is not significantly different from zero. The indication is similar to that stemming from Figure 20, showing to the average observed dropout rates classified by parents job. It is probably reasonable to read this increase in the dropout propensity as due to the group composition: entrepreneurs who lead small businesses, often family-led ones, are the largest subgroup largely outnumbering big entrepreneurs. The former are likely to be eager to get their children help to run the company, even without a top-level education; if other motivations to pursue tertiary education are not very strong, therefore, their children will be more likely to dropout and devote themselves to the family business, without no effort or uncertainty in entering the job market. The partial effect not giving the same indication suggests that if parents culture and wealth are taken into account, this negative effect disappears, for example because small entrepreneurs who motivate their children against tertiary education are easily lower-educated and low ISEE family business owners with limited income opportunities.

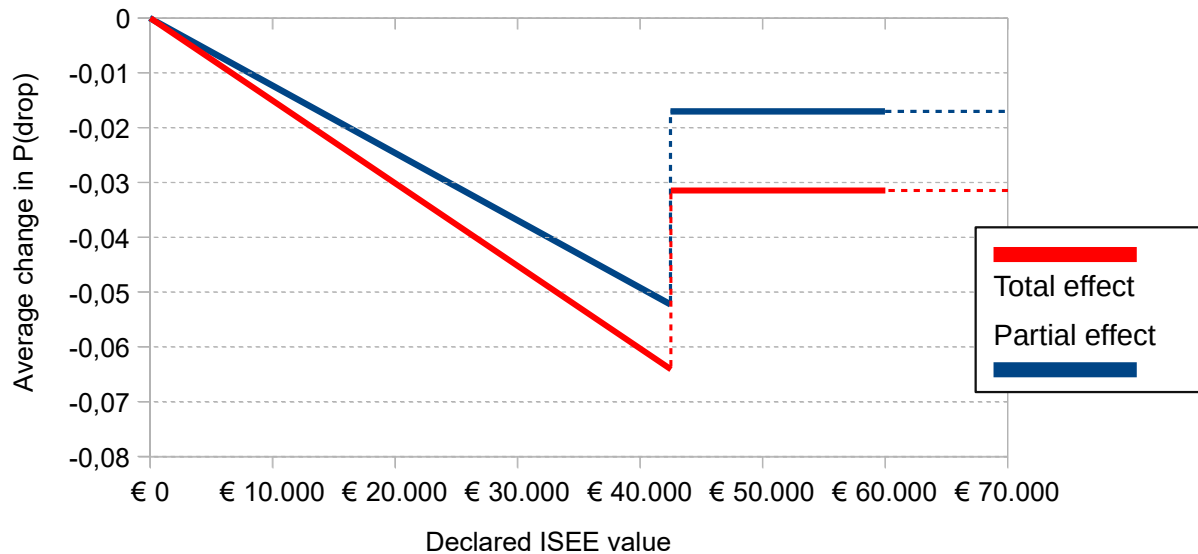
Figure 23. Partial and total effects of father's job



*** significant with $\alpha=0,01$; ** significant with $\alpha=0,05$; * significant with $\alpha=0,1$

In examining the role of the family wealth as approximated by ISEE (Figure 24), the model was first estimated with a series of indicators of ISEE bands, whose coefficients estimators were free to assume arbitrary values, plus a specific indicator for non-disclosure cases. The obtained estimates showed an essentially linear trend for medium-low ISEE values, with decreasing dropout risk (around one and a half percentage points for each € 10,000 ISEE increase. For figures over € 42,000, however, this trend disappears and the dropout probability stabilizes at the level of the values around € 16-17,000, finally to increase significantly for non-discloser cases (+ 8,6 percentage points even compared to zero ISEE cases). Moreover, this dropout probability structure remains similar, albeit decreasing slightly, for both the total and the partial effect.

Figure 24. Partial and total effects of ISEE value



6. First year performance, dropout and family context

The information regarding the family context can also be exploited to check if and how this appears to be correlated with the student's performance during the first year of university studies. As well known, data on university careers are rather limited, consisting simply of the details regarding the exams of the curriculum first year where the student succeeded. This does not allow to fully assess what the student actually did in the period for several reasons, linked to the options students have when trying an exam. In Italian universities routine practice they can:

- fail the exam;
- give up the exam before being evaluated, if they feel they underperformed compared to their expectations/ambitions;
- after being evaluated, reject the grade they are offered because they are aiming at better results
- pass the exam and proceed further with the studies.

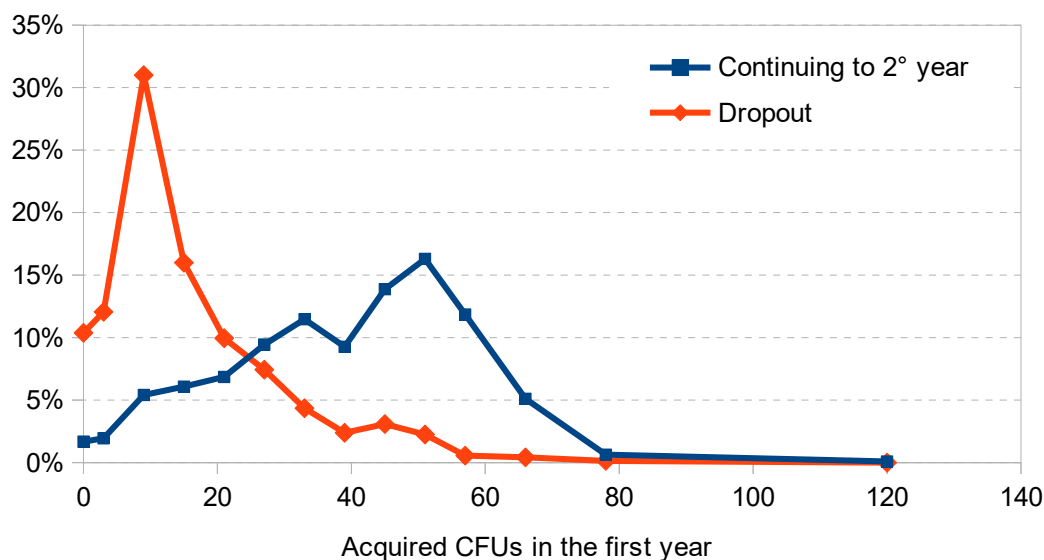
In the first three cases, no long-term record is kept of what happened in such aborted efforts. Failures, give-ups and refusals of a mark considered too low are now potentially registered by the UniTO information system, through the related computerized procedure of verbalization, but this information is not reported in the ANS databases. Informations on other aspects, such as lectures attendance when this is optional, are not recorded as well.

The only elements that can therefore be analysed are the number of credits accumulated through passed exams, and the associated marks, as well as the time frame in which the exams took place. It is reasonable, moreover, to assume that the dropout decision may be linked to the quality of one's own results in university: a student with a brilliant career start should be less inclined to dropout than one who instead has had substantial difficulties in his studies and exams. However, the relationship between performance and dropout propensity may not have a unique causal direction, since it could also be that a student who for various reasons is considering the dropout option will be less committed to studying, attending lectures, etc., performing badly precisely because of this. Due to this, the first year performance results were not included among the covariates of the models for the dropout propensity in Paragraph 5, and will be examined with an exploratory approach in this paragraph.

Figure 25 shows the distribution of the total amount of credits acquired in first year exams (up until the September 2016 session). The strong positive asymmetry of the distribution for those dropping out after the first year is clear: among these, for example, 80% does not go beyond 20 credits, and only 8% exceeds 40, where among the students who continue this threshold is exceeded by the majority (57% of students). The average amount of acquired credits mirrors this big gap, with averages of 39.4 and 16.8 credits for the two

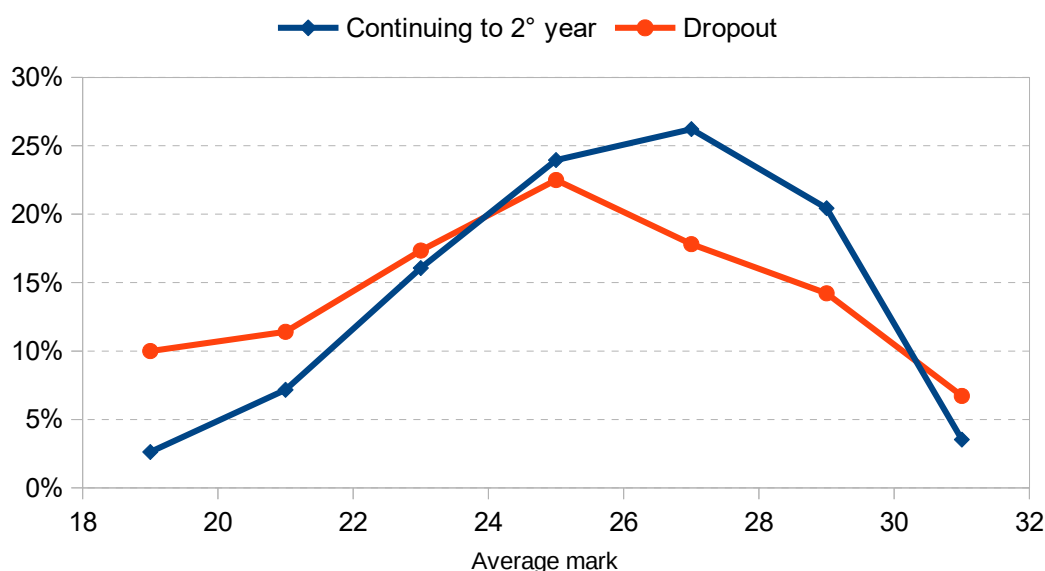
groups respectively.

Figure 25. Acquired CFUs in the first year and dropping out



Given such a wide gap in the *quantity* of passed exams, what happens in terms of *quality* of the results obtained for the visible part (passed exams)? As shown in Figure 26, there is a difference here as well, but the extent of the deficit for those who will then leave is more limited, with an average gap of one point only (25.7 versus 24.6). Notice, however, that average marks for dropouts are computed on a generally lower amount of credits, therefore corresponding to a much more limited overall study commitment.

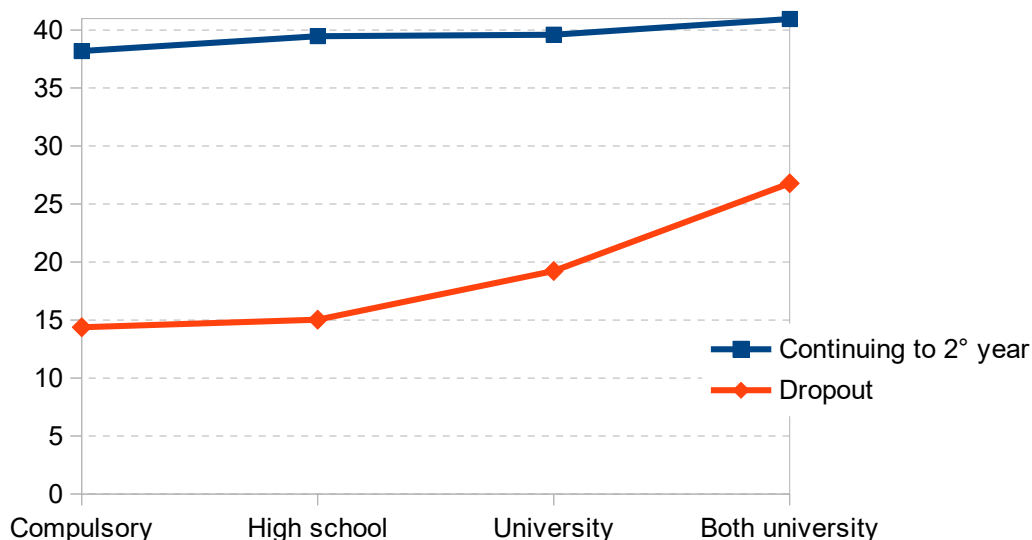
Figure 26. Average marks in first year exams and dropping out



More concisely, looking only at the average number of CFUs acquired and the average grade in the exams that were passed, we can take into account information relating to the family context used in the rest of the work. We thus examine the average level of these two indicators for students of different cultural, professional and economic backgrounds; results are shown in Figures 27, 28 and following. Keeping dropout and continuing students distinct as well, this allows us to better understand if and how study performance does change in the first year between dropouts and re-enrollments for the different family backgrounds.

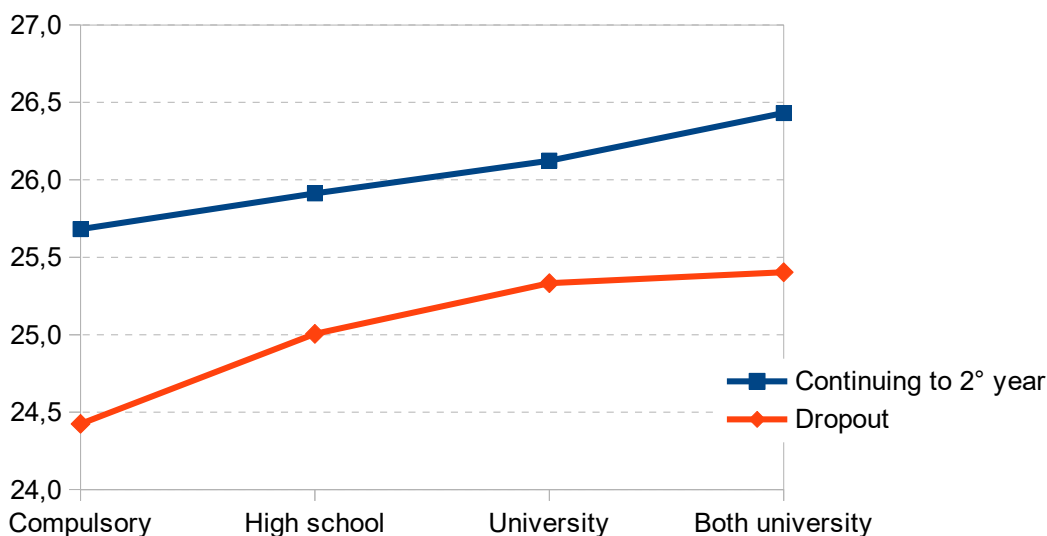
The acquisition of credits - i.e. the advancement in studies mainly from the point of view of career speed, rather than the quality of the results - displays an always strong gap between dropout and continuing students, but this is only weakly correlated with parental education for continuing students (Figure 27, blue line). On the other hand, the relationship for dropout students is more marked: here the extreme opposites (both university-educated parents vs. basic schooling parents) show a 13 CFUs average difference, while this is only 3 CFUs for continuing students. The gap comes along when parents have tertiary education, since children of high school parents do not differ from those with parents with compulsory education.

Figure 27. Average first year acquired CFUs and dropping out by parents highest education



For marks, Figure 28 shows that the maximum difference in parents' education leads to an average deviation of about a point or a little less, with a rather regular upward trend for both groups (dropouts and continuing) following the increase of educational qualifications. Overall, this influence on first year performance does not appear to be very strong: a single point on the scale from 18 to 30 (actually including also 31 as the value associated to 30 "cum laude") is one rather modest gap, considering that the average individual vote has a standard deviation of 2.8 points, and the votes on singles exams of 3.5 points; and for CFUs acquisition, only dropouts show a significant deficit between primary/secondary and tertiary educated parents.

Figure 28. Average marks in first year exams and dropping out by parents education



It can be interesting to compare these differences in performance with those obtained when classifying the

same students on the basis of the main feature of their own previous school experience, i.e. the high school track. Especially on marks, however, there may be compositional differences related to the disciplinary fields: to keep track of these, tables 13 and 14 show the origin-destination matrix for the 2015/16 cohort with the “transfer rates” between upper secondary tracks and fields of study in university. The most intense colors highlight the majority shares; Table 13 shows the distributions by track, therefore with the same origin: for example, students coming from the Classical Lyceum choose Humanities in 40% of the cases, although not disdaining the Scientific field (almost 20%). On the other hand, Table 14 contains the distributions by fields of study: thus, for example, 54% of students choosing the Medical field come from the scientific Lyceum, with decidedly smaller shares from all other tracks (among which Classical Lyceum still prevails).

Table 13. Origin-destination matrix of the 2015/16 cohort, by upper secondary track and field of study (% by track)

	Track							
Field of study	Scientific Lyceum	Technical	Classical Lyceum	Linguistic Lyceum	Vocational	Social sciences Lyceum	Art Lyceum	Total by field of study
Humanities	20,5%	16,0%	39,8%	37,3%	36,1%	43,1%	50,8%	27,8%
Hard Sciences	35,5%	29,4%	19,6%	14,6%	20,7%	11,7%	18,0%	26,5%
Economics-Statistics	19,4%	29,2%	11,3%	13,7%	12,0%	7,4%	4,9%	17,6%
Political Science	10,1%	16,5%	12,8%	24,5%	21,8%	23,8%	18,0%	15,5%
Medical	10,9%	4,4%	7,8%	5,3%	6,2%	7,2%	4,1%	7,9%
Law	3,6%	4,4%	8,7%	4,6%	3,1%	6,8%	4,1%	4,8%
Total by track	38,9%	17,5%	15,0%	10,0%	9,7%	7,6%	0,8%	100,0%

Table 14. Origin-destination matrix of the 2015/16 cohort, by upper secondary track and field of study (% by field of study)

	Track							
Field of study	Scientific Lyceum	Technical	Classical Lyceum	Linguistic Lyceum	Vocational	Social sciences Lyceum	Art Lyceum	Total by field of study
Humanities	28,7%	10,1%	21,4%	13,4%	12,6%	11,9%	1,4%	27,8%
Hard Sciences	52,1%	19,4%	11,1%	5,5%	7,6%	3,4%	,5%	26,5%
Economics-Statistics	42,9%	29,0%	9,6%	7,8%	6,6%	3,2%	,2%	17,6%
Political Science	25,4%	18,7%	12,4%	15,8%	13,7%	11,8%	,9%	15,5%
Medical	53,6%	9,8%	14,8%	6,7%	7,6%	7,0%	,4%	7,9%
Law	29,1%	16,0%	27,1%	9,6%	6,3%	10,8%	,6%	4,8%
Total by track	38,9%	17,5%	15,0%	10,0%	9,7%	7,6%	0,8%	100,0%

The average acquired CFUs and marks are shown in Figures 29 and 30. Concerning the former, classical-scientific (but also linguistic) high school students are the fastest, while those from the vocational track (as well as Art school) fall behind by about 8-9 points. The gap between extremes is about 2 points for marks, with a surprisingly sharp advantage by classical Lyceum students above all others (including scientific Lyceums, lagging by one point). Here, as mentioned, however, the field of study composition for Scientific Lyceums students could play a role, as they are more oriented towards courses in Hard Sciences rather than Humanities (specific percentages are the opposite than for Classical Lyceums), where the metric used to assign marks could be less "generous". The same-level grade performance on the lowest marks among students of the Technical and vocational tracks could be somewhat surprising, but it is however again associated with different fields of study (i.e. the prevalence of Humanities for Vocational and of Economics-Statistics and Hard Sciences for Technical).

Figure 29. Average first year acquired CFUs by students upper secondary school track

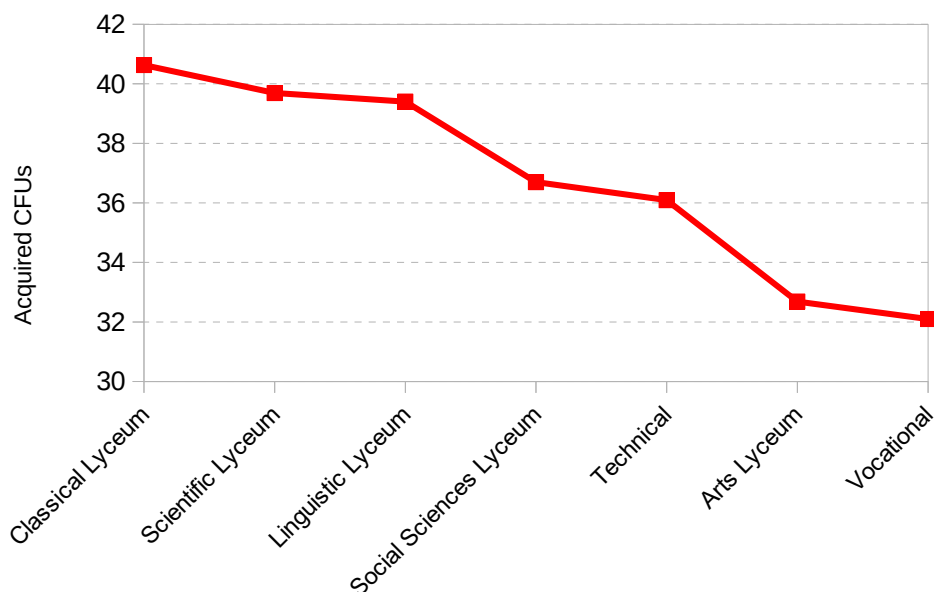
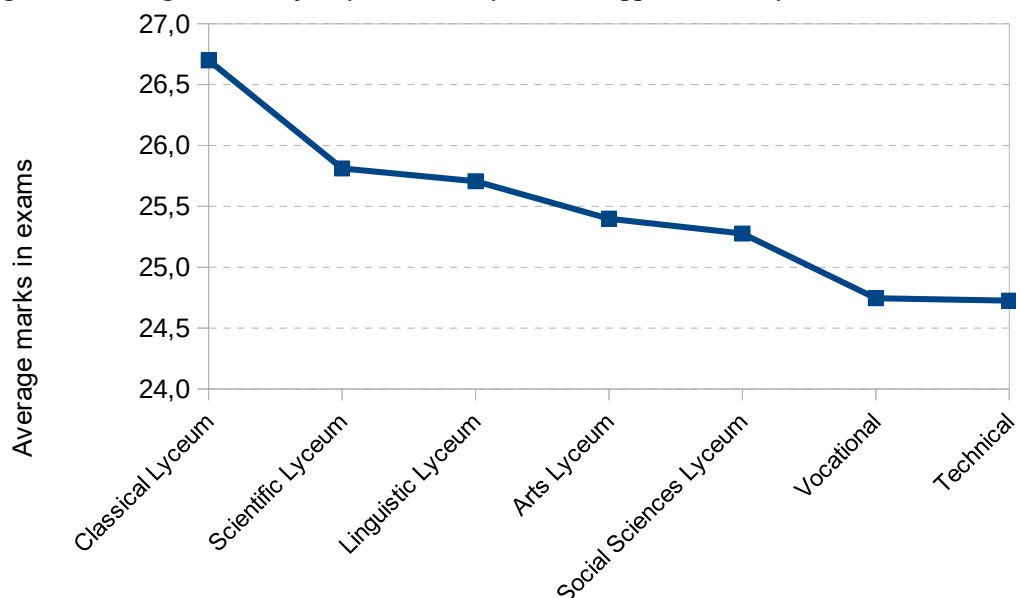
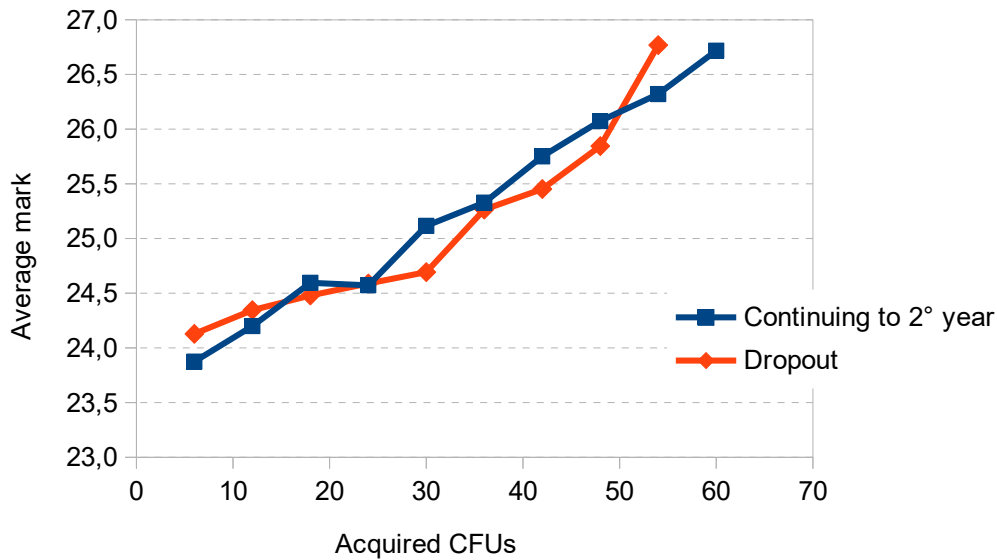


Figure 30. Average marks in first year exams by students upper secondary school track



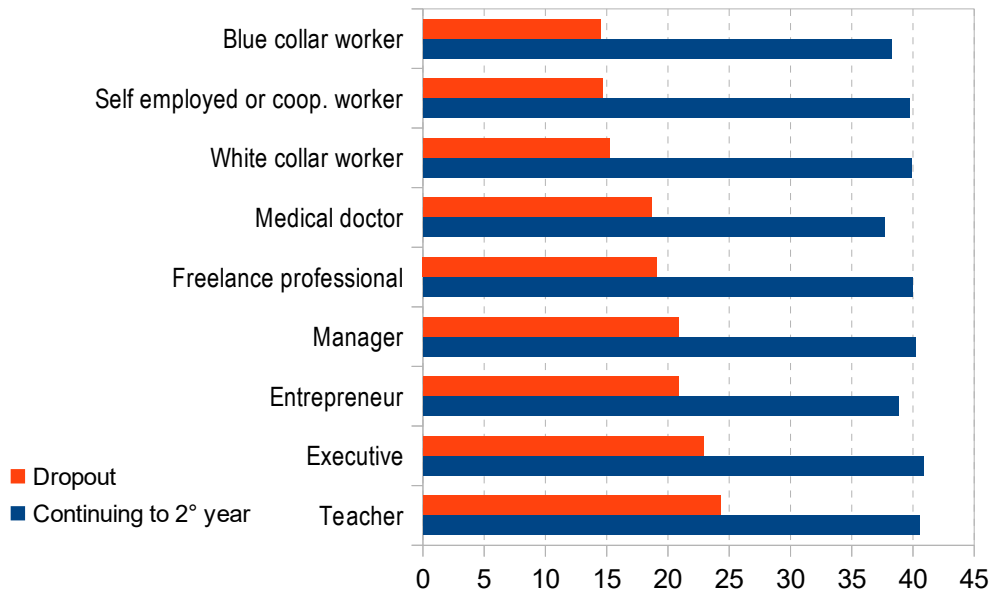
In analysing the study experience through credits acquisition and grades, it could be wondered if there is any "substitution effect" between the two factors. In other words, do students tend to choose between two alternative strategies, one focused on the quality of learning, with high marks on a relatively limited number of credits, and the other giving priority to speed, with the acquisition of many credits even if this means getting low-middle level marks? Based on 2015/16 data, the answer is negative: on the contrary, those who acquire many credits are likely to get high grades as well, and vice versa. Figure 31 shows this, with the conditional average grades classified by the level of acquired CFUs. This positive correlation holds even for students about to dropout.

Figure 31. Average exams mark by amount of acquired CFUs in the first year



Moving now to the classification by father's job, once again (as for the educational background, see Figure 27) there seems not to be a strong link between the family background and CFUs acquisition speed among students who continue their studies beyond the first year (Figure 32). Some more significant differences exist for those dropping out, even though the number of cases for specific job types is often quite low to accept results as entirely reliable¹⁰. Generally speaking, lower-skilled professions are associated with slightly lower credit acquisition rates (mother's job classification gives roughly similar indications).

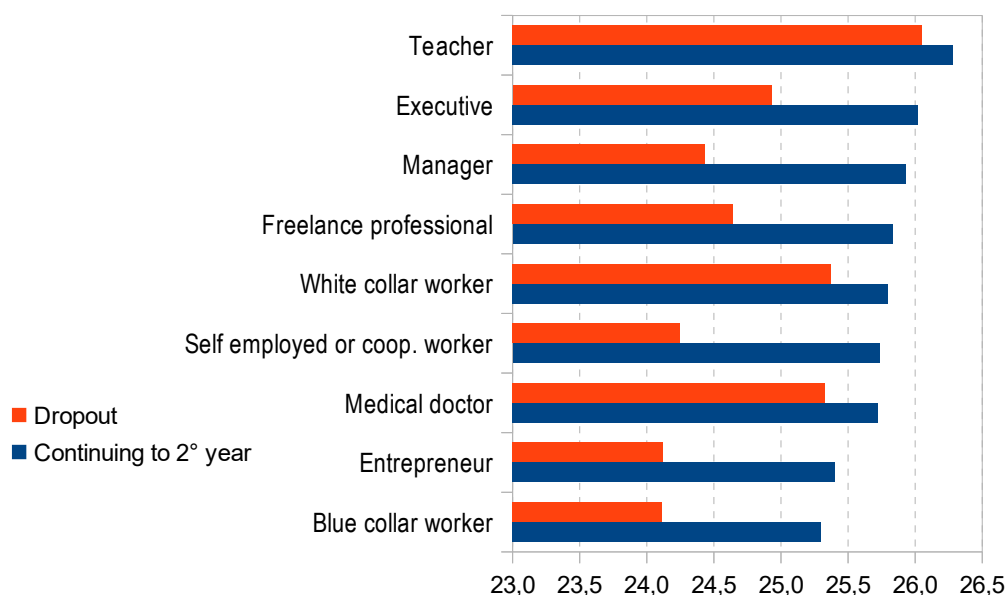
Figure 32. Average number of first year acquired CFUs and dropout, by father's job type



Looking at average grades of passed exams by parents' job (Figure 33), the outcome is similar to that based on the parental education: the maximum difference is about one point, with maybe some slight more visible difference among students continuing to second year than for the acquired CFUs. Dropout students display more marked fluctuations, but again often based on a very limited number of cases and therefore not strongly reliable.

¹⁰ For example, there are only 15 dropout students in the dataset whose father is a medical doctor; and 16 with a father who is a teacher.

Figure 33. Average first year exams marks and dropping out, by father's job type



Moving to the third family background variable considered, with Figures 34 and 35 we briefly examine the association between the performance variables and ISEE (when disclosed). A weak relationship can be ascertained between family wealth and career speed: passing from an ISEE near to zero to the highest values for which it makes sense to disclose it (just under € 85,000) there is an average increase of 8-9 acquired credits at first year for students who then continue to second year. Among dropouts, however, the trend is even more nuanced and irregular, being in fact based on a few cases and therefore not very reliable.

There is again a positive but weak correlation with average grades, with a gradual increase from 25.3 to 26.6 points as ISEE grows; this holds in this case for both students who dropout or continue, but for the former the trend is appreciable only up to to ISEE around € 50,000 due to the small number of cases in the upper bands (the dotted line in Figure 35).

Figure 34. Average first year acquired CFUs and dropout, by ISEE band

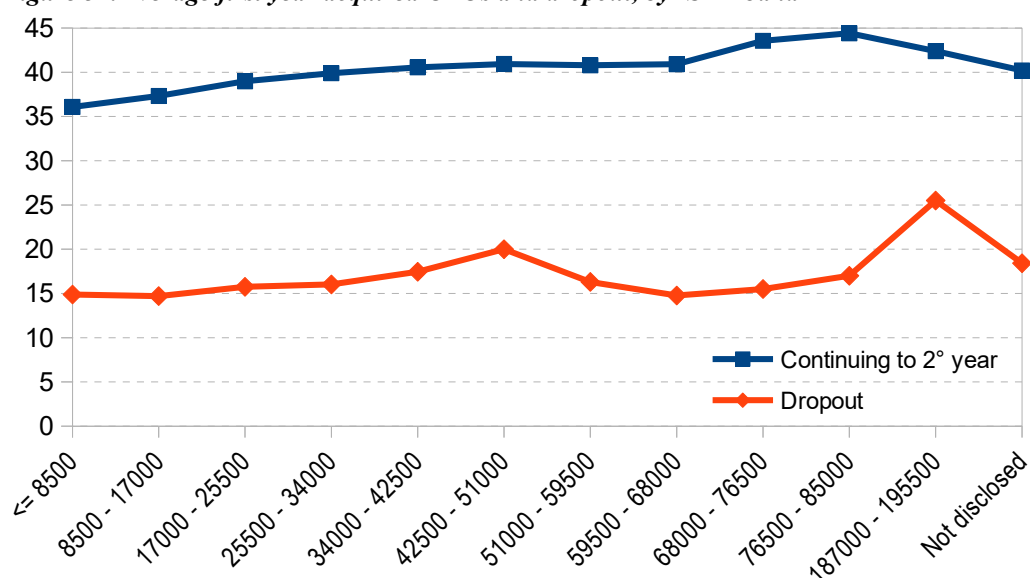
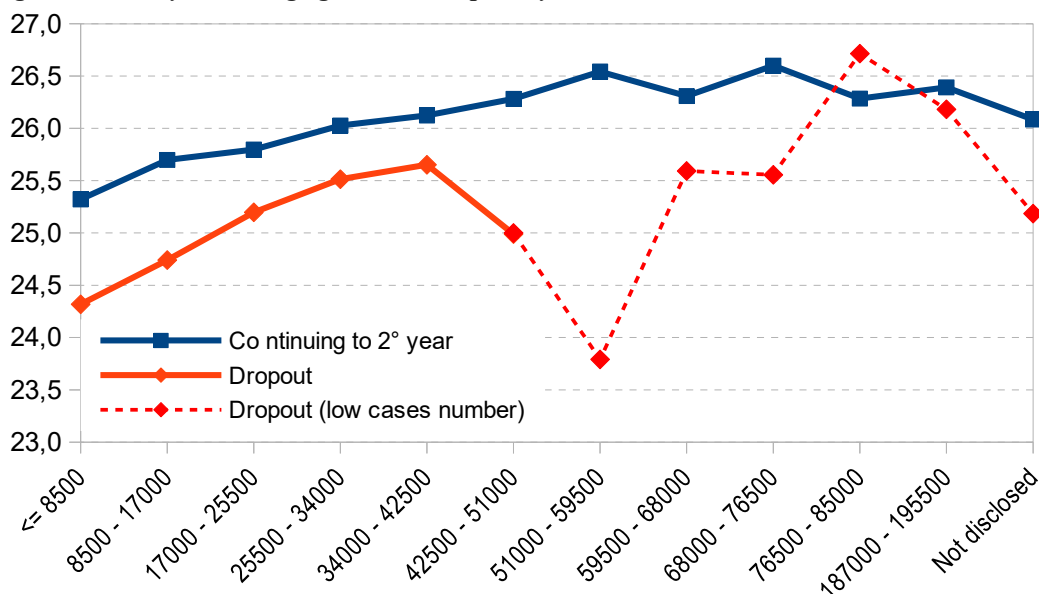


Figure 35. First year average grade and dropout by ISEE band



Finally, let us focus on the timing of exams (for the successful efforts only), from two points of view: their distribution during 2016 and the time interval between each passed exam and the next one.

The distribution over time of the exams passed by students who continue to second year appears reasonably balanced, with a larger quota in the summer session (when all the exams offered by the course for the first year are now possible), a slightly lower share in the winter session and a significant residual in September. On the other hand, Figure 36 shows a decidedly more uneven breakdown in favour of the first session for dropouts: within April, 67% of exams that will be tried successfully in the year is already done, compared to 34% for students who will continue. The summer session already sees a slowdown for dropouts, even more marked for September, with only 5% of the total, compared to 20% by the continuing students. The career of prospective dropouts, in short, "aborts" with a certain advance compared to its natural developing over time. Notice again that it is not possible to know what is the incidence of failed exams in the second part of the year for dropouts, compared to failing to even trying them.

Figure 36. Monthly distribution of first year successful exams by dropout or continuing to 2° year

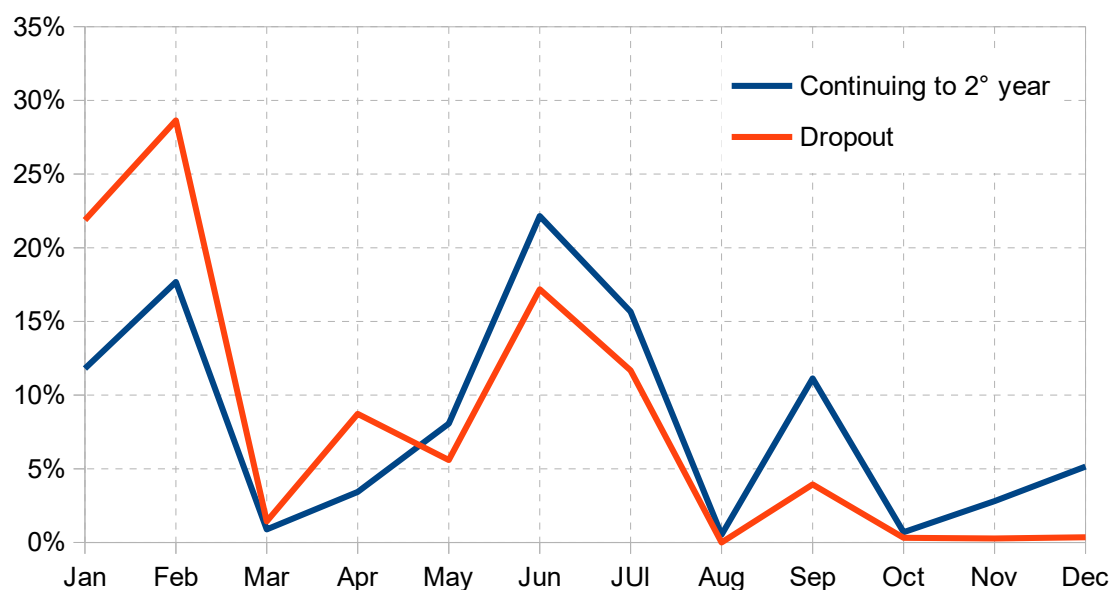
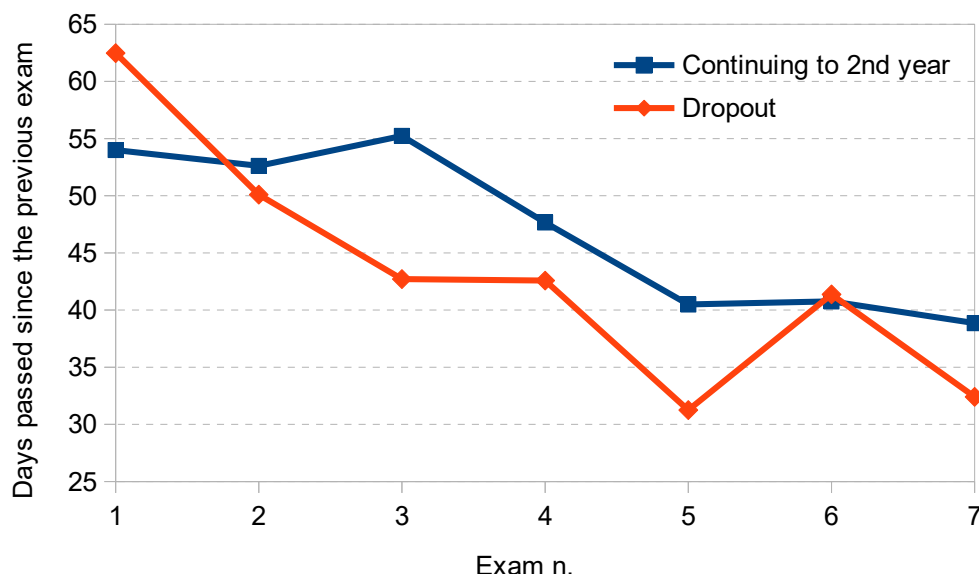


Figure 37 shows instead the average time lapse in days between the passing of subsequent exams, assuming

that students begin to explicitly study for exams right after Christmas (the value corresponding to the first exam is therefore the average number of days between December 27th and the passing of the first exam). In other words, the value on the Y-axis indicates how many days on average have gone since passing the previous exam: for example, the value 55 for exam n. 3 for the students continuing to second year implies an average period of 55 days between passing the second exam in their career and passing the third one. Times tend to shrink as the year wears on: for continuing students the first three exams mark the time in a regular manner, at around 55 days for each, while for the following ones average preparation times shorten and stabilize around 40 days. The trend for dropouts shows an initial time lasting about 10 days longer, with intervals then for subsequent exams instead shorter than the other students.

Figura 37. Average time lag among passed exams in the first year by dropout or continuing to 2° year



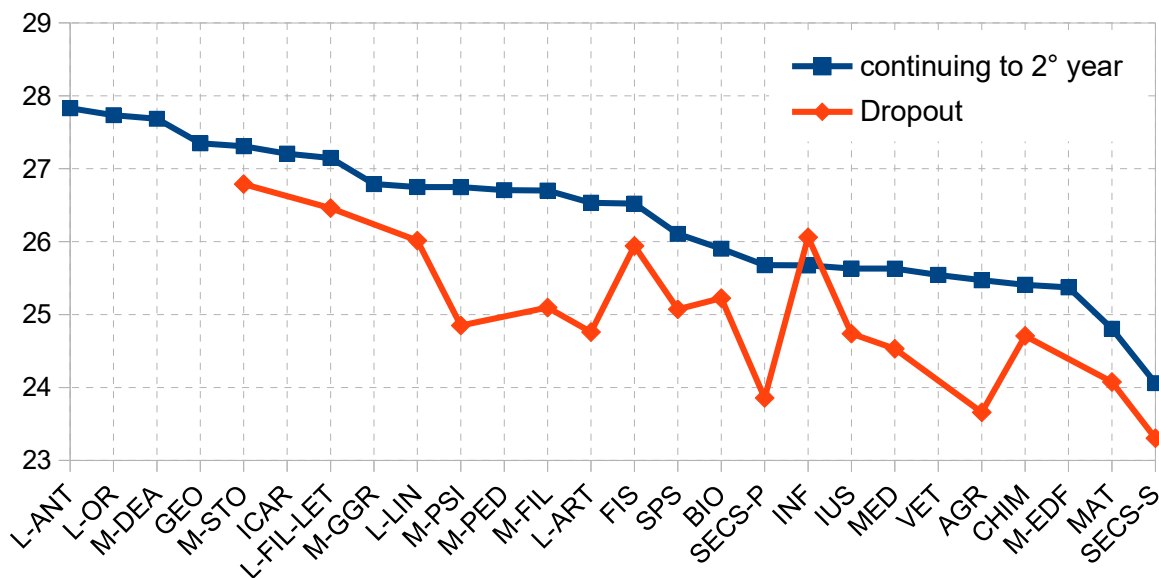
Of course, in examining results in Figure 37 the fact that failed attempts are not recorded on the National Student Registry must be taken into account. Thus, it is not possible to know how many failures occurred in the interval between two successful exams. In theory, opposite to this result, a longer period of time between two successful exams could be expected for dropouts, assuming that these students experience more difficulties in their studies and may therefore suffer more failures than others. Actually, however, students cannot freely choose when to try their exams: schedules are set by teachers, the number of exams per year may differ among field of studies, and can depend on the number of credits of each exam. These factors probably affect all the characteristics of study performance: for example the conceptual scales with which grades are assigned. For this reasons, the exams behaviour was analysed separately by field of study, using the first, alphabetical part of the corresponding abbreviations (*Settori Scientifico-Disciplinari* in the Italian system) as an aggregation criterion (for example, grouping together all the economic disciplines as SECS-P); Table 15 lists the fields with the identification of the topics involved. This led to an aggregation in 26 groups¹¹. The average grades obtained in the exams of each field by first year students are reported in Figure 38 distinguishing dropouts and those continuing to second year, ordering the fields decreasingly with respect to the grades in the latter group. For dropouts, the average is only shown for fields with a minimum of 30 observations available.

¹¹ The two fields starting with “ING” (Engineering) were excluded, due to the negligible number of associated exams (that could also be exams taken at *Politecnico di Torino*, the other Athenaeum in Turin).

Table 15. Summary of university fields of study at the University of Turin

Acronym	Field	Acronym	Field
L-ANT	Archaeology	FIS	Physics
L-OR	African and Asian Studies	SPS	Sociology
M-DEA	Anthropology	BIO	Biology
GEO	Earth sciences	SECS-P	Economics
M-STO	History	INF	Computer science
ICAR	Architecture	IUS	Law
L-FIL-LET	Humanities of the ancient world	MED	Medical sciences
M-GGR	Geography	VET	Veterinary sciences
L-LIN	Foreign languages	AGR	Agriculture
M-PSI	Psychology	CHIM	Chemistry
M-PED	Pedagogy	M-EDF	Sport sciences
M-FIL	Philosophy	MAT	Math
L-ART	Arts and history of arts	SECS-S	Statistics

Figure 38. Average first year exams marks and dropping out, by field of study

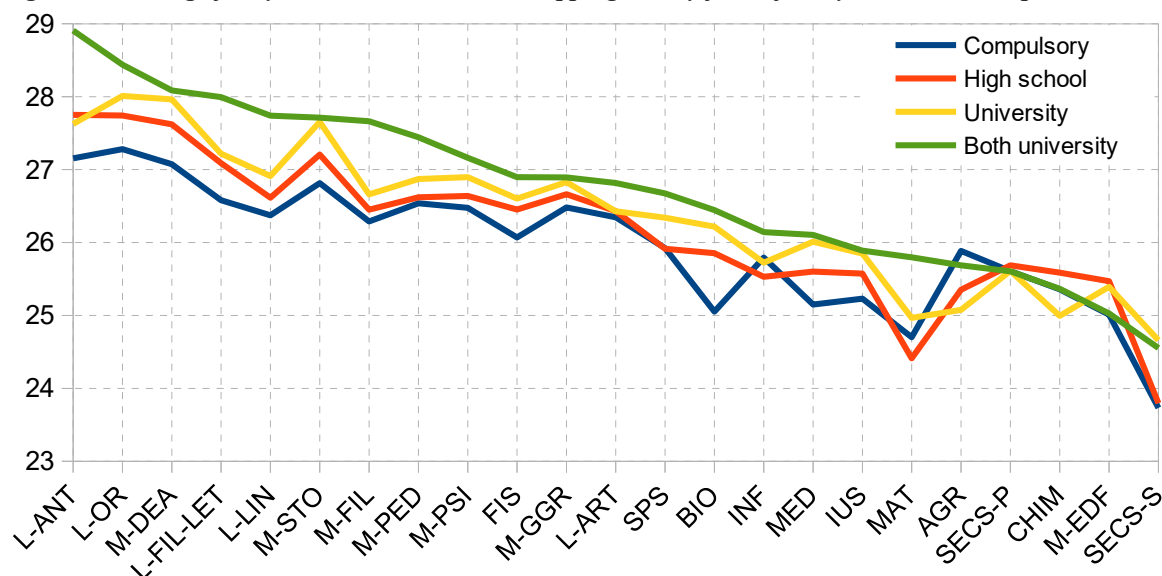


Average marks for dropouts are systematically lower than those obtained by the students continuing to second year, with the sole exception of INF (Computer Science), the anomaly being probably due to the very high demand for qualified professionals in the specific labor market sector, motivating a fair share of students to opt for immediately rewarding jobs without completing their university studies. In many cases, however, the gap is very small, around half a point or less: among groups with wider gaps we find the economic (SECS-P), agrarian (AGR), psychological (M-PSI), artistic (M-ART) and philosophical (M-FIL). It should be noted that the fields where the average grade is generally lower (mathematics-statistics) do not have a significant difference between dropouts and students continuing to second year.

Finally, it was examined (Figure 39) if and how the average grades classified by fields of study¹² differ on the basis of the parents' education level. The fields are ordered according to the average grade for the children of 2 graduates parents, a type of family background that is in many cases again associated with better results than the families with only one graduated parent.

¹² Again, some fields (VET, ICAR, GEO) were omitted due to the small number of cases.

Figure 39. Average first year exams marks and dropping out, by field of study and maximum parents education



In areas with better grades (left side of the graph) the gap between the top and bottom education levels is often even greater than one point, while it surprisingly narrows for some of the fields with the lowest average marks, such as economics, chemistry, sport sciences. The gap is again around one point for the two fields with the lowest average grades (mathematics and statistics).

7. Conclusions

The relevance of family background in determining the schooling career of children, in terms of track choices as well as performance, is a result shared by a vast body of literature. Tertiary education, the last stage of the formative experience for the vast majority of young people, is expectedly the stage that is more "mediated" by the previous scholastic experience, as well as determined by the development of the individual's adult personality, less affected by the educational influence of parents when growing up. On the one hand, in fact, the choice of the lyceum secondary school track and a good performance in it most likely define a future successful university student. On the other hand, it is plausible to assume that the student who at nineteen chooses to pursue university studies and selects the field of study is relatively more autonomous than the fourteen-year-old who must choose the secondary school track.

However, it is still of great interest to better understand what influence family characteristics can still exert from the point of view of social, economic and cultural inequalities on the university experience of their offspring; a clearer framework on these issues can be a valuable resource both to inspire schooling and youth-oriented public policies and to ensure full awareness of the context in which universities deploy their governance.

At the University of Turin the collection of the relevant information on the students' families for this reasons, proposed by the research group of the *EqualEducToEmploy* project, has been implemented since 2015. The analysis of the first results, carried out in this work, focused on the main features of the first phase of university student's life: primarily the dispersion after the initial year preventing the degree completion, whereas the first year has always been the most critical moment and frequent exit from the system; secondly, the results from the student activity in terms of successful exams during the first year. This investigation was framed in the context of an overall check-up of the characteristics of the 2015/16 students cohort at UniTo, which broadly confirms the typical situation outlined by the studies on the Italian university population in terms of gender, diploma and graduation mark, abandonment rate.

With regard to family characteristics, in terms of parental education 20% of the children have graduate fathers (as well as mothers) among undergraduates, a share that rises to 23-24% for master courses and reaches 30% for 5 years courses. On the other hand, father and mother differ more markedly at lower educational

levels, with 39% of fathers with compulsory education and 8 percentage points less for mothers (undergraduates). Parents jobs are rather heterogeneous, with a significant share of children of low qualifications parents: for master and five-years degrees, 17% have working fathers becoming 25% for undergraduates. The share is similar for low-skilled clerical professions, but without major differences between degree types. For fathers, the remaining 50% is divided between freelance professionals and highly qualified jobs (entrepreneurs, managers, executives), while among mothers many school teachers are found, with a share of 16% for five-years and master degrees.

In addition to the data specifically collected on the educational and work profile of the family, to explicitly assess the possible role of its economic wealth, the only available data of this nature was used, i.e. the ISEE disclosed by most students to get access to lower university fees. However, using this variable is difficult not only because of the partiality of the data (ISEE above the threshold of € 85,000 always pay full fees), but especially by the impossibility of attributing plausible high levels of ISEE to non-disclosers, as made clear by combining it with the other family characteristics (for example, there is still a 20% of non-disclosers who have both parents with compulsory education).

Moving to the studying experience during the first year, it must be remembered that all exams that do not end with some credits acquisition are not recorded by the National Student Registry. This greatly limits the ability to understand how less brilliant students careers develop, with failures to pass some exams, and unfulfilled expectations that motivate to reject the assigned grade. Any evaluation of the exam grades must take this into account.

The indicators considered here are the number of credits acquired during the first year, and the average grade obtained in the successful exams as well as their timing. Dropout students slow down the exam activity as the year goes on, and this is also accompanied by a shorter average time gap between subsequent exams. The gap in terms of number (credits acquired) and quality (grades) of exams between dropouts and those who continue is more marked in terms of credits than grades: differences when classifying by family characteristics are in genre rather limited, never exceeding 10 cfu and a couple of points (out of thirty) in grades. Generally, however, these differences by parents' education and jobs are more marked for dropouts: family connotation is therefore a more important factor for "critical" students from this point of view. Coming to the ISEE, acquired credits are almost insensitive, while higher grades are to a certain extent more associated with better wealth, even if - as for the dropout risk - things stabilize above the indicator average levels.

What then is the impact of the three family-related factors on the first year dropout risk, and on the studying outcomes obtained during this period? As far as dropout is concerned, it is the economic factor that appears to affect it the most, as shown both by exploratory analysis and by the prediction models for the dropout propensity that involve the three variables. At least up to medium-high levels of ISEE, a greater wealth is clearly associated with a gradually decreasing dropout risk (over € 50,000 the risk settles down). On the other hand, parental education appears to be only weakly relevant, and only some jobs are significantly associated with changing dropout risks (about six percentage points lower for children of doctors, managers and teachers rather than unskilled job). Entrepreneurs are the only parents with an effect in the opposite direction, probably driven by micro- and small businesses that probably favour dropping out to facilitate the early involvement in the family business.

On the whole, we can conclude that the connotation of the family of origin has a rather weak, tough not totally non-existent, relationship with the choices and results of those who, after the entire previous school career, decide to enroll in university; and the probably more relevant role is that of wealth, a factor that undoubtedly places more stringent material constraints on life, study and work choices of young people. However, given the particular circumstances in which ISEE is - or is not - disclosed, as described in Paragraph 4, a completely reliable picture of this issue will emerge only after further studies and investigations concerning the behavioural mechanisms of all students families in this regard.

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