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INEQUALITY IN HIGHER EDUCATION AND UNIVERSITY-TO-EMPLOYMENT TRANSITION

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Abstract

This thesis aims to shed light on the dynamics of educational and labor market disparities in Italy, contributing to the broader literature on human capital and providing insights into policy interventions that may address and potentially reduce inequalities in opportunities and outcomes. Drawing upon data from the Italian official surveys for higher education provided by the inter-university Consortium AlmaLaurea, the study examines how socioeconomic background, gender, and early career experiences influence access to higher education and labor market outcomes later in life. The research employs causal inference methodologies based on selection on observables strategies to offer robust insights into the drivers of inequality in the transitions from high school to university and from university to employment.

The study is organized into three interrelated chapters. The first chapter explores the gender gap in STEM fields, analyzing the impact of environmental factors - such as family, peers, high school teachers, and college students - on students' enrollment choices. The second chapter assesses the role of intra-curricular internships on graduates' intentions, aspirations, and short-term labor market performance. The third chapter investigates three alternative and complementary measure of parental background (social class, family resources and parental education) in shaping graduates' risk of unemployment, inactivity, or NEET (Not in Employment, Education, or Training) status.

Introduction

The transition from education to the labor market represents a pivotal stage in an individual's life and plays a crucial role in shaping broader socio-economic dynamics. It is a key mechanism for reducing social inequalities and fostering intergenerational mobility. In an era defined by rapid technological advancements and evolving labor market demands, the capacity of educational systems to prepare students for meaningful employment is under intense scrutiny. Simultaneously, systemic inequalities in access to education and employment opportunities continue to exacerbate social divides.

Higher education has traditionally been regarded as a gateway to better career prospects and upward social mobility. However, disparities in access to education, coupled with structural inefficiencies in labor markets, often perpetuate existing inequalities rather than alleviating them.

In Italy, these challenges are particularly pronounced. High levels of youth unemployment, significant regional disparities, and the persistent influence of socio-economic background on educational and occupational outcomes highlight the pressing need for targeted interventions. While focusing on the Italian context, where structural inefficiencies in the labor market and entrenched social inequalities pose additional barriers for young graduates entering the workforce, this thesis contributes to this ongoing discourse by exploring three critical dimensions of the education-to-work transition. Each chapter examines distinct but interconnected issues, shedding light on the obstacles and opportunities encountered by young individuals as they navigate this complex pathway. Together, these studies provide a comprehensive analysis of the factors influencing educational and occupational outcomes, with a particular emphasis on the Italian context.

The first chapter, "Good mentors and bad teachers: high school students' sources of information and the gender gap in STEM", investigates the environmental factors contributing to the gender gap in STEM disciplines (Science, Technology, Engineering, and Mathematics). Despite progress towards gender parity in access to tertiary education, women remain significantly underrepresented in STEM courses. Through an analysis based on administrative and survey data collected among freshmen at the University of Modena and Reggio Emilia, the study highlights how different sources of information—parents, teachers, peers, and university students—influence university enrollment choices. The findings show that teachers and, to a lesser extent, peers tend to reinforce gender

segregation, while parents and university students can act as compensatory forces. Particular attention is given to students from disadvantaged family backgrounds, for whom improved school mentoring and the use of university students as role models can have a particularly positive impact.

The second chapter, "Should I study or should I work? Internships, job seeking and job placement in Italy", analyzes the role of curricular internships in the transition from academia to the labor market, with a specific focus on the Italian context. Using a causal approach based on data from AlmaLaurea surveys, the study examines the impact of mandatory and optional internships on the short-term labor market outcomes of graduates. The findings reveal that, for first-cycle graduates, internships encourage job-seeking behavior, reducing inactivity but discouraging enrollment in second-cycle degree programs. Conversely, for second-cycle graduates, internships significantly increase post-graduation employment prospects. Furthermore, internships improve the alignment between acquired skills and job requirements, especially for bachelor's graduates. These results underscore the importance of policies that enhance internships as a tool to strengthen youth employability and job quality.

Finally, the third chapter, "No NEET to worry? The effect of parental background on Italian graduates' transition to employment", explores the impact of family background on the occupational trajectories of Italian graduates, with particular attention to the NEET (Not in Education, Employment or Training) phenomenon and unemployment. Based on data from the AlmaLaurea survey, the study shows how socio-economic background influences university-to-work transitions and job opportunities. Graduates from families with high socio-economic status tend to experience a smoother entry into the labor market, thanks to stronger social networks and financial family support, which allows for greater selectivity in job choices. However, the analysis also highlights how family background affects the quality and stability of employment obtained, revealing persistent intergenerational inequalities in the Italian context.

Although these three chapters focus on different aspects, they offer a comprehensive view of the challenges associated with the transition from university to the labor market. They emphasize the importance of targeted interventions to reduce gender inequalities, enhance internship experiences, and address socio-economic disparities. Together, these contributions provide an empirical basis for developing policies aimed at improving the effectiveness of the education system and fostering a fairer and more inclusive labor market.

Chapter 1: Good mentors and bad teachers: high school students' sources of information and the gender gap in STEM

Abstract

This study examines the environmental factors contributing to the STEM gender gap, focusing on the impact of different informational channels used by students when making university enrollment choices: family, high school teachers, peers, and university students. Using administrative and survey data on freshmen from the Italian university UniMoRe, a double-difference approach is applied, stratifying by family background. We find information from teachers and, to a lesser extent, peers reinforce gender segregation, while parents and university students counterbalance this effect. Evidences also suggest improving high school mentoring and leveraging university students as role models would be most effective for disadvantaged students.

1. Introduction

According to the Global Gender Gap Report 2022[1], women enrollment in tertiary education has increased worldwide at an increasing rate in the last five years, and gender parity in educational attainments is achieved in most countries.[2] The problem emerges when female enrollment is decomposed by degree field. There is a substantial gender gap in science, technology, engineering and mathematics (STEM).[3] In those fields, a lower number of women is enrolled and even lower is the number of female graduates. These fields tend to be perceived as "male-dominated", due to male overrepresentation, which discourages further female enrollment.[4] The choice of the fields of study

[1] See Section 2.7 pag.42. Downloadble at the link https://www3.weforum.org/docs/WEF_GGGR_2022.pdf
[2] See Bertocchi and Bozzano (2019) for a review on the historical evolution of gender gaps in education.
[3] Female enrollment in economics is stable throughout the years, while it increases in other STEM subjects, like engineering (Avilova and Goldin, 2018; Lundenberg and Stearns, 2019). See Allgod et. al. (2015), Tonin and Wabba (2015), Li (2018), Porter and Serra (2019) and Ahlstrom and Asarta (2019) for a discussion on the determinants of lower female enrollment in economics majors.
[4] According to the Global Gender Gap Report (2022), Information and Communication Technologies (ICT) and Engineering, Manufacturing, and Construction are the two STEM fields reporting the highest gender gaps in college enrollment.

has significant life-long consequences for women for their employability and earning profiles, since STEM degrees lead to higher employability and higher wages.

Among the different channels that the empirical research has considered to explain the persistence of such significant gender gap in STEM fields, psychological and environmental factors appear to play a crucial role in female segregation: family, peers and school teachers can influence female choice of the field of study (UNESCO, 2017), jointly with gendered stereotypes on STEM studies and jobs represented as exclusive "male domains".

As shown by Kahn and Ginther (2018) in the case for US, female underrepresentation in math-intensive science fields[5] can be traced back to childhood: despite biological differences are not significant drivers in mathematical ability at early developmental stages, gender gaps in mathematical ability widen in middle and high school, due to the negative influence exerted by gender stereotypes proposed by family, teachers and peers and other environmental factors, such as culture and role models. Luo et al. (2022) show that parental educational level and having STEM teachers as mentors positively affect female choice of a STEM degree. Peers do not affect significantly female attainment of a STEM degree, even if a stronger sense of peer belonging appears to be negatively correlated with obtaining a math-intensive degree. Cheng et al. (2019) provide strong empirical evidence that the role of parental occupation in STEM field has an heterogenous effect by student gender on student's field choice. One of the parents working in the STEM field increases the probability that a boy in high school will enroll in a related subject. However, the effect is stronger for women (and not for men) in their adulthood, since it increases the probability of entering the STEM field in adulthood above girl's aspirations to enter such field during adolescence. Parental support plays a different effect on math achievement between boys and girls: while mothers' support is beneficial to girls, it affects negatively male performance (Hoferichter and Raufelder, 2019).

The aim of present study is to contribute to this stream of literature looking at environmental factors. We focus on the role of the information that students gather in their when facing the college field choice. We consider four possible sources of information. The first three - parents, teachers and peers – are the main sources investigated in the literature, in their many direct and indirect effects. Since in this specific case we look at the information during the enrollment final decision, we consider a

[5] The authors propose a taxonomy of fields of study based on mathematical requirements and identify two main categories: LPS (life science, psychology and social science, without economics) and GEMP (geoscience, economics, engineering, math and computer science, and physical science). Women are underrepresented in GEMP.

further source, that will result also significant: the information gathered form currently enrolled university students.

To study the impact on the STEM gender gap of the advice that students seek within their networks, we rely on a survey administered at the time of enrollment to nearly 12,000 freshmen at the University of Modena and Reggio Emilia from 2020 to 2022 which directly questions about the channels that students declare to use to gather information at time of their enrollment decisions.

We use a double differences strategy that allow us to identify the gender bias effect by applying a selection on observable strategy under weak restriction hypotheses. This approach is also enabled by the richness of data encompassing educational background, familial circumstances, geographic origins, and the overall spectrum of external influences.

Since social influences are, by definition, inherent to the specific context in which they occur, we explore how occupational and educational parents' characteristics interact with these informational channels by stratifying the sample according to these two dimensions of both the family as a whole and each parent individually. These characteristics represent different facets of background conditions, which is evident in our findings when examining the data related to the information provided by parents.

According to the main results, while the guidance from teachers can inadvertently widen the gender gap in STEM fields, connections with family and current university students offer a significant counteracting influence. These findings form the basis for policy recommendations aimed at refining the informational and educational channels available to students to help reduce educational and subsequent economic gender disparities. The insight on students' family background reveals that the gender dimension of the effect of the advice students receive out of their families is markedly stronger for students hailing from worst parental backgrounds. This highlights the connection between gender dimensions and family background, and how the suggested policies may also affect the vertical aspects of inequalities within this context.

In the upcoming session of the article, we review the literature to explore the factors contributing to the gender gap in STEM fields, including the influences of family, peers, and teachers. The following session presents the data from the survey conducted at the University of Modena and Reggio Emilia, and then details the descriptive evidence on the association between external influence, STEM enrollment and gender differentials, by providing a general motivation of the study. The subsequent

section delves into the empirical strategy, including the identification framework and the statistical models used. We then discuss the results, highlighting key findings and implications. Finally, we conduct robustness checks and propose further research directions, concluding with some policy recommendations on the design of guidance and role model policies.

2. External influences and the STEM Gender Gap

Women's share of STEM education and employment has increased over the long term, but that progress has slowed considerably despite the increasing political salience of gender equality in society. Competencies in STEM are becoming extremely important not only for social and cultural participation of young individuals in a society more and more dominated by technology, but also as a competitive factor on the labor market: individuals with a STEM education have better access to the labor market and are more likely to receive better job opportunities and higher wages.

Among the explanatory hypotheses for the gap, a portion of the literature has focused on the role of mathematical skills. Achievement in quantitative subjects, measured either by grades or using (nationally or regionally administered) standardized tests is positively correlated with a student's choice of STEM field at the university and appears to be associated with other outcomes, such as interest in STEM (see among others Holmes et al. 2018, Hubner et al. 2017). The idea that girls are less capable than boys in math and differ in spatial skills represented a central element in traditional sex-centered explanations of the low numbers of women in engineering and science. This type of argument has become less and less common as evidence has accumulated that girls' and boys' math abilities do not differ significantly. Recent research focuses on girls' confidence in math, rather than on girls' mathematical skills. Among others, Zhao and Perez-Felkner (2022) find that female students who are more likely to perceive their mathematical abilities as strong will be more likely to select a STEM major in college compared to a less confident girl. However, Zhao and Perez-Felkner (2022) also find that, other things equal, girls who are self-confident in their math ability are more likely than comparable boys to select a major in social or natural sciences, rather than computer science or engineering.[6]

[6] The effect of differential math confidence holds true for different student age. See among others John, Vierra, and Robnett's (2022).

Alternative explanations highlight the social origins of the differences. A significant role in explaining gender differences in STEM enrollment and achievement (Xie, Fang and Shauman, 2015) can be traced back to family background. Parental expectations, educational resources, role models, cultural and social norms, support and encouragement, access to technology and tools, and stereotype threat all play roles in explaining gender differences in STEM enrollment and achievement. Family background, reflecting these factors, significantly influences a child's choices and performance in STEM fields, with potential consequences for gender disparities in these areas. Scholars have investigated the role of horizontal differences, such as parents' educational level and field, social class and occupation in order to explain daughter's STEM choices.[7] The link between parental occupation in STEM fields and the female choice in STEM has been explored in a number of directions, such as the academic persistence in STEM fields (Anaya et al. 2022), occupational aspirations (Cheng et al, 2019) and achievement in STEM (Mues et al. 2021)[8]. Family background (through the intergenerational mechanism of transmission of STEM-related human capital to the offspring) is empirically relevant to explain gender differences in the choice of STEM fields, individual aspiration, achievement and career patterns.[9]

Not only the familiar background affects the choice to enroll in STEM fields, but also close environment mainly represented by relatives, teachers, peers (see among others Henriksen et al., 2015; Mainhard et al., 2018; Menacho et al., 2021; Palmer et al., 2017; Salmi et al., 2016; Vennix et al., 2018). Luo et. al. (2022) provides evidence supporting the positive effect of having STEM teachers as mentors, which affects positively female choice of a STEM degree. School peer environment and, more in general, social context affect female choices to enroll in a STEM degree program. However, empirical evidence on the direction of the social influence on female choices is mixed. Teaching methods may affect female performance in math. Di Tommaso et al. (2024) investigates a teaching methodology focused on peer interaction through a randomised controlled trial in an Italian school. According to their work, this methodology improves girls' math performance, with no impact on boys, and reduces the math gender gap by about 40%.

[7] See among others Ertl and Hartman (2019), Holmes, Gore, Smith and Loyd (2018), Plasman, Gottfried and Williams (2021), Tilbrook and Shifrer (2022).
[8] However, it remains unclear the role of family having parents with occupational STEM backgrounds on STEM choices of young individuals with migration background and minorities of different ethnic origins (Lissitsa and Chachashvili-Bolotin, 2019; Gutfleisch and Kochan, 2022).
[9] Most studies focus on educational choices and achievement of adolescents. See Mues et al (2021) for parents' influence on early stages of education.

Using a data set on Swedish students, Raabe et al. (2019) finds strong evidence on friend influence: students tend to adjust their preferences to match those of the friends. Additionally, girls tend to retain the STEM choice the larger the number of female classmates showing the same preference. Other studies do not find concluding evidence on friend/peer effect on STEM choice. According to Luo et al. (2022), peers do not affect significantly female attainment of a STEM degree, even if a stronger sense of peer belonging appears to be negatively correlated with obtaining a math-intensive STEM degree. Using Danish administrative data, Brenoe and Zolitz (2020) provide evidence that a larger proportion of female peers reduces women's probability of enrolling in and graduating from STEM programs, while men's STEM participation increases with more female peers present.

Policy proposals to boost female enrollment in STEM fields target the visibility of female STEM role models, especially in school (Gil- Quintana et al, 2020, Cheng et al 2020). Female role models in STEM are positively correlated with girls' interest in STEM subjects, according to a study run by Microsoft (2017) on a sample of 11.500 European young women. Girls who know female role models show almost twice the level of interest in STEM as girls without them. However, the lack of a positive female role model in STEM aggravates the problem, since more than half of the sample (about 64% of the girls interviewed in the Microsoft study) could not identify any women who excel in STEM. In addition, the Microsoft study shows the need to feel supported by their families, with 81% of girls who receive parental support reporting a predisposition to pursue STEM studies.[10] On similar grounds, Nowak et al. (2014) sustains that 'an important objective in seeking increased retention rates is to build a critical mass of women who can become role models for women to follow' (p. 57). Tal et. all (2024) show that women are more influenced than men by a role model which stimulate their intrinsic motivation and improve female success rate in STEM fields. Mentoring programs should be designed to provide young women with more role models in order to increase female achievements in STEM fields.

Gender-science stereotypes are also a determinant of STEM enrollment. Gender-science stereotypes of math and science affect male and female choices of STEM majors depending on the perceived masculinity image of the field subject. STEM subjects perceived as less masculine are more likely to

[10] See also studies regarding the importance of teaching methods in STEM. Relevant issues among others to increase female interest in STEM subjects are female participation to out-of-school STEM activities (Henriksen et al 2015, Palmer et al 2017), a learning environment promoting curiosity and experimentation (Dasgupta and Shout, 2014; Ahmed and Mudrey, 2019), an applied teaching method (Diekman et al, 2010).

be selected for a STEM career. Makarova et. al. (2019) show that the masculinity image of three subjects (math, chemistry and physics) differs across male and female students. According to Olmedo-Torre et al (2018) social stereotypes and immediate environment are perceived by female students as the main reasons for low female enrollment in STEM.[11]

Additionally, environmental factors such as family affects the gender gap in STEM graduation through gendered educational choices taken at early stage of education. In the case of Italian Universities, Granato (2023) estimates the determinants of gender gap in STEM graduates, using data from Italian graduate students leaving college from 2010 to 2015. Granato (2023) shows that about a half of the gender gap is explained by gender gap in math and science due to different high school curricula. Using data from Italy and controlling for individual and family background characteristics, Contini et. al. (2017) provide robust evidence that girls systematically underperform boys in math, and that the gender average gap widens with Italian pupils' age. Empirical evidence shows also that the gender achievement gap in math and reading widens after college.[12]

Rather than exploring the various stages of generation and widening of the gender gap, we consider the different channels used to gather information during the enrollment decision: parents, teachers, school peers, or university-enrolled students. We assess the various impacts that each channel has on the gender gap and how these impacts vary depending on students' backgrounds. While confirming some common results in the literature, the aim of this deeper insight is to provide some detailed evidence on the compared impact of the four different channels as to support the design of policies that effectively target and assess the external influences with great impact on the choice of the academic pathway to undertake.

3. Data, variables and descriptive statistics

The study exploits a dataset resulting from the match between sample data collected by the

[11] See also Starr (2018) and Bloodhart et al. (2020) for preconceived and distorted stereotypes in STEM.

[12] Fryer et al. (2010) reports the existence of a substantial gender gap in mathematics in the early years of schooling using a nationally representative panel of US children. According to Fryer et all (2010), while there is no significant math gender gap upon entry to school, girls lose ground relative to boys over the first six years of school, half of the black-white gap over these same ages. Empirical evidence does not support explanations such as less investment by girls in math, low parental expectations, and biased tests.

AlmaLaurea Consortium at the time of enrollment and university administrative records of the University of Modena and Reggio Emilia (UniMoRe), an Italian medium sized public university. The AlmaLaurea Inter-University Consortium collects data since the late 90s to depict the Italian higher education scenario and it is responsible for the official and national wide *Graduates' Profile Survey* and *Graduates' Employment Status Survey*. UniMoRe is one of the Italian universities to have adopted an additional AlmaLaurea's tool in order to gather standardized information also on freshmen at the time of enrollment. This specific questionnaire is mandatory and contains a wide range of information on prospective students including the channels of influence, motivations and orientation tools that led students to their university degree choice, as well as information about socio-economics background of enrolling students and their families.

After retaining only those observations that have non-missing values for all relevant variables, the resulting sample contains data on 12,106 students enrolled at the UniMoRe from the academic year 2020/2021 up to the academic year 2022/2023.

The definition and descriptive statistics for the field choice and the four channels of influence in making the university choice examined in the empirical strategy in Section 4 are shown in Table 1.

The sample is made up of around 57% of women and 43% of men and it is split down the middle between STEM students and not. However, this picture changes when we consider the enrollment rate by gender. In line with the international evidence[13], girls are underrepresented in STEM courses with only 37% of them who opt for that career path compared to 68% of boys.

Table 1: Descriptives statistics (outcome and treatment)

	Women	Men	STEM	Non-STEM	Total
	6,890 (56.9%)	5,216 (43.1%)	6,134 (50.7%)	5,972 (49.3%)	12,106 (100.0%)
Woman			0.42 (0.49)	0.72 (0.45)	0.57 (0.50)
STEM	0.37 (0.48)	0.68 (0.46)			0.51 (0.50)
Influence of parents	0.48 (0.50)	0.49 (0.50)	0.51 (0.50)	0.45 (0.50)	0.48 (0.50)
Influence of teachers	0.27 (0.45)	0.35 (0.48)	0.33 (0.47)	0.28 (0.45)	0.31 (0.46)
Influence of c. students	0.52 (0.50)	0.48 (0.50)	0.51 (0.50)	0.50 (0.50)	0.51 (0.50)
Influence of peers	0.47 (0.50)	0.50 (0.50)	0.48 (0.50)	0.49 (0.50)	0.48 (0.50)

[13] Empirical evidence on math gender gap is robust across western countries, among which Italy displays one of the largest according to the Program for International Student Assessment (PISA).

Our main information of interest comes from the following question: *Below you will find listed various sources and channels that you can turn to, to gather information, when you have to choose a degree program and university to matriculate in. For each one you should indicate whether it was helpful to you in making your choice (or, possibly, if it is a source that you did not use)*.
We consider the answer corresponding to the 4 advising channel, respectively: *schoolteachers*; *peers school mates*; *parents and other relatives*; *other university students.* We binary recode the variable from the survey by considering a "high influence" when the answer is *definitely yes*, and *more yes than not*, as opposed to the answers *more not than yes*, *definitely no* and *not used*.
In the overall sample, the channels of college students, parents and peers appear as the dominant influences in the university choice. A high level of parents' influence is declared by students without gender differences. Differences that slightly arise when the sample is split according to whether the courses are STEM or not: students who decide to enroll in a STEM course are more often influenced by parents. Students who declare a high influence of university students already enrolled in universities are mainly woman without difference by field of study. Even if in the overall sample it appears as the less important channel, the influence received by high school teachers is the channel with the highest gender difference. Men are more frequently under the high pressure of teachers' suggestions than women and the high pressure of teachers is especially evident for those who opt for a STEM career.

The descriptive statistics of control variables are included in the Appendix. Table A1 reports three set of control variables. The first block is represented by the information on students' high school path, including the type of high school and the final grade. The second block exploits the administrative information on students to characterize the geographical background: nationality, off-campus condition, macro-region of origin in Italy, features of municipality of origin (inner area or district capital) and the employment rate of the Labor Market Areas (LMAs) of origin. The LMAs are sub-regional geographical areas defined by the Italian National Statistical Institute (ISTAT) to group homogeneous and integrated sub-regional labor markets. The number of geographical controls is motivated by the well-documented territorial heterogeneity for Italy[14].

[14] In 2021 the highest regional disparities in EU were recorded in Italy (a coefficient of variation of 17.5%). Broadly, there is a north–south split between Italian regions: the northern Provincia Autonoma di Bolzano/Bozen recorded the highest employment rate (79.2%), while the southern island region of Sicilia has the lowest one (46.2%) (Eurostat, 2023).

The third set of variables records the educational and occupational characteristics of student's father and mother. We aggregate the occupational features in a dummy variable distinguishing "low status occupations" from "high status occupation". In the former category we include, *Self-employed worker, co-employer, cooperative member*; *blue collar and similar*; *homemaker, white collar with low level of qualification*. In the latter we include *white collar with high level of qualification, entrepreneur, professional, teacher* and *executive.* While the occupational background roughly split the sample in half with gender differences (48.3% of students have fathers with a high-status occupation vs. 42% of mothers in the same occupational condition), the scenario is very different as regards to education. Mothers are more frequently graduated than fathers (22.4% and 17.8% respectively) but with on average a very low share of students with at least one of the parents with a higher education level. These evidence from our sample reflect the distribution of educational attainments in the Italian population. Only the 20% of the Italian population older than 25 years has a university degree in 2021, under the EU average of 33.4% (ISTAT, 2022).

4. Empirical strategy

This paper aims to identify the potential effects of informational channels utilized by prospective university students when selecting their field of study. Since the data are collected from students who are enrolling, the validity of the analysis and its results is conditioned on the decision to pursue a university education.

The initial part of the analysis focuses on discerning the impacts of four external influence channels (high school teachers, parents, peers, and university students) on the probability of enrolling in a STEM faculty. Following this, we delve into the examination of the heterogeneity of these effects, specifically analyzing how these determinants of university choice vary based on students' backgrounds.

Simplifying with a linear formulation, the baseline model is as follows:

$$(1) \quad Y_i = \alpha + \beta_1 Z_i + \beta_2 Gender_i + \beta_3 Z_i \times Gender_i + \boldsymbol{\gamma X}_i + \varepsilon_i$$

where Y_i is the probability of enrolling in STEM, Z_i is the dummy for channel high influence, *Gender* takes value 1 for females and 0 for males, and X_i is a vector of controls including also time dummies. Our parameter of interest β_3. Consistently estimating of this parameter require less restrictive hypothesis than in the case of β_1, i.e, the independence between the probability of receiving a high influence from a channel and the probabilities of choosing a STEM degree conditioned to the influence received. In our case the focus is on first differences, the impact on gender differentials. We can thus allow endogeneity between enrollment decisions and the exposure to informational channels if this relationship doesn't have a specific gender dimension. Otherwise said, the restriction hypothesis is much slacker: conditioned to observables including all gender interactions, the differences by gender in the probability of receiving a high influence have to be independent from any unobservable related to the enrollment choice.

Since we are in investigating the channels of family, peers, university acquaintances, and teachers, the observables we include consist in a very broad set of individual characteristics that encompass geographical origins, educational paths, professional sectors and education of parents, distinguished between father and mother, as well as the other external channels to catch also all unobserved factors that impact on the overall individual exposure to external influences. Under the independence assumption conditioned to all this set of variables we can identify the impact of the different informational channels on the gender bias by estimating the parameter β_3, using a selection on observable strategy that balance for observables. To this option we choose a weighted approach by performing an IPW correction. In the first stage we include full interactions with the gender dummy and estimate with a logit specification the following model:

$$(2) \quad Z_i = \tilde{\alpha} + \tilde{\boldsymbol{\beta}}\boldsymbol{X}_i + \tilde{\boldsymbol{\gamma}} Gender_i \times \boldsymbol{X}_i + \tilde{\varepsilon}_i$$

The same procedure is applied for each of the four channels to obtain the four correspondent coefficients β_3. In each of these separate estimations the controls include also the variables of the other channels of influence.

As to the control variables, since we are in investigating the channels of family, peers, university acquaintances, and teachers, we control for a broad set of individual characteristics that encompass geographical origins, educational paths, professional sectors and education of parents, distinguished

between father and mother. For each of the four channels, we also control for the three other channels, accounting thus also for the overall of an individual's recourse to informational channels. To analyze possible behaviors by sub-groups, the models are then replicated by stratifying by students' family background.

To assess the validity of the results, we have performed a robustness check on the weighting procedure selected. In this further step of analysis, the IPW correction balancing according to the predictions obtained with the estimation of model 2, is replaced by a double weighting procedure. We first balance for gender and then use the weights in the balance for treatment. In the first stage, we estimate with a logit specification the following model:

$$(3) \quad Gender_i = \alpha + \boldsymbol{\delta Z_i} + \boldsymbol{\gamma X}_i + \tilde{\varepsilon}_i$$

Again, we include a broad set of observable characteristics including geographical origins, educational paths, professional sectors and education of parents, as all the four external channels. The predicted values of model 3 are the then used as weights in Equation 2 without the interacted term $\tilde{\boldsymbol{\gamma}} Gender_i \times \boldsymbol{X}_i$.

5. Results

The first part of Section 5 focuses on discerning the impacts of the four informational channels (high school teachers, parents, peers, and university students) on the probability to enroll in a STEM faculty, looking for channels that amplify gender segregation and channels able to offset negative influence. In the second paragraph, we delve into the examination of the heterogeneity of these effects, specifically analyzing how these determinants of university choice vary based on students' backgrounds, distinguishing between father and mother. This follow-up is dictated by the attention paid by the literature on this topic: family socio-economic background plays a significant role in explaining gender differences in STEM enrollment (Xie, Fang and Shauman, 2015), academic persistence (Anaya et al. 2022), occupational aspirations (Cheng et al, 2019) and achievement (Mues et al. 2021).

5.1 Main findings

Table 3 presents the results of the main estimates of the model outlined in Equation 1. The top rows display the coefficients of interest, specifically those related to the interactions between the dummy variable indicating the student's gender and the variable representing the intensity of the specific informational channel, as reported by the students. Each of the four columns shows the estimate corresponding to the model that consider the interacted term and the IPW balance for one of the four channels at a time.

The first remarkable finding is the significance of the coefficients of all four channels, indicating that informational channels play an important role in determining gender differences in the choice of enrollment in degree programs. Specifically, it can be observed that two channels -parental influence and influence from students who are already attending university - have positive coefficients, thereby playing a role in narrowing the gender gap. Conversely, the influences exerted by schoolteachers and peers have the opposite effect.

Table 3: Probit for the probability of enrollment in STEM - base model

	W. D-D analysis, base model			
	T: parents	T: teachers	T: c. students	T: peers
Infl. of parents*Woman	0.036**			
	(0.017)			
Infl. of teachers*Woman		-0.044**		
		(0.020)		
Infl. of c. students*Woman			0.035**	
			(0.018)	
Infl. of peers*Woman				-0.034*
				(0.019)
Woman	-0.152***	-0.112***	-0.152***	-0.127***
	(0.012)	(0.011)	(0.013)	(0.014)
Infl. of parents	0.031**	0.039***	0.050***	0.044***
	(0.013)	(0.010)	(0.009)	(0.009)
Infl. of teachers	0.019**	0.039***	0.011	0.007
	(0.009)	(0.015)	(0.010)	(0.010)
Infl. of c. students	0.012	0.021**	-0.006	0.010
	(0.009)	(0.011)	(0.014)	(0.009)
Infl. of peers	-0.029***	-0.033***	-0.028***	-0.003
	(0.009)	(0.010)	(0.009)	(0.014)
Obs.	12,106	12,106	12,106	12,106

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Notes: estimations include controls for geographic origins (nationality, district capital, inner area, macro-region and off-campus condition), year, high school type and high school grade, employment rate in the Labor Market Areas (LMAs) from which the prospective students come from.

In terms of the magnitude of these effects, receiving a high level of influence from teachers, as opposed to a low level, increases the gender gap in the probability of enrolling in a STEM faculty by 4.4%. Besides, the influences exerted by the information collected form family members and university students both reduce the gap by approximately 3.5%. A result that is similar in size but opposite in direction is the influence of peers, which is however relatively less significant, with a 10% level of significance compared to the 5% of the other three channels.

While the evidence on high school teachers cannot be directly compared to the study by Luo et al. (2022) on teachers due to the lack of information on the subjects taught, the findings regarding the

impact of parents align with the significant role attributed to them in explaining gender differences in enrollment and achievement (Xie, Fang, and Shauman, 2015; Anaya et al., 2022; Cheng et al., 2019; Mues et al., 2021). This is also consistent with literature identifying parents as primary social agents who positively influence their child's career aspirations and values (Sonnert, 2009; Almarode et al., 2014). According to Jiang et al. (2024), female first-generation college students, who are more likely to be ethnic minorities (mainly Latinx and Black students), receive less parental support to enroll in STEM studies and develop lower math and science motivational beliefs since high school, thereby explaining a lower probability to choose STEM studies.

As to peers' advice, the negative relationship observed is consistent with the findings of Brenøe and Zölitz (2020) and Raabe et al. (2019), who explain it as an adjustment of female preferences to align with those of female peers. However, this is not consistent with Luo et al. (2022), who identified a positive effect of peers on STEM enrollment for girls. Their findings, though, pertain to selective science high schools and might be explained by an ex-ante selection process in which parental background also plays a role, an issue that we will investigate further below.

The coefficients in the other rows, those related to non-interacted terms, provide some additional descriptive evidence. The gender coefficient confirms the existence of a significant gender gap in field enrollment choices[15]. Regarding the coefficients of the informational channels, it is important to remember that even when considering the coefficient of a channel in the column where the interaction is associated with that specific channel and hence, where the IPW balancing pertains to that same channel, the interpretability remains purely descriptive. As explained in the methodology section, a causal interpretation would require assuming a much more restrictive identification hypothesis, i.e. that individuals with different propensities to enroll in STEM are on average equally susceptible to each channel of external influence.

[15] The coefficient of the non-interacted terms differs between the four model not only because of the different interaction considered but also because each model is weighted according to a different IPW specification of the first stage treatment variable.

5.2 The role of student family background

To deepen the evidence presented above, we now turn to examine the differential impact of these channels based on students' family backgrounds features. On one hand, family characteristics can directly influence the impact that the family itself exerts on children. In our case this would concern the first channel we have considered, i.e. the information provided by parents. On the other hand, socioeconomic status, often reflected in the professional standing of the parents and their educational attainment, can also significantly mediate the influence of the other external factors. By analyzing how these channels operate differently across students from various family backgrounds, we can thus gain insights into whether and how these factors contribute to reinforcing or mitigating the gender gap, and how this dynamic relates to the intergenerational dimension of inequalities. This analysis may offer a critical perspective for evaluating potential policy interventions aimed at addressing both horizontal and vertical inequalities.

Moreover, the impact of paternal and maternal features might be different due to traditional gender roles, differing expectations, or distinct forms of social capital each parent may provide. By separately analyzing the characteristics of the father and mother, we can capture more accurately the complexity of family dynamics and their role in either perpetuating or reducing gender disparities.

We consider two distinct dimensions of family background: occupational status and educational level. Indeed, different proxies of socioeconomic background capture different aspects of the influence of social origin. Specifically, education reflects not only cognitive skills but also non-cognitive traits, while occupational class serves as an indicator of social status and access to social networks, which can provide resources and opportunities that further shape educational and career trajectories (Bukodi & Goldthorpe, 2013).

Table 4 reports the results of the sample stratification by parents' occupational status, categorized as "high" or "low," as defined in the data section. We limit the reported evidence to the coefficient of interest for each of the 24 separate models, with 6 models for each of the 4 channels depending on the different subsamples considered. The first two columns present the results for the sample split according to the professional status of the family as a whole: the first column shows the results of the

models estimated on students having at least one parent with high status, while the second column concerns the other students, with no parents having high status. The remaining four columns present the results of the estimation where the sample is split depending on the professional status of the father and the mother, respectively.

Table 4: Probit for the probability of enrollment in STEM - stratification by parents' occupation

	W. D-D analysis, stratification (occupation)					
	At least one high status	None high status	Father high status	Father low status	Mother high status	Mother low-status
Infl. of parents*Woman	0.018	0.059**	0.020	0.046*	0.006	0.054**
	(0.021)	(0.029)	(0.024)	(0.024)	(0.026)	(0.023)
Infl. of teachers*Woman	-0.026	-0.057*	-0.037	-0.045*	-0.021	-0.065**
	(0.025)	(0.031)	(0.028)	(0.027)	(0.031)	(0.026)
Infl. of c. students*Woman	0.012	0.063**	-0.004	0.064**	0.008	0.055**
	(0.023)	(0.029)	(0.026)	(0.025)	(0.028)	(0.024)
Infl. of peers*Woman	-0.045*	-0.014	-0.002	-0.066**	-0.043	-0.020
	(0.024)	(0.031)	(0.027)	(0.026)	(0.028)	(0.025)
Obs.	7,379	4,727	5,843	6,263	5,087	7,019
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1						

Notes: estimations include controls for geographic origins (nationality, district capital, inner area, macro-region and off-campus condition), year, high school type and high school grade, employment rate in the Labor Market Areas (LMAs) from which the prospective students come from.

The negative influence of teachers and the positive impact of parents and current university students are confirmed; however, the gender bias effect is limited to the case of students with lower levels of family socio-economic background, both considering parents as a whole or the influence of mother and father separately. While keeping the same sign, the influence exerted by peers operate only when students are from the upper class. If the reduction of sample sizes may justify the lower significance level, it is worth to notice that the magnitude of the coefficients substantially increases. Altogether, what clearly emerges is the higher exposure of students from lower social classes and a strong impact of the information gathered from older university students.

Looking at the detail in which the occupational profiles of the two parents are taken into consideration separately, we can observe that the evidence on the first three channels is confirmed for both the father and the mother. Indeed, the coefficients are significant only in the case of low status. However, we also observe a greater significance in the case of the mother where the value of the coefficients is also slightly higher except for the case of the university students channel, which in the case of the low status father reaches the highest value of all and equal to 6.6%.

As to the channel of the information collected through peers, which in the overall picture also appeared to have a role in widening the gender gap but to a lesser and less significant extent, we note that the sign of the coefficient and the low significance is confirmed but remains only in the subsamples with more observation, i.e., the case in which one parent has high status and in the case in which the father has a low status occupation.

Table 5 reports estimate equivalent to those in the previous table but considers the level of parental education instead of their occupational status. As we anticipated, when conducting these stratifications, we must distinguish between the direct relationship - concerning the information received from the family, i.e., the unit in relation to which we are stratifying, for which we might expect marked differences due to the variation in how parental occupation and education alter the type and content of possible information conveyed - and the indirect relationship, which involves how other external influences might act differently being mediated by characteristics of the family of origin. In fact, it is precisely in the direct channel where substantial changes are observed: unlike in the case of occupational status, where the effect on the gender gap is limited to those from worse backgrounds, the opposite occurs for the level of education. In this case, the reduction in gender differences resulting from the use of information received from the family occurs only in families with a higher level of education. This result aligns with previous assumptions according to which parents characterized by higher educational level may have higher expectations on children's performance in math intensive subjects (Simpkins et al. 2006) or else may be better in identifying STEM activities that increase pupils' interest in the subject (Dabney et al. 2016, Sahin, 2017). The key role attributed to parents with higher education in educational choices of their offspring confirm the main evidence reported by the stream of literature on the interplay of different proxies for socio-economic background. Parental education, especially the mother's education, is the most significant predictor of children's educational attainments (Bukodi & Goldthorpe, 2013; Buis, 2013). Parental

occupation, besides linking education to income, reflects social standing, prestige, and social capital (Weeden & Grusky, 2005). Thus, while parents with higher education exert pressure on the educational path of their children, a high-status occupation could show its effects after graduation when searching for employment. However, what deviates from the literature on the topic is the different role attributed to the education of father and mother. In our sample the evidence is mainly driven by the father's channels, since the positive impact of parents' counselling is significant when the father has a degree. This could also be related to the even greater STEM gender gap among previous generations.

In the case of teachers and university friends, the analysis by parental education level yields results substantially like those found for the occupational status, with the significance of effects limited to those from relatively worse family backgrounds. The difference from the previous case, however, is that the effect of lower status is no longer linked to both parents but is instead limited to the maternal channel. Moreover, in the case of stratification by parental education, the significance of the peers' variable seems to diminish in narrower subsamples, confirming a generally lower significance of this variable.

Table 5: Probit for the probability of enrollment in STEM - stratification by parents' education

	W. D-D analysis, stratification (education)					
	At least one graduated	None graduated	Father with degree	Father without degree	Mother with degree	Mother without degree
Infl. of parents*Woman	0.064**	0.021	0.096**	0.024	0.050	0.028
	(0.031)	(0.021)	(0.040)	(0.019)	(0.035)	(0.020)
Infl. of teachers*Woman	-0.056	-0.046**	-0.082*	-0.040*	-0.022	-0.054**
	(0.036)	(0.023)	(0.044)	(0.021)	(0.042)	(0.022)
Infl. of c. students*Woman	-0.008	0.046**	-0.020	0.043**	0.020	0.037*
	(0.033)	(0.021)	(0.043)	(0.020)	(0.038)	(0.020)
Infl. of peers*Woman	-0.018	-0.039*	-0.001	-0.040*	-0.048	-0.030
	(0.034)	(0.023)	(0.045)	(0.021)	(0.039)	(0.021)
Obs.	3,633	8,473	2,156	9,950	2,713	9,393

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Notes: estimations include controls for geographic origins (nationality, district capital, inner area, macro-region and off-campus condition), year, high school type and high school grade, employment rate in the Labor Market Areas (LMAs) from which the prospective students come from.

As we anticipated in the previous section, we have performed a robustness analysis by adopting an alternative weighting methodology. Results of all estimates are strongly robust, and we report them in the Appendix.

6. Conclusion

In this paper, we aim to contribute to the literature on the gender gap in STEM, particularly to the stream that investigates the role of environmental factors and social influences in educational choices rather than mechanisms that can be traced, more or less directly, to biological differences. Among the various ways external influences can impact the choice of university courses, we focused on the role of different informational channels that prospective university students rely on, specifically family, high school teachers, acquaintances already enrolled in university, and peers. Preliminary descriptive analyses based on the available data, an official survey of students at the University of Modena and Reggio Emilia that directly investigates the informational channels students use when enrolling, provided the motivation for this study. Indeed, different usage of these four channels between those who choose STEM and those who do not, as well as between male and female students, emerged. The general findings are consistent with the bulk of the literature on the subject, extending its validity while also providing additional evidence useful for policy formulation in this area.

The results show a robust picture of different influencing channels acting in opposite and overlapping directions. The teachers' channel contributes to widening the gender bias. Same evidence though less significant concerns the peers' channel. In contrast, a positive narrowing role is played both by the information from students already enrolled in a university course, an overlooked aspect in the literature, and by the family.

Environmental influences and networks are, by definition, context-specific, which led us to investigate how different family characteristics might mediate the impact of these informational channels. We did this by stratifying the sample based on two distinct characteristics of family background: occupational status and the educational level of both the family as a whole and each

parent separately. These two characteristics capture very different aspects of background conditions, and this is reflected in our results when directly considering the information gathered through parents. For this channel, while the stratification by parents' occupational status shows that the role of reducing the gap found in the overall sample is relevant but specific to students from lower socioeconomic backgrounds (operative opposed to executive), the stratification by educational level shows the significance and relevance of the effect exactly the opposite, i.e., for students from higher backgrounds (at least one parent graduated). Moreover, in the first case, the evidence is consistent regardless of the individual parent's occupational status and is more significant for the mother's status, while in the second case, the link to the parent's educational attainment is relevant only in the case of the father's degree.

As for the other channels, the stratification is particularly significant regarding both the negative effect of the teachers' channel and the positive effect of the information gathered through acquaintances already enrolled in university. In both cases, whether considering the occupational characteristics or the educational level of the family, and whether considering the family as a whole or just one parent, it is the students from lower socioeconomic backgrounds who are most affected by these two channels.

These results are useful for designing policies that can counteract self-segregating educational choices, both those directly related to gender and those that, through this channel, interact with the vertical dimension of inequalities. The negative effect of teachers, in addition to highlighting how stereotypes are shared and conveyed even by educators, underscores the limitations of guidance in high schools. This system becomes even more critical considering that teachers' impact is more significant on students from disadvantaged backgrounds who generally have lower continuation rates in education. In other words, teacher training and improving school counseling would simultaneously be effective policies for reducing gender gaps and promoting social mobility.

The evidence of a positive impact of information from acquaintances who have already started university also provides some policy suggestions. Countering stereotypes through role models is usually done by presenting exemplary figures, female excellences in science or new technology development. However, it may not be fame that matters, but simply encountering actual experiences that debunk stereotypes. In the example of gender segregation, interacting with a simple female

engineering student may be just as effective as listening to a woman astronaut or science Nobel prize. Consistently, a more systematic focus on college students and alumni as vehicles for more effective educational orientation policies could be pursued.

Further development of the analysis can take two directions. On one hand to extend the other channels of influences other than in-person contacts; on the other hand, one could focus on the effectiveness of the different information channels in terms of students' university choice or labor market careers.

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Appendix

A) Data, variables and descriptive statisticts

Table A1: Descriptives (covariates)

	Men	Women	Total		
		M(SD) / n(%)		Min	Max
Italian	0.98 (0.14)	0.97 (0.17)	0.98 (0.16)	0	1
Macro-region				1	5
North-West	381 (7.3%)	488 (7.1%)	869 (7.2%)	0	1
Nord-East	3,842 (73.7%)	5,505 (79.9%)	9,347 (77.2%)	0	1
Centre	238 (4.6%)	221 (3.2%)	459 (3.8%)	0	1
South	572 (11.0%)	511 (7.4%)	1,083 (8.9%)	0	1
Islands	183 (3.5%)	165 (2.4%)	348 (2.9%)	0	1
District capital	0.09 (0.29)	0.08 (0.27)	0.08 (0.27)	0	1
Inner area				1	3
central pole	3,325 (63.7%)	4,479 (65.0%)	7,804 (64.5%)	0	1
mid-range	1,512 (29.0%)	1,958 (28.4%)	3,470 (28.7%)	0	1
peripheral area	379 (7.3%)	453 (6.6%)	832 (6.9%)	0	1
Off-campus student	0.29 (0.45)	0.21 (0.41)	0.24 (0.43)	0	1
High-school type				1	10
gymnasium	184 (3.5%)	462 (6.7%)	646 (5.3%)	0	1
scientific	2,190 (42.0%)	1,692 (24.6%)	3,882 (32.1%)	0	1
linguistic	218 (4.2%)	1,300 (18.9%)	1,518 (12.5%)	0	1
humanities	56 (1.1%)	458 (6.6%)	514 (4.2%)	0	1
other lyceum	140 (2.7%)	819 (11.9%)	959 (7.9%)	0	1
business	507 (9.7%)	1,010 (14.7%)	1,517 (12.5%)	0	1
technical	1,569 (30.1%)	451 (6.5%)	2,020 (16.7%)	0	1
other technical school	120 (2.3%)	115 (1.7%)	235 (1.9%)	0	1
professional	143 (2.7%)	268 (3.9%)	411 (3.4%)	0	1
other	89 (1.7%)	315 (4.6%)	404 (3.3%)	0	1
High-school grade				1	4
60-75	1,655 (31.7%)	1,735 (25.2%)	3,390 (28.0%)	0	1
76-84	1,215 (23.3%)	1,494 (21.7%)	2,709 (22.4%)	0	1
85-94	1,077 (20.6%)	1,709 (24.8%)	2,786 (23.0%)	0	1
95-100	1,269 (24.3%)	1,952 (28.3%)	3,221 (26.6%)	0	1
Employment rate LMS	0.35 (0.48)	0.37 (0.48)	0.36 (0.48)	0	1
Education of father				1	4
primary	178 (3.4%)	318 (4.6%)	496 (4.1%)	0	1
junior high school	1,175 (22.5%)	2,015 (29.2%)	3,190 (26.4%)	0	1
high school	2,768 (53.1%)	3,496 (50.7%)	6,264 (51.7%)	0	1
university	1,095 (21.0%)	1,061 (15.4%)	2,156 (17.8%)	0	1
Education of mother				1	4

primary	142 (2.7%)	241 (3.5%)	383 (3.2%)	0	1
junior high school	798 (15.3%)	1,339 (19.4%)	2,137 (17.7%)	0	1
high school	2,906 (55.7%)	3,967 (57.6%)	6,873 (56.8%)	0	1
university	1,370 (26.3%)	1,343 (19.5%)	2,713 (22.4%)	0	1
Occupation of father				1	2
low-status	2,430 (46.6%)	3,833 (55.6%)	6,263 (51.7%)	0	1
high-status	2,786 (53.4%)	3,057 (44.4%)	5,843 (48.3%)	0	1
Occupation of mother				1	2
low-status	2,841 (54.5%)	4,178 (60.6%)	7,019 (58.0%)	0	1
high-status	2,375 (45.5%)	2,712 (39.4%)	5,087 (42.0%)	0	1

B) Robustness checks

Table B1: Probit for the probability of enrollment in STEM - base model

	W. D-D analysis, base model			
	T: parents	T: teachers	T: c. students	T: peers
Infl. of parents*Woman	0.035**			
	(0.017)			
Infl. of teachers*Woman		-0.045**		
		(0.020)		
Infl. of c. students*Woman			0.036**	
			(0.018)	
Infl. of peers*Woman				-0.034*
				(0.019)
Woman	-0.152***	-0.112***	-0.152***	-0.127***
	(0.012)	(0.011)	(0.013)	(0.014)
Infl. of parents	0.030**	0.039***	0.050***	0.044***
	(0.013)	(0.010)	(0.009)	(0.009)
Infl. of teachers	0.020**	0.039***	0.011	0.007
	(0.009)	(0.015)	(0.010)	(0.010)
Infl. of c. students	0.012	0.021**	-0.007	0.010
	(0.009)	(0.010)	(0.014)	(0.009)
Infl. of peers	-0.028***	-0.032***	-0.028***	-0.003
	(0.009)	(0.010)	(0.009)	(0.014)
Obs.	12,106	12,106	12,106	12,106

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Notes: estimations include controls for geographic origins (nationality, district capital, inner area, macro-region and off-campus condition), year, high school type and high school grade, employment rate in the Labor Market Areas (LMAs) from which the prospective students come from.

Table B2: Probit for the probability of enrollment in STEM - stratification by parents' occupation

	W. D-D analysis, stratification (occupation)					
	At least one high status	None high status	Father high status	Father low status	Mother high status	Mother low-status
Infl. of parents*Woman	0.019	0.060**	0.021	0.047*	0.008	0.053**
	(0.021)	(0.029)	(0.024)	(0.024)	(0.026)	(0.023)
Infl. of teachers*Woman	-0.025	-0.059*	-0.036	-0.047*	-0.021	-0.064**
	(0.025)	(0.031)	(0.028)	(0.027)	(0.031)	(0.026)
Infl. of c. students*Woman	0.013	0.065**	-0.004	0.066***	0.009	0.057**
	(0.023)	(0.029)	(0.026)	(0.025)	(0.027)	(0.024)
Infl. of peers*Woman	-0.045*	-0.015	-0.002	-0.067***	-0.043	-0.020
	(0.024)	(0.031)	(0.027)	(0.026)	(0.028)	(0.025)
Obs.	7,379	4,727	5,843	6,263	5,087	7,019

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Notes: estimations include controls for geographic origins (nationality, district capital, inner area, macro-region and off-campus condition), year, high school type and high school grade, employment rate in the Labor Market Areas (LMAs) from which the prospective students come from.

Table B3: Probit for the probability of enrollment in STEM - stratification by parents' education

	W. D-D analysis, stratification (education)					
	At least one graduated	None graduated	Father with degree	Father without degree	Mother with degree	Mother without degree
Infl. of parents*Woman	0.064**	0.021	0.097**	0.024	0.049	0.028
	(0.031)	(0.021)	(0.040)	(0.019)	(0.035)	(0.020)
Infl. of teachers*Woman	-0.061*	-0.045*	-0.087**	-0.038*	-0.026	-0.054**
	(0.035)	(0.023)	(0.044)	(0.022)	(0.042)	(0.022)
Infl. of c. students*Woman	-0.007	0.047**	-0.018	0.043**	0.020	0.039*
	(0.033)	(0.022)	(0.043)	(0.020)	(0.038)	(0.020)
Infl. of peers*Woman	-0.017	-0.039*	0.003	-0.039*	-0.049	-0.030
	(0.034)	(0.022)	(0.044)	(0.021)	(0.039)	(0.021)
Obs.	3,633	8,473	2,156	9,950	2,713	9,393

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Notes: estimations include controls for geographic origins (nationality, district capital, inner area, macro-region and off-campus condition), year, high school type and high school grade, employment rate in the Labor Market Areas (LMAs) from which the prospective students come from.

Chapter 2: Should I study or should I work? Internships, job seeking and job placement in Italy

Abstract

This study investigates the impact of intra-curricula internships on intentions, aspirations and labor market performance of Italian graduates. We rely on a national-level official survey whose coverage and scope allow us to investigate the impact of internships by leveraging information on courses with different internship modalities, both across programs and over time. Overall, the findings underscore the importance of internships in facilitating the choice to enter the labor market with significant differences between the two cycles of study characterizing the Bologna process. For second-cycle degrees, internships significantly increase post-graduation employment prospects while, for first-cycle degrees, internships do not directly impact employment rates but encourage job seeking reducing inactivity though at same time decreasing enrollment propensity in the second-cycle. Additionally, internships enhance job match quality by reducing skill and educational mismatch. Graduates job aspirations are also affected, though only for male students.

1. Introduction

Intra-curriculum internships are included in university programs with the aim to combine academic knowledge with experience gained on the field to strengthen the employability of future graduates and facilitate the transition to the labor market. The introduction of curricular internships into study programs is a widespread and popular practice since it does not extend the duration of studies *per se*. The internship is fully integrated into the university curriculum and, like academic exams, contributes to the requirement-capture process for graduation. The advantage of undergraduate internships over the student-worker status is the possibility of an upstream agreed planning with the university offices of the activities that the intern is called to carry out and the learning outcomes to be achieved, consistent with the student's program of study.

As Schambach and Dirks (2002) point out, the benefits of internships are multiple and affect a

plurality of agents. For their part, trainees have the opportunity to apply theoretical knowledge to concrete problems in a real organizational environment, where circumstances are much more complex than those that can be reproduced in exercises and case studies. Other benefits include the possibility of self-assessment of skills possessed and those required by the job market, the development of so-called "soft skills" such as problem solving and team working, the creation of a network of useful contacts, and the possibility of readjusting career aspirations. On the side of the host companies, the main benefit is the chance to include in the company a figure with a certain degree of theoretical preparation at zero cost and low risk of evaluation, to be trained as a potential employee. Further, the possible return for the sponsoring university should not be underestimated: internships are a tool for universities to strengthen their relationship with the business world, as well as to gather constant feedback from student interns and host companies on the validity and relevance of academic curricula.

A growing body of international literature has attempted to quantify the impact of internships on employment outcomes. Findings remain mixed: some studies (e.g., Klein & Weiss, 2011; McKenzie et al., 2016) report no significant effects of internships on wages for recent graduates, while others (e.g., Margaryan et al., 2022) find positive impacts, particularly in terms of earnings. This study aims to extend and clarify the mixed evidence on internships by analyzing their impact in Italy. On the one hand, we consider a comprehensive set of factors, including, beyond the usual employment probabilities and wages, job match quality and attitudes toward both the labor market and further studies. On the other, we analyze key heterogeneities, with a particular focus on the two cycles of tertiary education under the European Bologna Process, making Italy a significant case.

In these two directions, our findings not only extend the existing evidence but also deepen the analysis and attempt to reconcile the mixed picture emerging from the literature. While the impact of internships is usually assessed on traditional labor market outcomes, such as job attainment, wage levels, and search duration, with relatively little attention to how internships influence non-traditional outcomes, e.g. attitudes towards the labor market and job quality in terms of occupational and skill alignment. No study, for instance, explores how internships might affect graduates' expectations and perceptions of their future careers or their ability to secure roles that are well-aligned with their educational background.

Studies like those of Nunley et al. (2016) and Baert et al. (2021) suggest internships, may act as signaling since they increase the number of job interviews graduates receive. Attitude to work is

instead shown to be a key issue in employers' choices in Van Belle et al. (2019). A positive association of students undertaking an internship with much broader aspects concerning labor market participation is also found in Miller et al. (2018). In this perspective, our analysis incorporates among the impacts of internships considered those concerning students' attitudes toward the labor market. This includes activity rates, focusing on the impact on NEET status and the continuation of studies, as well as preferences regarding the type of employment sought. The effect on internships may also extend to the quality of matches, that we consider in terms of skill and educational mismatch.

In a context where broader effects are considered the interaction with the institutional set up takes a relevant position, in particular if we consider a main characteristic of the Italian system, shared by all the European Bologna process, i.e. the two-cycle structure. The role of internships may vary significantly by educational stages, between bachelor and master: internships can be pivotal for bachelor's students, influencing their academic trajectory by helping them decide whether to continue in their field, switch areas, or enter the labor market directly. For master's students, internships often play a more strategic role, facilitating a direct transition into the job market.

Finally, the experience of internships within the university curriculum has assumed a crucial role in higher education programs in Italy, even if no study has assessed the impact of intra-curricular internships on Italian graduates. Notwithstanding Italy's youth face significant challenges in accessing rewarded and stable employment opportunities due to persistent economic hurdles and structural issues in the labor market.

Results on employment and wages, though in the direction of the literature, shows the distinction between Master's and Bachelor's degrees to be marked and significant. Within a framework of positive effects on job match quality and skills utilization, internships also show a significant negative effect on the propensity to continue studies, driven only partially by a decrease in inactivity. Additionally, key aspects of desired employment are impacted, though this effect is observed only among men, not women.

The study is structured as follows: the "Theoretical background" section presents the main economic theories approaching the functioning mechanism of internships in labor market outcomes, and the "Literature review" section summarizes the related empirical studies. "The Institutional framework" section sheds light on the peculiarities of the Italian socio-economic and academic framework. Next, the "Data, variables and methodology" section illustrates the methodological design adopted,

outlining the data sources and the dependent and independent variables selected for the analysis. Finally, results are presented and discussed, highlighting policy implication for public policies and higher education institutions in the “Results” and the “Conclusion” sections.

2. Theoretical background

The advent of internships in the study programs stems from criticism of tertiary education, which is often held responsible for contributing little to the development of soft skills and directly employable technical skills. Based on Becker's (1964) distinction between generic and specific human capital, internships can be instrumental in the creation of soft skills that are transferable to any field and workplace, as well as in the creation of skills that are specific to company type and occupational sector. For their part, employers have a competitive advantage in the transfer of certain types of skills: practical knowledge resulting from experience can only be obtained at the workplace, just as soft skills are developed more at the office than in school (Bolli & Renold, 2017). Several studies show that doing an internship during tertiary education has a positive impact on both soft skills and the acquisition of practical and specific experience (Brooks et al., 1995; Helyer and Lee, 2014). According to Brooks et al. (1995), students who have in their study programs credits acquired through internships exhibit skills relevant to the labor market, good knowledge of the tasks carried out, and clearer career development goals. In the same vein, Van Belle et al. (2019) show that employers are more interested in hiring recent graduates who show a good attitude to work, a broad social network, motivation and a sense of responsibility, thus placing more emphasis on soft and interpersonal skills. From an economic theory perspective, there are multiple channels through which internships can impact employment outcomes. Doing an internship during the academic career can directly impact the development of skills considered above or, once included in the graduates’ resume, can convey a signal about productivity to the employer who is hiring.

According to the *Human Capital Theory* (Becker, 1964), work experience contributes on par with formal education to the development of skills that make workers more productive and employable and, consequently, better paid. An alternative mechanism, consistent with the *Signaling Hypothesis* formulated by Spence (1973), attributes to the internships in the resume a signaling function in the information asymmetry of the labor market since employers cannot observe the productivity of

graduates before hiring. The presence of an internship in the job applicant's resume could convey information about job aptitude. A third channel through which internships can impact employment outcomes lies in the *Screening Hypothesis* (Stiglitz, 1975), which, like the *Signaling Hypothesis*, leaves room for the interpretation of internships as a means of reducing information asymmetry between employers and potential employees. Again, internship is a diriment element in the selection process of graduates for whom current productivity is unknown. A fourth channel that help to explain the functioning of internship is the *Social Network Theory* (Granovetter, 1973). In this case, the idea is that graduates find jobs through the social capital developed through the relationships built and information gathered during the internship. Despite most (economic) theoretical frameworks predict internship experience to heighten the labor market chances of graduates, empirical evidences are not fully conclusive.

3. Literature review

The literature on internships is growing, but several gaps still need to be fiiled with 19 articles published in highly qualified scientific journals over the past 20 years (Miralles-Quiròs & Jerez-Barroso, 2018) and most of them adopting descriptive approaches. This suggests also a need for studies that expand the set of outcome variables examined and explore the heterogeneity of effects across tertiary education cycles as reformed by the Bologna Process. Such investigations should employ rigorous, non-descriptive methodologies to address the trade-off between policies aimed at facilitating the transition to the labor market and those promoting higher levels of tertiary and post-tertiary education.

The scarcity of quantitative studies further highlights the need for empirical evidence to better understand the relationship between internships and employment outcomes later in life. It is indeed likely that the choice to do an internship correlates with unobserved factors such as motivation, ambition and ability, that are also correlated with labor market outcomes later in life. For these reasons, the estimates might be biased due to selection of students in doing an internship since students who do an internship may differ from students who do not in terms of characteristics that are not controlled for but which also affect job performance.

Following what already presented by Di Meglio et al. (2022) and Baert et al. (2021), and broadening the review, Table 1 presents and summarizes a number of studies that in the 2000s have dealt with the

identification problems associated with self-selection presents in the estimation of intra- curricular internship effects.

Ranging from regression analysis with controls for a rich set of covariates, to semi-experimental methodologies (matching estimation methods, instrumental variable techniques) and field experiments, previous studies have tried to disentangle the effect of internships on a number of subsequent job outcomes, from job search duration to wage and occupational mismatch. However, as well discussed in Baert et al. (2021) and Nunley et al. (2016) the non-experimental nature of most of these studies may potentially biased the results.

Table 1. Summary of empirical studies on intra-curricular internships and labor market outcomes

Author-year	Country	Type of curricular internship	Labour market outcome variable(s)	Main results	Approach to endogeneity
Gault et al. (2000)	US	Not specified	Ease of finding first job, annual wage, satisfaction with co workers and supervisor, and overall job satisfaction.	Positive effect on job search duration, annual wage and overall job satisfaction	Matching (on: age, years of work experience, grade point average , major area of study, and gender).
Callanan & Benzing (2004)	US	Not specified	Acceptance of a career oriented job and confidence with the job position	Positive association with securing a career-orientated job, no association with good personal fit with the job	Logistic regressions with controls for observable factors
Gault et al. (2010)	US	Not specified	Employers' perceived value, job and wage offers received	Positive association with full-time job offers, positive association with higher starting salaries only for high performing interns.	OLS with controls for observable factors
Klein & Weiss (2011)	DE	Mandatory	Search duration until the first significant job, employment history complexity and hourly wages five years after graduation	No effects in general, nor for graduates from lower educational background	Propensity score matching
Rigsby et al. (2013)	US	Voluntary	Job offers received	Positive association for interns who accepted the related job offer received, negative for those students who did not receive or reject the related job offer	Probit regression with controls for observable factors
Weiss et al. (2014)	DE	Mandatory	Job search duration, probability of working in service class positions and hourly wage	No effects	Propensity score matching
Silva et al. (2016)	PT	Voluntary and mandatory	Graduate unemployment rate	Negative association particularly for mandatory, shorter internships and intenships provided by politechnic universities	OLS with controls for observable factors
Jung & Lee (2017)	KR	Voluntary and mandatory	Job search duration, wages and job satisfaction	Positive association on job search duration and job satisfaction. Positive association with wages only for voluntary internships	OLS with controls for observable factors
Miller et al. (2018)	US	Not specified	Propensity to seek employment or attend graduate school, continuing the current job or starting a new job	Positive effects on the odds of seeking employment after graduation	Logistic regressions with controls for observable factors
Silva et al. (2018)	PT	Voluntary and mandatory	Average difference between the graduate unemployment rate before and after the Bologna Process	Negative association for mandatory internships	OLS with controls for observable factors
Verhaest & Baert (2018)	BE	Mandatory	Job search duration for the first job, job search duration for a good match (objective and subjective educational mismatch)	No effects on transition rates	Discrete choice model with exclusion restriction
Pinto & Pereira (2019)	PT	Voluntary	Job suitability, employability skills and starting salaries	Positive effects and no differences found between domestic and international internships	Experimental between-subject factorial design
Bittmann & Zorn (2020)	AT	Voluntary and mandatory	Income, job mismatch and job satisfaction	Positive association for voluntary internships, not for mandatory	OLS and Logit regressions with controls for observable factors
Baert et al. (2021)	BE	Voluntary	Job interviews requested	Positive effects on the probability of being invited to a job interview	Randomized field experiments
Bolli et al. (2021)	CH	Voluntary and mandatory	Yearly wage 1 and 5 years after graduation	Positive effect on graduates' incomes. Evidences that general human capital is the main mechanism rather than firm- or field-specific human capital, signaling, or screening	Instrumental variable
Di Meglio et al. (2022)	ES	Volutary	Job search duration for the first job; the vertical, horizontal and skills matching with the first job; being employed and wage quintiles 4 years after graduation	Positive effect in the short run, weak effects on matching and no effects on wages in the medium run	Probit regressions with control for observable factors
Margaryan et al. (2022)	DE	Voluntary and mandatory	Gross monthly wage 1 and 5-6 years after graduation	Positive effects on wages, particularly pronunced for graduates from field of study characterized by a weak labour market orientation. Lower risk of unemployment 1 year after graduation	Intrumental variable

In the US, Gault et al. (2000) find significant early career advantages for intern business alumni of a Northeastern public university in terms of less job search time, increased monetary compensation and greater overall job satisfaction. The same author (Gault et al. 2010) corroborates earlier published empirical research by focusing of the perceived value of internship for interns and for employers and the employer selection and compensation decisions, with differences between high, average and low-performing interns. Still considering only business degrees, Callanan & Benzing (2004) analyze a sample of 163 senior graduates from a large public university in the mid-Atlantic region of the US, finding that the completion of an internship assignment is linked with a career- oriented employment, but is not related to a higher level of confidence over personal fit with the job position achieved.

Miller et al. (2018) add further insights for American students on the relationships between impact practices of co-curricular education experiences and students' career and educational aspirations. Using a large sample of over 30.000 undergraduate students from the National Survey of Student Engagement (NSSE), the study suggests that If students participate in certain practices, such as internships, senior capstones, and service learning, this is positively related to job attainment prior to graduation and has positive effects on the odds of seeking employment after graduation or continuing for graduate school.

For Germany, Klein & Weiss (2011) e Weiss et al. (2014) assess the impact of mandatory programs to address the potential endogeneity of doing an internship. By using compulsory internships instead of voluntary ones, they reduce the number of potential confounding factors, as student are not able to self-select into participation ones enrolled in a certain program. In the former, the authors use observational data for the 1997 graduation cohort surveyed in the HIS (*Hochschul-Informations-System*) Graduate Panel and find that compulsory internship programs neither have a positive effect on labor market outcomes in general, nor are they particularly beneficial for graduates from lower educational backgrounds. In the latter, they compare the labor market outcomes of different types of work experience during tertiary education, stressing the theoretical mechanism underlying the benefits. Findings indicate that work experience that is unrelated to the field of study or was a mandatory part of the study program is not linked to higher chances for entering a favorable class position or to higher wages in the long run, providing evidence for the signalling explanation of educational benefits in the labor market rather than the human capital explanation.

Margaryan et al. (2022) study the causal effect of intra-curricular internships in firms on earnings later in work career, by using mandatory firm internships at German universities as an instrument for

doing a firm internship while attending university. In contrast with the previous two researches on the German case, they observe a positive effect on earning returns of about 6 percent, especially for those individual and areas of study that are characterized by a weak labor market orientation. In this work, the focus is only on master graduates, excluding graduates who finished university with a bachelor's degree.

Silva et al. (2016; 2018) provide aggregate descriptive evidences on occupational outcomes and undergraduate internships for Portuguese students and find a negative association between mandatory internships and unemployment rate among graduates, most notable after the conclusion of the Bologna process. Pinto and Pereira (2019) examine the perceived employability of voluntary domestic and international business internships, using an experimental between-subject factorial design. The evidence provided show that the non- participants result in the worst rates of job suitability and employability skills, while the outcomes of the international and the domestic conditions were not significantly different from each other. Di Meglio et al. (2022) examine whether internships improve job attainments in the short run (first employment after graduation) and in the medium term (employment 4 years later) for the Spanish cousins. Use the first Spanish University Graduate Job Placement Survey 2014, they carry out a comprehensive study, both for bachelor and master graduates, in order to identify association between intra-curricular internships and job search duration, occupational mismatch and wage quintiles. The results highlight that internship experience facilitates the university-to-work transition also for Spanish graduates. However, although the effects of internships on being employed do not vanish in the medium run, there is weak evidence of positive effects on skill, vertical and horizontal matching four years after graduation and no effects are found on wages.

Coming back to continental Europe, Verhaest & Baert (2018) and Baert et al. (2021) find no effects on transition rate from university to first job for mandatory internships and positive effects on the probability of being invited to a job interviews (12.6% more invitations) for 3 months unpaid facultative internships during master. In Switzerland, Bolli et al. (2021), following Margaryan et al. (2022), address endogeneity with an IV approach and find that internships increase graduates' incomes, identifying as potential mechanisms the general human capital. This paper, as Di Meglio et al. (2022) do for Spain, only control for education level, providing an analysis of the phenomenon on average between three-year programs and master's degrees.

In Austria, Bittmann and Zorn (2020) demonstrate that voluntary internships are associated with significantly better labor market outcomes, while we find no complementary effects for mandatory

internships. Similar results are shown by Jung and Lee (2016) for South- Korean graduates where positive association with wages is found only for facultative internships.

Overall, the literature on the impact of internships on labor market outcomes reveals three main gaps. First, despite some progress, few studies (Klein & Weiss, 2011; Weiss et al., 2014; Baert et al., 2021; Margaryan et al., 2022; Bolli et al., 2021) employ causal methods to address potential endogeneity issues due to self-selection into internships. Moreover, all five studies listed here focus on traditional labor market outcomes, such as job search duration and wage, with only two (Klein & Weiss, 2011; Weiss et al., 2014) considering job quality in terms of stability and sector alignment.

Second, existing research typically emphasizes the distinction between short- and medium-term effects (Bolli et al., 2021; Di Meglio et al., 2022; Margaryan et al., 2022), with very limited focus on the educational cycle during which students undertake internships. As discussed in the introduction, bachelor's students may use internships to explore career options, master's students using them as a means to secure specialized employment.

Finally, it is noteworthy that the U.S. remains the most studied country in top field-specific journals. In Europe, research has primarily focused on continental countries, particularly Germany and Belgium, with additional insights from Southern Europe, notably Portugal and Spain. To our knowledge, no study has yet explored the impact of intra-curricular internships in Italy. At same time, as a result of the European level reforms of the Bologna Process, that have involved a convergence in countries University systems, country level evidence may help in finding common issues, as we will discuss in our case for the two-cycle structure of the system.

4. Institutional framework

This section examines the institutional framework linking higher education to the Italian labor market, focusing on key reforms and existing evidence regarding the employability of Italian graduates. The subsection *Tertiary education and institutional reforms* delves into the major transformations on the Italian higher education system since the Bologna Process, highlighting their implications for education and labor market integration. The subsection *Previous evidences on the employability of Italian graduates* provides a review of the literature on the transition from university to work, with particular attention to the role of internships. To offer a broader perspective, an overview of the socio-economic

context that underpins the challenges of youth labor market in Italy has been included in the Appendix – Section A.

4.1 Tertiary education and institutional reforms

The interplay between the higher education and the labor market is a stepping stone in the reform of the Italian and European university system started in 1999 known as the Bologna Process. The signatories of the Declaration embraced the adoption of a unified degree structure in tertiary education, aiming to promote mobility and the professional advancement of graduates, as well as to bolster the global competitiveness of European higher education (HE) (Van der Wende, 2000). At the same time, the Declaration emphasizes student-centered pedagogical methods, ensuring that students acquire industry-recognized competencies through the integration of traditional coursework with hands-on training, including internships (Rico, 2010). The process began with the reform of course planning, new curricula and a more accurate means of identifying 'learning outcomes' and 'employment and professional results'; while strengthening the role of placement services in each university with internships available both during and after degree courses (Regini, 2009). This reform meant a significant change in the strategies and functions of the Italian universities, inspired by a market logic which considers students, families and businesses as relevant stakeholders in the reorganization and evaluation of teaching and research activities (Arcidiacono, 2015)

In this sense, in the early 2000s, there was a transition of the Italian higher education (HE) system towards a 3 + 2-year system (bachelor-master), inspired by the Anglo-Saxon model, with more vocational undergraduate courses designed to increase employability in the labor market. This new framework adopted a two-cycle degree structure, comprising a first-level degree (Laurea Triennale, equivalent to a three-year bachelor's degree) and a second-level degree (Laurea Magistrale, equivalent to a two-year master's degree). This replaced the programs of the previous system, which typically lasted for at least four years. Additionally, there are integrated master's degrees (Laurea Magistrale a Ciclo Unico, five or six-year programs) tailored for specific disciplines such as law and medicine. Moreover, new rules incorporated further facets of collaboration between universities and the productive sector through a set of initiatives aimed at enhancing the engagement of employers' organizations in shaping learning outcomes and attaining these goals (such as including company representatives in the management bodies of universities, acknowledging credits for vocational skills

gained in the workplace, etc.).

In Italy, curricular internships are administered by university regulations and are promoted by universities, in compliance with the relevant national legislation[16]. They are sometimes mandatory and sometimes presented as a voluntary option in a study program, allowing students to obtain the required university credits in term of ECTS (European Credit Transfer and Accumulation System) within a study program. Regarding the duration as well, training internships are regulated by the internal regulations of each university, always in compliance with the generic national norm. Typically, internships must take place within the period of enrollment in the course of study, and the duration varies from a minimum of 1 month to a maximum of 12 months, and must be continuous. The Bologna reform sparked a significant expansion of HE in Italy, as evidenced by the doubling of graduates entering the workforce, rising from approximately 171,000 in 2001 to about 366,000 in 2022 (MUR, 2023). Especially in the wake of the 2007 financial crisis, the Italian job market found it difficult to absorb graduates. To address this challenge, one strategy to facilitate the transition from university to employment was to promote internship programs during and after studies. Consequently, an increasing number of degree programs incorporated internships into their curriculum and awarded credits to participating students. With the transition from a single-cycle to a two-cycle education system, the proportion of graduates undertaking curricular internships (internships integrated into the study program) rose from 22% in 2004 to 60% in 2022 (AlmaLaurea, 2005; 2023).

4.2 Previous evidences on the employability of Italian graduates

A range of studies have explored the employability of Italian graduates. Rostan (2017) provides a comprehensive overview of the challenges faced by Italian graduates in the labor market, particularly in comparison to Germany. Ciriaci (2014) underscores the role of university quality, especially research performance, in enhancing graduates' employability. However, Potestio (2014) suggests that despite efforts to improve employability through higher education reform, challenges persist, particularly for first-level graduates. Brunello and Cappellari (2008), using data from the National Statistical Office (ISTAT) on Italian graduates, find that attended college matters and that there are important college-related differences. However, the effects do not persist over time and are not large enough to justify mobility flow from poorly to better performing institutions. Ballarino and Bratti

[16] Ministerial Decree of March 25, 1998, N. 142.

(2009) split the analysis on graduates' employability prospects during 1995-2004 by fields of study. They find that scientific fields consistently offer a higher probability of stable employment compared to humanities, reflecting the increasing flexibility of the two main Italian labor market reforms of that period, 'Pacchetto Treu' (Law n. 196, 24 June 1997) and the 'Riforma Biagi' (Law n. 30, 14 February 2003). Di Pietro and Urwin (2006) and Aina and Pastore (2012) focus on the educational mismatch that affects Italian graduates. The former study accesses the effect of over- education on the earning profile of Italian graduates, showing that over-educated graduates receive lower wages than peers with a similar level of education who do not experience educational mismatch. The latter demonstrate that delayed graduation directly increases the chances of over- education and it also indirectly contributes to wage penalty.

Despite its potential role in the smoother transition into the labor market and its large inclusion in study programs offered by the Italian universities, the effectiveness of internships has been largely under-investigated in the Italian context. The literature is surprising scarce and based on local-scale data, mostly related to the policy evaluation of extra-curricular internships as part of active labor market program, mainly financed by the European Social Fund (ESF) in support of the Youth Guarantee implementation plans (2013) (Ghirelli et al., 2019; Cappellini et al., 2019; Pastore and Pompili, 2019).

Coming back to the evaluation of undergraduate internships on the labor market performance, the evidences are even less informative. Della Volpe et al. (2016) built a database of the curricular internships offered by all Italian universities in different Courses of Studies (CoS) during the academic year 2014/15, consulting the websites of the Italian Ministry of Education and the official websites of 91 Italian universities. Although 3139 out of 4428 CoS (70.89%) offer curricular internships, these learning experiences in most field of studies have a minor role in learning paths. Except for the "Medical, Health and Sport Sciences" area and some isolated cases, the data collection reveals a fragmentation of the internship experience, which crosses all disciplinary areas. Considering that a single academic course in any CoS corresponds to 9 or 12 ECTS, the data also suggest even less attention to internships compared to the effort required for an exam. The same author, Della Volpe (2017), collects and describes questionnaires used by the universities of the Regional Observatory of Campania University System and given by the host institutions to interns to fill out in order to evaluate the skills growth in terms of initial and final assessment. What emerges from the 732 post- internship questionnaires collected by the University of Suor Orsola Benincasa in 2013-2014 is a positive value of the experience with an increase of 37% and 32% for cross-technical and professional skills declared

by participants.

To the best of our knowledge, the only study that tries to assess the impact of intra-curricular internships in Italy at a national level is the analysis by Tzanakou et al. (2021). In this comparative study on the labor market transition of graduates in Italy and in the UK, the authors analyze how doing an internship during undergraduate HE programs affect the employment status, the type of job and the wage five years after graduation. The research, lacking in addressing the sample selection bias and without applying any methodology for causality, suggests that doing any curricular internship, except for undertaking an internship within a firm, do not tend to improve the employability of graduates in the labor market in Italy, whereas the UK experience shows more positive results. Similarly, undertaking an internship do not affect the likelihood of working in a graduate job (five years after graduation) in Italy and no significant effect of internships on wages is found. However, the study only focuses on young workers with a bachelor degree, restricting the analysis to who enrolled during 2005–06, before the full implementation of the Bologna Process, and completed their studies during 2009–10, just as the impact of the financial crisis started to bite.

5. Data, variables and method

5.1 Data

The database used in the empirical analysis is provided by the AlmaLaurea Inter-university Consortium which includes today 78 Italian Universities (more than the 90% of Italian graduates if on-line Universities are not taken into account) and collects data yearly since 1998 in order to interpret the Italian educational and employment scenario. AlmaLaurea is responsible for two main national surveys, the survey on the profile of graduates and the survey on the employment status in the short and medium run after graduation. The *Graduates' Profile Survey* provides a wide-ranging portrait of the characteristics and performance of graduates, including socio-economic background, university achievements, experiences gained during studies and the evaluation of degree programs. The *Graduates' Employment Status Survey*, which is carried out one, three and five years after graduation, outlines graduates' job placement in the labor market, including profession, wage and the use in the workplace of skills acquired while at university. The one-year later questionnaire of interest has an

average response rate of over 70%. (see AlmaLaurea Report 2023 for a detail explanation and for survey weights calculation).

The data are collected using both questionnaires addressed to university graduates and administrative records provided by universities. The sample provides information on Italian graduates enrolled from the academic year 2004/2005 to the academic year 2018/2019 and interviewed one year after graduation from 2008 to 2022. The initial sample size, after merging the two datasets and retaining only those who responded to at least the Graduates' Profile Survey, amounts to approximately 3 million observations, covering 300 degree classes and around 10,000 study programs.

We impose the following limit to the sample. First, we take into account that a typical feature of some university degrees is that they imply an obligatory second phase of education. For example, prospective lawyer in Italy, after completing their university studies, have to complete 1.5 years of training before taking the state exam, which then qualifies them to work as a lawyer. A similar second educational phases of varying duration exist, for example, for the profession of accountant or labor consultant. Also, for the healthcare area of studies, medical doctors, dentists, vets, psychologist and pharmacists have to attend post-graduate courses before enter the labor market. During this period graduates are outside the regular labor market and, following this approach, we exclude all the individuals that declare of being involved in a further training stage after graduation (post-graduate courses, PhD and post-doctoral courses, extra-curricular internships).

Finally, we exclude information with missing values for the variables of interest. For the sample of the main estimations, limited to courses shifting from no internship to mandatory internship this results in a final sample size of 75,147 graduates interviewed by the time of graduation and 56,787 graduates who reply also to The *Graduates' Employment Status Survey* one year after graduation, split in a 71.2% of graduates who attend a 3-year degree program and a 28.8% from a master program. The study programs are reduced to a total of 977, corresponding to 213 degree classes.

5.2 Variables and descriptive statistics

The definitions and descriptive statistics of all the dependent variables of the main estimation sample are shown in Table 1.1 and Table 1.2.

We consider both intention and aspirations by the time of graduation and labor market outcomes one year later, focusing on the impact of the intra-curricular internship as one of first experiences in the labor market for the Italian graduates.

With this aim, we carry out a comprehensive study on the effect of intra-curricular, not only taking into account traditional labor market outcomes like employment status, time to find a job and wage, but we also examine results for the step before entering the labor market, namely the intention to stay in education or not and the relevant aspects in job seeking. Another element of novelty in the field of studying the impact of internships on NEET status (Not in Education, Employment, or Training): this helps evaluate their effectiveness in reducing the risk of young people remaining inactive after completing their higher education. The variable *NEET* takes value 1 if the person declares himself/herself unemployed or inactive (not looking for a job, not involved in training or education), 0 otherwise.

Furthermore, the survey allows us to define two different measures of the self-reported adequacy of the job to the graduates' competences and educational profile. The first one is a measure of skill mismatch (when a worker is over or under-skilled with respect to his/her task at the workplace). The survey asks graduates with what extent they use the skills acquired during their degree program, considering three possible answers: "to a high extent", "to a low extent", "in no way". We consider that graduates are well-matched when they report having used the skills obtained during the university program in their job to a high extent, otherwise they are mismatched. According to this definition, more than 56% of graduates have experienced a skill mismatching.

The second one is a measure of educational mismatch (when a worker has a qualification not in line with that required by the job), and more specifically, a measure of vertical matching (when the worker is over or under-educated compared to the educational level required by the job). The question of reference in the AlmaLaurea *Graduates' Employment Status Survey* defines four categories: "the degree is a requirement prescribed by the law", "the degree is not requested by the law but in fact it is necessary", "the degree is not requested by the law but in fact it is still useful", "the degree is neither requested by the law, neither useful in another way". According to these categories, we define as mismatch the last option.

The definitions and descriptive statistics of the treatment and control variables are shown in Table 2. First, we control for various socio-demographic variables including gender, area of birth, nationality and off-campus condition during studies; socio-economic background considering both parent's educational and occupational background. Another important group of control variable which could impact labor market outcomes proxy for cognitive ability, namely study performance and duration, measured by the high- school grade, the degree grade, the age at graduation and the condition of late graduation. Next, control for extra-curricular activities such as whether a graduate has

previously worked during studies is added. When we look at the sub-sample of graduates who declared to be employed one year after graduation, controls for field of work, type of contract, working time and employment rate for the Italian Province where the study program is located are also included.

5.3 Estimation strategy

The identification strategy used in this study leverages the richness of the available data, both in terms of the database's size—comprising 3 million students in the two respective Almalaurea surveys—and the variety of individual-level variables, including detailed information on students' academic, geographic, and family backgrounds (Table 1.2). This enables a strategy that relies on sample partitions suitable for mixed in-sample and out-of-sample approaches.

A critical challenge in estimating the impact of internships lies in accounting for student self-selection in internships. The literature shows that the availability of an internship is not a significant determinant in students' enrollment choices while selection bias remains a key concern, as the choice to undertake an internship is often optional. In this case previous studies have addressed this issue through instrumental variable approaches (Bolli et al., 2021; Margaryan et al., 2022)[17].
In this study, the nationwide coverage of the data allows us to focus on degree programs that have transitioned from not requiring internships to making them mandatory (or vice versa). This ensures a sufficiently large and representative sample without significant restrictions on the sub-fields of study included. By doing so, we avoid the endogeneity arising from students' self-selection into optional internships while maintaining adequate sample representativeness at the level of degree classes, which provides a more granular classification compared to the broad macro-areas often used in empirical studies.

Despite evidence in the literature suggesting that the availability of internships—whether mandatory or optional—does not significantly influence students' choice of program or university, we address potential distortions in student composition stemming from the introduction of mandatory internships through a two-stage propensity score matching strategy. We thus go beyond the approach by Klein

[17] Margaryan et al. (2022) and Bolli et al. (2021) use information on the mandatory nature of the internship as an instrument, moving in a similar direction of our sample restriction though in a less straight approach.

and Weiss (2011) and Weiss et al. (2014) first by considering same courses that have change internship modality rather than differences within courses with different modality and, second, by assessing possible residual self-selection thorugh courses enrollment. To construct a propensity score for students' likelihood of undertaking an internship, we use an out-of-sample strategy (see Baldwin and Fellingham (2013) and Hill and Su, Y.-S. (2013) for a discussion). Specifically, we estimate the propensity score in a sample of students enrolled in programs where internships are optional, and thus whose enrollment decisions are not concerned by internship requirements. Within this group, we observe the choice of whether to pursue the optional internship or not. The core identification assumption is that a student for whom a mandatory internship could act as a marginal incentive to enroll is also likely to choose an internship when it is optional. Conversely, students who would not opt for an internship are assumed to find mandatory internships a disincentive to enroll in the program. As a result, matching with such a propensity score would assess the biases due to the activation of mandatory internships in a specific degree program.

In the first stage, we estimate a logit model of the following form:

$$(1) \qquad Logit\ P(Int_i = 1) = a + \boldsymbol{bX_i} + \boldsymbol{cZ_i} + \epsilon_i$$

where Int_i is a binary variable indicating whether the student *i* undertakes an internship (if optional), $\boldsymbol{X_i}$ represents a vector of individual characteristics, including geographic, family, and high school background, $\boldsymbol{Z_i}$ is a vector of program characteristics, including degree class, level, and year of enrollment, ϵ_i refers to clustered errors at the program level. The predicted probabilities from this model are used to estimate the likelihood of choosing an internship for students in the second-stage sample, which includes those enrolled in programs that shifted in time from not offering internships to requiring them (or vice versa).

In the second stage, we estimate the impact of mandatory internships on labor market outcomes using the following model:

$$(2) \qquad y_i = \alpha + \boldsymbol{\beta X_i} + \boldsymbol{\gamma Z_i} + \delta Int_i + \varepsilon_i$$

where y_i is the labor market outcome of interest (e.g., employment status, salary, or time-to-employment), Int_i is a binary variable equal to 1 if the student was enrolled in a program during the

period when internships were mandatory, $\boldsymbol{X_i}$ is a vector of individual characteristics, $\boldsymbol{Z_i}$ is a vector of program characteristics including degree class fixed effects. The error term ε_i represents clustered errors at the program level. The coefficient of interest, δ, represents the impact of mandatory internships on the outcome y_i, controlling for students' propensity to undertake an internship, captured by the first-stage matching weights.

For robustness, we also consider simple estimates without propensity score matching to assess the sensitivity of results to selection bias, as well as an alternative approach using inverse probability weighting (IPW) instead of matching. Robustness in these estimates indicates a limited influence of selection bias. We further explore heterogeneity in the impact of internships by degree level, conducting separate estimates for Bachelor's and Master's programs in addition to pooled estimates, and by gender, introducing interactions between gender and the treatment variable.

The independent variables considered in the analysis are primarily binary, and for these, we use a probit specification in the estimation of equation (2). In this case the coefficient δ represents the effect on the probability of $y_i = 1$ of the internship. For continuous outcomes such as salary and time-to-employment, we employ ordinary least squares (OLS) regression. Thus, the coefficient δ report the impact of making an internship measured in units of the dependent variable (250 euro category for monthly wages and 1month for time to find employment)

Given the survey nature of the data, we apply weights provided by AlmaLaurea, which account for partial non-response rates (respectively 10% and 30% in the two surveys). In the two IPW estimations these weights are incorporated into the first stage.

To address possible residual concerns about the relationship between the presence of internships in a specific course and local labor market conditions, which may not be fully captured by university fixed effects, we exploit the clear spatial gradient in labor market indicators across Italian regions (NUTS 3 level). The descriptive evidence, as shown in Figure 1.1 and Figure 1.2 (Appendix – Section C), highlights the significant geographic divergence in the distribution of youth unemployment rates and the prevalence of internships among graduates. The distribution of internships is more geographically fragmented than the well-documented North-South gradient of economic conditions in Italy. This supports the argument that local labor market conditions are unlikely to significantly bias our estimates through the choice of the college governance to introduce internships.

6. Results

The following tables examines the impact of internships on various labor market outcomes, focusing on both traditional and more nuanced measures of job match quality, as well as attitudes towards the labor market. Table 3.1 explores the effect of internships on traditional labor market outcomes, specifically employment status, time to find a job, and monthly wage. Then, Table 3.2 focuses on how internships influence students' attitudes towards the labor market, specifically their intention to stay in education and their likelihood of becoming NEET (Not in Education, Employment, or Training). Finally, Table 3.3 looks at the effect of internships on the quality of job match, examining both skill mismatch and educational mismatch. These measures indicate the extent to which an individual's qualifications align with their job, providing insight into how well internships prepare graduates for their professional roles. As we already discussed, the degree level (Bachelor vs Master) is the main heterogeneity we will consider, and we thus include the separate estimations directly in the main output together with the estimations in the pooled sample.

Table 3.1 Effect of internships on main labor market outcomes

		Employed	Months to find a job	Monthly wage
Pooled		0.013**	-0.022	0.071**
		(0.006)	(0.033)	(0.030)
	Obs.	35,499	17,289	24,096
Bachelor		0.011	-0.045	0.071*
		(0.008)	(0.049)	(0.038)
	Obs.	22,168	9,871	14,886
Master		0.024**	0.011	0.056
		(0.011)	(0.047)	(0.044)
	Obs.	13,331	7,418	9,210
Labor market controls		no	yes	yes
Year of graduation FE		yes	yes	yes
University FE		yes	yes	yes
Class of degree FE		yes	yes	yes
Standard errors in parentheses clustered by degree program *** p<0.01, ** p<0.05, * p<0.10				

Internships show a statistically significant positive effect on the likelihood of being employed, especially among Master's degree graduates, with an overall increase in probability of 1.3%. This standard labor market outcome already provides evidence of a significant difference between the internship effect in the two cycle-levels. For master graduates internships improve the probability of being employed of 2.4%. Instead, for Bachelor's degree graduates, the effect is still positive but not statistically significant. Our results are in accordance with Di Meglio et al. (2022) for the Spanish context in the medium run.

As to the job search duration, in line with Klein & Weiss (2011) and Weiss et al. (2014) for mandatory internships in German universities, there is no evidence of an impact also for the Italian case and across all groups.

A weaker significance, even if with a positive coefficient, is reported for monthly wage but it seems to concern only graduates who finish their higher education with a first-cycle degree. Also this result is in line with previous findings of positive association with yearly wages of Swiss (Bolli et al., 2021) and American graduates (Gault et al., 2020) and gross monthly wages of German graduates (Margaryan et al., 2022). In addition, unlike these previous works, the impact of internships on wages is also assessed by controlling for employment conditions in terms sector, type of contract, working hours and local employment rate.

Table 3.2 Effect of internships on attitudes towards labor market

		Intention to stay in education	NEET
Pooled		-0.017***	-0.001
		(0.006)	(0.006)
	Obs.	75,147	56,787
Bachelor		-0.020***	-0.004
		(0.008)	(0.006)
	Obs.	53,516	41,905
Master		-0.017*	-0.025*
		(0.010)	(0.015)
	Obs.	21,631	14,882
Labor market controls		no	no
Year of graduation FE		yes	yes
University FE		yes	yes
Class of degree FE		yes	yes
Standard errors in parentheses clustered by degree program *** p<0.01, ** p<0.05, * p<0.10			

The analysis of these more standard labor market outcomes allows us to confirm certain findings from the literature and highlight an important difference between the two levels of degree cycles. This difference could potentially explain the variability observed in the evidence provided by previous descriptive studies (see Table 1 for a complete comparison). We now shift our focus toward more qualitative aspects, particularly students' attitudes toward the labor market and higher education. These aspects may have value in themselves, such as the impact of internships on the willingness to pursue further studies, or they may help us delve deeper into the mechanisms driving the more quantitative outcomes, such as the impact on the activity rate or on the quality of the job match.

Looking a Table 3.2, internships have a statistically significant negative effect on the intention to remain in education across all groups, indicating that internship experience may reduce students' inclination to pursue further studies. This effect is slightly stronger for Bachelor's degree holders (-2%, $p < 0.01$) than for Master's students (-1.7%, significant at the 10% level). As to Miller et al. (2018) for the USA with a descriptive analysis, here the causal effect shows that internships encourage students to enter the labor market directly rather than continuing their education.

Instead, only for Master's graduates, doing an internship during the cycle of study is associated with a modest reduction in NEET status. This finding suggests that internships may have a restricted protective effect against NEET status for this sub-group of population, potentially increasing their employability. By looking at the complement of these choices, we could say that internships increase graduates' attachment to labor market.

Table 3.3 Effect of internships on the quality of job match

		Skill mismatch	Educational mismatch
Pooled		-0.030***	-0.022***
		(0.008)	(0.006)
	Obs.	24,096	24,096
Bachelor		-0.035***	-0.034***
		(0.010)	(0.008)
	Obs.	14,886	14,886
Master		-0.030**	-0.003
		(0.015)	(0.007)
	Obs.	9,210	9,210
Labor market controls		yes	Yes
Year of graduation FE		yes	yes
University FE		yes	yes
Class of degree FE		yes	yes
Standard errors in parentheses clustered by degree program *** p<0.01, ** p<0.05, * p<0.10			

Moving to the qualitative aspects of job matches, the impact of internships on skill mismatch is statistically significant across all groups. This effect is pronounced both for Bachelor's and Master's graduates, decreasing the probability of a bad match respectively of 3.5% and 3.0%. and suggesting that internships play a key role in improving the alignment between their skills and job demands. The effect of internships on educational mismatch is also significant, though the results vary across groups. The full sample shows a reduction in educational mismatch, suggesting that internships may help graduates secure positions that are more in line with their academic background. However, this result is only driven by first-cycle graduates, while the effect on masters is not statistically significant. Probit estimates for educational mismatch place Italian evidences in contrast with the findings of Verhaest & Baert (2018) for subjective and objective educational mismatch after mandatory

internships in Belgium, and Bittman & Zorn (2020) still for mandatory internships in Austria. Instead, the results for skill mismatch are coherent with Passaretta and Triventi (2015), who found that in Spain and in Italy, work experience decreases the probability of skill mismatch in future occupation.
Overall, doing an internship has a positive impact across all outcomes, with the exception of the job search duration. Benefits are more pronounced for graduates who enter the labor market right after the conclusion of a first-cycle degree, particularly in terms of wage and job match quality. For Master's graduates, while internships still provide benefits, especially in terms of reducing skill mismatch and facilitating labor market activation and entry, the effects are generally less pronounced. One of the most notable findings, which emerges clearly and is consistent across both Bachelor and Master level of study, is the significant impact that internships have in reducing the intention to continue further studies. This suggests that internships not only provide valuable practical experience but also play a pivotal role in shaping students' decisions about their educational trajectory, encouraging them to transition directly into the labor market instead of pursuing additional academic qualifications.

In this section, we focus on analysing the impact of internships on key aspects that graduates seek in their future jobs. Tables 4.1 and 4.2 explore various dimensions, including earning potential**,** career prospects**,** job stability**,** acquisition of skills**,** and free time**.** This analysis provides a deeper understanding of how internship experiences influence graduates' perceptions of these job-related attributes, offering a comprehensive view of the benefits internships can bring in preparing for the labor market. Furthermore, while results on all previous outcomes are the same also when considering the interaction with the gender variable (see the Appendix – Section D), when moving to this dimension of students' attitude through the labor market, the gender dimension shows significant insights that are worth to be considered.

Table 4.1 Effect of internships on relevant aspect in job seeking

		Earning potential	Career prospects	Acquisition of skills	Free time
Pooled		0.003	0.005	0.008*	0.012
		(0.006)	(0.008)	(0.005)	(0.008)
	Obs.	75,147	75,147	75,147	75,147
Bachelor		0.006	0.010	0.010*	0.011
		(0.008)	(0.009)	(0.006)	(0.010)
	Obs.	53,516	53,516	53,516	53,516
Master		0.005	-0.004	-0.001	0.016
		(0.011)	(0.015)	(0.008)	(0.015)
	Obs.	21,631	21,631	21,631	21,631
Labor market controls		no	no	no	no
Year of graduation FE		yes	yes	yes	yes
University FE		yes	yes	yes	yes
Class of degree FE		yes	yes	yes	yes

Standard errors in parentheses clustered by degree program *** p<0.01, ** p<0.05, * p<0.1

The results from this analysis suggest that internships have a very modest impact on these aspects of job seeking, with the most notable effect being on acquisition of skills, which is statistically significant at the 10% level. Although it concerns only one aspect, it is the most prominent aspect when considering that internships are included in curricula to foster the acquisition of work-related skills. However, this evidence is not confirmed for students at the end of their master.

Table 4.2 Effect of internships on relevant aspect in job seeking – by gender

		Earning potential	Career prospects	Acquisition of skills	Free time
Pooled	Internship	-0.004	-0.005	0.001	0.014
		(0.008)	(0.009)	(0.005)	(0.010)
	Male	-0.048***	-0.019	-0.062***	-0.031***
		(0.010)	(0.013)	(0.007)	(0.011)
	Internship*Male	0.018	0.029**	0.018**	-0.005
		(0.012)	(0.014)	(0.008)	(0.014)
	Obs.	75,147	75,147	75,147	75,147
Bachelor	Internship	0.002	-0.003	0.003	0.018
		(0.010)	(0.012)	(0.007)	(0.012)
	Male	-0.040***	-0.019	-0.062***	-0.022*
		(0.012)	(0.016)	(0.009)	(0.012)
	Internship*Male	0.012	0.033*	0.019*	-0.020
		(0.014)	(0.017)	(0.010)	(0.015)
	Obs.	53,516	53,516	53,516	53,516
Master	Internship	-0.011	-0.012	-0.008	0.005
		(0.013)	(0.017)	(0.008)	(0.018)
	Male	-0.081***	-0.023	-0.062***	-0.054**
		(0.018)	(0.017)	(0.012)	(0.024)
	Internship*Male	0.046**	0.026	0.020	0.031
		(0.021)	(0.022)	(0.015)	(0.029)
	Obs.	21,631	21,631	21,631	21,631

Standard errors in parentheses clustered by degree program *** p<0.01, ** p<0.05, * p<0.1

The interaction coefficient between internship and male captures the differential effect of internships on male graduates compared to female graduates. Specifically, this interaction term helps to assess whether the impact of internships on the various job-seeking aspects differs based on gender. The non interacted term shows the same lack of significance of the further estimates. The slightly significant impact on the acquisition of skill dimension for Bachelor students is shown to concern only males, which also evidence a further slightly significant impact on the career prospect dimension. Much more significant is instead the male specific impact on earning potential.

As a result of the internship experience, male bachelor's graduates, experience a reshaping of ideal job in terms of career prospects and acquisition of skills, together with the lower propensity to enroll

in further education (which also concern women). Male master's graduates who have done an intra-curricular internship are instead pushed towards a job position with earning potential. This highlights a distinction between bachelor's and master's levels and between male and female graduates in how internships translate into future employment aspirations.

In the Appendix – Section E, we also present robustness checks conducted using the single-stage OLS model and the Inverse Probability Weighting approach. The results remain robust in terms of both the coefficients and their confidence intervals, confirming the relatively marginal impact of potential selection effects.

7. Conclusion

The research examines whether intra-curricula internships can influence intention and aspirations of students and can improve their labor market performance matching two official national-level surveys for Italy.

The findings reveal that internships play a multifaceted role in shaping graduates' labor market outcomes, though their effects differ across the two different cycles of tertiary education characterizing the Bologna Process. For master's graduates, internships are associated with a higher likelihood of employment, a finding consistent with evidence from other Mediterranean countries like Spain and Portugal (Di Meglio et al., 2022; Silva et al., 2016; Silva et al., 2018). For bachelor's graduates, internships primarily enhance wages and improve the alignment between job roles and educational qualifications, although no significant effects on overall employment rates or job search duration were observed.

Internships also influence educational trajectories, with students who undertake them being less likely to pursue further studies. This effect is particularly evident among bachelor's graduates, indicating that internships can encourage immediate entry into the workforce. However, this raises questions about whether internships might discourage deeper specialization or delay the attainment of higher qualifications, a potential trade-off that warrants careful consideration.

Beyond traditional labor market outcomes, internships shape graduates' attitudes and aspirations.

Male students, in particular, report changes in their job preferences, with internships fostering a greater focus on career prospects and skill acquisition. In contrast, no significant effects on aspirations were observed for female graduates, highlighting potential gender differences in how internships influence students' outlook on the labor market.
The study also underscores internships' role in reducing skill and educational mismatches, especially for bachelor's graduates. These results suggest that internships successfully align academic training with labor market needs, fulfilling one of their primary purposes in higher education programs. Additionally, the distinction between bachelor's and master's levels could help explain some of the inconsistencies observed in the broader literature on internships.

From a policy perspective, these findings highlight the need to tailor internship programs to the differing roles they play across the two cycles of the Bologna Process. While internships enhance employability and skill alignment, their potential to discourage further studies requires careful consideration. Policies should aim to balance the benefits of early labor market entry with the value of advanced education, ensuring that internships support both immediate and long-term career goals.

As for further developments, while broader questions remain regarding the type of skills actually developed during internships, our analysis has shown that the mechanisms through which internships impact graduates' career paths are multifaceted. These include not only effects on employability and job alignment but also shifts in aspirations and attitudes toward the labor market. This suggests the importance of further exploring how internships shape both immediate and long-term labor market outcomes in the Italian context.

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Appendix

Section A)

Socio-economic framework

In the century of permanent crisis, Italy is one of the European countries most affected by poor performance in the youth labor market, along with its Southern European counterparts. The youth unemployment rate has reached its peak in 2014 with 42,7% of people under 25 and 18,6% of people aged 25-34 unemployed, compared to the 12,2 of unemployment rate for the whole working population 15-64 in the same year (Istat, 2024).

In addition, while the European NEET rate fell after the Great recession and before the Covid-19 pandemic from 16,1% in 2013 to 12,6% in 2019, Italy is still far from the European Pillar of Social Rights Action Plan target for the NEET rate less than 9% by 2030. Four of the 21 region across the EU where at least one fifth of all young people aged 15–29 was neither in employment, nor in education or training in 2022 are located in Italy (Puglia 26%, Calabria 28,2%, Campania 29,7%, Sicilia 32,4%). And, while a protective role exerted by a tertiary qualification against unemployment is well recognized, the only European region to report an employment rate for people aged 25-64 with a tertiary level of educational attainment in 2022 below 70% is the southern Italian region of Calabria. It is still worth pointing out that the low performance of the Italian labor market, both for people with tertiary education and for people with at most secondary education, is accompanied by a high territorial heterogeneity, the highest in EU for the employment rate in the period 2011-2021[18] (Eurostat, 2023).

The penalization of young Italians affects both those outside the labor market and those aiming for career progression. A number of EU Member States, including Italy, have mitigated the negative effects of the economic shocks since the 1980s on the employment performance with the introduction of measures[19] of labor market flexibility which have strongly incentivized the use of short-term working arrangements, by differentiating the Italian workforce between the "outsider" young workers employed in "atypical" jobs and the "insider" adult workers who enjoy high levels of employment

[18] In 2021 the highest regional disparities were recorded in Italy (a coefficient of variation of 17.5%). Broadly, there was a north–south split between Italian regions: the northern Provincia Autonoma di Bolzano/Bozen recorded the highest employment rate (79.2%), while the southern, island region of Sicilia had the lowest (46.2%) (Eurostat, 2023).

[19] The Treu Package in 1997 and the Biagi's Law in 2003.

protection (Liotti, 2020; Cirillo et al., 2017, Pinelli et al. 2017).

Despite more recent measure to reduce the segmentation between workers categories[20] (Picot and Tassinari, 2015; Sestito and Viviano, 2016; Pinelli et al., 2017), still in 2022 the percentage of new hires with temporary contracts in Italy was little less than 80%, compared to the average percentage of 50% in the OECD countries and, while the share of involuntary part-time has declined among new hires in the OECD countries taken into account, Italy maintains the record of the largest share with the 25% of new hires in an involuntary part-time contract, followed by Spain (OECD, 2023).

However, temporary employment may be merely a transient experience that leads to stable labor market inclusion. The problem arises when temporary workers remain in insecure positions for a long time, trapped in insecure and precarious jobs, while knowledge accumulation relies on long- lasting employment relationships. If the prospect for upward mobility in the transition rate temporary to permanent jobs are positive in Austria, Estonia and Germany, around half of the workers in Italy and Spain are still in temporary jobs, even after 10 years (OECD, 2015).

This picture of difficult transition for young Italians between education and labor market is combined for Italy with criticisms towards an overly theoretical education system (Mora et al., 2000; Triventi and Trivellato, 2009), low propensity to gain work experience during studies and less institutionalised mechanism in the linkage between higher education and the labor market.

While the Nordic countries have early labor market entry, Spain and Italy face long job search periods, mainly due to the economic context afore mentioned but also for the lack of simultaneous study and work experience that leaves graduates behind in the human capital accumulation process and without ties to the business world (Salas-Velasco, 2007).

Again, personal ties and non-formal channels are by far the most widespread and efficient channel for finding a job in Southern European countries (Reyneri, 2005; Passaretta and Triventi, 2015).

Therefore, taking into account the abovementioned features, undergraduate intenships, which is likely to improve practical skills, should be better rewarded by employers, who traditionally complain about the insufficiently ‘pragmatic’ orientation of university curricula (Moscati et al., 2010). Besides providing work-related skills needed to achieve suitable and fast access to the job market, internships may also contribute to the broadening of the social network relevant for job seeking. Last but not least, the impact of internships on aspirations related to ideal job and further choices between continuing studies or enter the labor market could be another field of research finding.

[20] The Fornero’s Law in 2011 and 2012 and the Job Act in 2015.

Section B)

Table 1.1 Descriptives (dependent variables) – Intention and relevant aspects

	Obs.	M(SD) / n(%)	Min	Max
By the time of graduation				
Intention to stay in education	75,147	0.68 (0.47)	0	1
Relevant aspects in job seeking (earning potential)			1	4
definitely no	75,147	214 (0.3%)	0	1
more no than yes	75,147	2,383 (3.2%)	0	1
more yes than no	75,147	25,687 (34.2%)	0	1
definitely yes	75,147	46,863 (62.4%)	0	1
Relevant aspects in job seeking (career prospects)			1	4
definitely no	75,147	350 (0.5%)	0	1
more no than yes	75,147	3,544 (4.7%)	0	1
more yes than no	75,147	20,546 (27.3%)	0	1
definitely yes	75,147	50,707 (67.5%)	0	1
Relevant aspects in job seeking (job stability)			1	4
definitely no	75,147	304 (0.4%)	0	1
more no than yes	75,147	2,677 (3.6%)	0	1
more yes than no	75,147	18,414 (24.5%)	0	1
definitely yes	75,147	53,752 (71.5%)	0	1
Relevant aspects in job seeking (acquisition of skills)			1	4
definitely no	75,147	114 (0.2%)	0	1
more no than yes	75,147	735 (1.0%)	0	1
more yes than no	75,147	14,920 (19.9%)	0	1
definitely yes	75,147	59,378 (79.0%)	0	1
Relevant aspects in job seeking (coherence with studies)			1	4
definitely no	75,147	618 (0.8%)	0	1
more no than yes	75,147	5,140 (6.8%)	0	1
more yes than no	75,147	29,848 (39.7%)	0	1
definitely yes	75,147	39,541 (52.6%)	0	1
Relevant aspects in job seeking (coherence with cultural interests)			1	4
definitely no	75,147	876 (1.2%)	0	1
more no than yes	75,147	8,637 (11.5%)	0	1
more yes than no	75,147	34,151 (45.4%)	0	1
definitely yes	75,147	31,483 (41.9%)	0	1
Relevant aspects in job seeking (independence and autonomy)			1	4
definitely no	75,147	326 (0.4%)	0	1
more no than yes	75,147	5,171 (6.9%)	0	1
more yes than no	75,147	27,305 (36.3%)	0	1
definitely yes	75,147	42,345 (56.3%)	0	1
Relevant aspects in job seeking (free time)			1	4
definitely no	75,147	1,303 (1.7%)	0	1

more no than yes	75,147	13,713 (18.2%)	0	1
more yes than no	75,147	35,291 (47.0%)	0	1
definitely yes	75,147	24,840 (33.1%)	0	1

Table 1.2 Descriptives (dependent variables) – Labor market outcomes

	Obs.	M(SD) / n(%)	Min	Max
1 year after graduation				
Conditional on having searched for a job				
Employed	35,499	0.72 (0.45)	0	1
NEET	56,787	0.22 (0.42)	0	1
Conditional on being employed and having found a job different from the job at the time of graduation				
Months to find a job	17,289		1	5
less than 1 month	17,289	3,228 (18.7%)	0	1
1-2 months	17,289	4,738 (27.4%)	0	1
3-4 months	17,289	3,399 (19.7%)	0	1
5-6 months	17,289	2,680 (15.5%)	0	1
over 6 months	17,289	3,244 (18.8%)	0	1
Conditional of being employed				
Monthly wage	24,096		1	13
less than 250 €	24,096	1,959 (8.1%)	0	1
251-500 €	24,096	2,756 (11.4%)	0	1
501-750 €	24,096	2,426 (10.1%)	0	1
751-1,000 €	24,096	3,187 (13.2%)	0	1
1,001-1,250 €	24,096	3,949 (16.4%)	0	1
1,251-1,500 €	24,096	5,644 (23.4%)	0	1
1,501-1,750 €	24,096	2,509 (10.4%)	0	1
1,751-2,000 €	24,096	1,031 (4.3%)	0	1
2,001-2,250 €	24,096	251 (1.0%)	0	1
2,251-2,500 €	24,096	140 (0.6%)	0	1
2,501-2,750 €	24,096	58 (0.2%)	0	1
2,751-3,000 €	24,096	76 (0.3%)	0	1
over 3,000 €	24,096	110 (0.5%)	0	1
Skill mismatch	24,096	0.56 (0.50)	0	1
Educational mismatch	24,096	0.19 (0.39)	0	1

Table 2 Descriptives (independent variables - treatment and controls)

	Obs.	M(SD) / n(%)	Min	Max
Internship	75,147	0.68 (0.47)	0	1
Male	75,147	0.37 (0.48)	0	1
Macro-region	75,147		1	6
North-West	75,147	17,856 (23.8%)	0	1
Nord-East	75,147	14,635 (19.5%)	0	1
Centre	75,147	9,968 (13.3%)	0	1
South	75,147	22,579 (30.0%)	0	1
Islands	75,147	7,503 (10.0%)	0	1
Foreign	75,147	2,606 (3.5%)	0	1
Off-campus	75,147	0.53 (0.50)	0	1
At least one parent with degree	75,147	0.14 (0.35)	0	1
At least one parent high-status	75,147	0.45 (0.50)	0	1
High-school grade	75,147		1	4
60-72	75,147	19,070 (25.4%)	0	1
73-81	75,147	19,570 (26.0%)	0	1
82-92	75,147	19,799 (26.3%)	0	1
93-100	75,147	16,708 (22.2 %)	0	1
Degree cycle	75,147		1	2
bachelor	75,147	53,516 (71.2%)	0	1
master	75,147	21,631 (28.8%)	0	1
Age at graduation	75,147		1	4
less than 23	75,147	23,903 (31.8%)	0	1
23-24	75,147	24,144 (32.1%)	0	1
25-26	75,147	14,430 (19.2%)	0	1
more than 26	75,147	12,670 (16.9%)	0	1
Degree grade	75,147		1	5
less than 90	75,147	6,966 (9.3%)	0	1
90-99	75,147	20,545 (27.3%)	0	1
100-104	75,147	14,692 (19.6%)	0	1
105-109	75,147	13,432 (17.9%)	0	1
110	75,147	19,512 (26.0%)	0	1
Late graduation	75,147	0.45 (0.50)	0	1
Student job	75,147	0.68 (0.47)	0	1
Field of work	24,096		1	15
Agriculture	24,096	374 (1.6%)	0	1
Metalworking	24,096	1,130 (4.7%)	0	1
Construction	24,096	972 (4.0%)	0	1
Chimical/ Energy	24,096	790 (3.3%)	0	1
Manifacturing	24,096	1,015 (4.2%)	0	1
Trade	24,096	4,981 (20.7%)	0	1
Credit/ Insurance	24,096	810 (3.4%)	0	1
Transport/ Telecommunication	24,096	1,166 (4.8%)	0	1
Consulting	24,096	1,855 (7.7%)	0	1

Information technology	24,096	866 (3.6%)	0	1
Services to business	24,096	625 (2.6%)	0	1
Public administration	24,096	514 (2.1%)	0	1
Education/ Research	24,096	2,683 (11.1%)	0	1
Healthcare	24,096	2,368 (9.8%)	0	1
Other services	24,096	3,947 (16.4%)	0	1
Type of contract	24,096		1	7
fixed term	24,096	5,709 (23.7%)	0	1
training contract	24,096	2,813 (11.7%)	0	1
non-standard	24,096	9,385 (38.9%)	0	1
collaboration contract	24,096	977 (4.1%)	0	1
self-employed	24,096	1,906 (7.9%)	0	1
other type	24,096	1,512 (6.3%)	0	1
without contract	24,096	1,800 (7.5%)	0	1
Working time	24,096		1	2
full-time	24,096	15,301 (63.5%)	0	1
part-time	24,096	8,795 (36.5%)	0	1
Employment rate (Province of studies)	24,096	65.19 (10.39)	39.68	79.17
Year of graduation	2007 - 2021			
University	1 - 72			
Class of degree	1- 213			

Section C)

Figure 1.1 Employment rate by Province

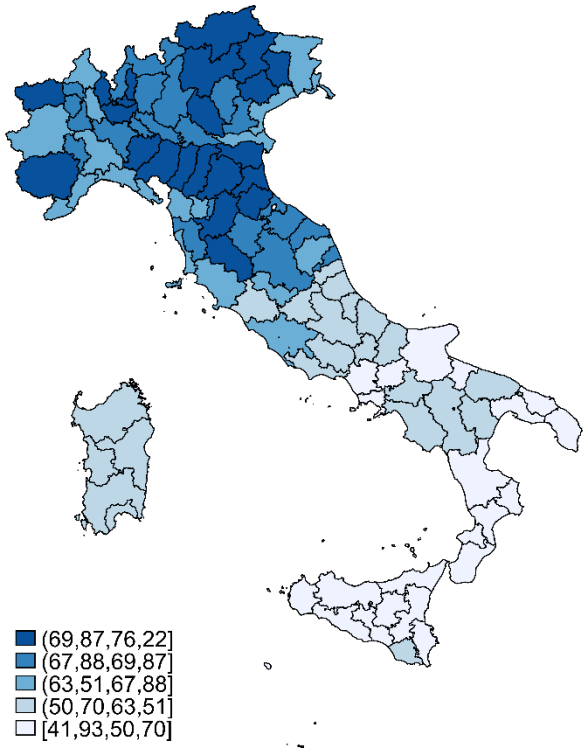
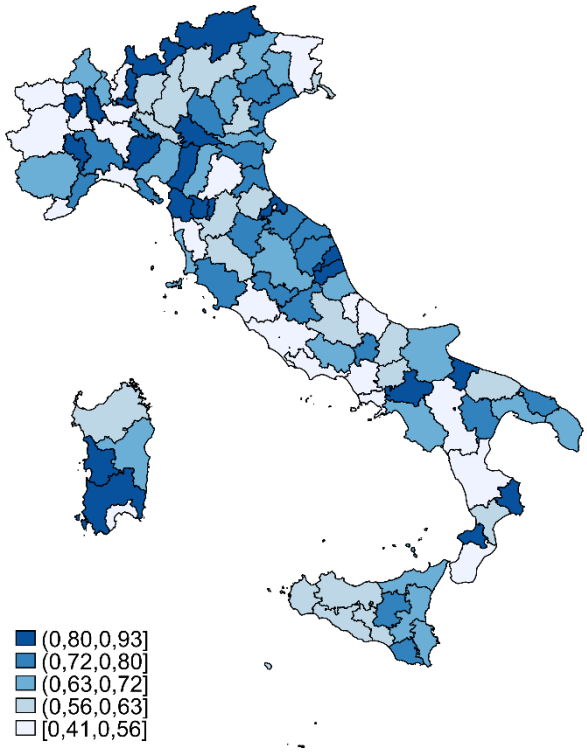


Figure 1.2 Participation rate in internships by Province



Section D)

Table 5.1 Effect of internships on main labor market outcomes by gender

		Employed	Months to find a job	Monthly wage
Pooled	Internship	0.016**	0.005	0.089***
		(0.007)	(0.037)	(0.032)
	Male	0.017*	-0.018	0.333***
		(0.009)	(0.044)	(0.043)
	Internship*Male	-0.007	-0.069	-0.046
		(0.010)	(0.050)	(0.049)
	Obs.	35,499	17,289	24,096
Bachelor	Internship	0.013	-0.041	0.085**
		(0.010)	(0.055)	(0.042)
	Male	0.006	-0.076	0.327***
		(0.012)	(0.059)	(0.053)
	Internship*Male	-0.005	-0.011	-0.036
		(0.013)	(0.069)	(0.060)
	Obs.	22,168	9,871	14,886
Master	Internship	0.024**	0.066	0.084
		(0.011)	(0.053)	(0.051)
	Male	0.032**	0.055	0.346***
		(0.013)	(0.066)	(0.074)
	Internship*Male	-0.003	-0.137*	-0.070
		(0.016)	(0.073)	(0.083)
	Obs.	13,331	7,418	9,210

Standard errors in parentheses clustered by degree program
*** p<0.01, ** p<0.05, * p<0.1

Table 5.2 Effect of internships on attitudes towards labor market by gender

		Intention to stay in education	NEET
Pooled	Internship	-0.019***	-0.005
		(0.007)	(0.007)
	Male	0.023***	-0.020***
		(0.006)	(0.006)
	Internship*Male	0.003	0.009
		(0.008)	(0.008)
	Obs.	75,147	56,787
Bachelor	Internship	-0.018**	0.002
		(0.008)	(0.007)
	Male	0.028***	-0.016**
		(0.007)	(0.007)
	Internship*Male	-0.005	0.004
		(0.009)	(0.008)
	Obs.	53,516	41,905
Master	Internship	-0.024**	-0.031**
		(0.011)	(0.015)
	Male	0.008	-0.028**
		(0.013)	(0.013)
	Internship*Male	0.023*	0.017
		(0.013)	(0.017)
	Obs.	21,631	14,882

Standard errors in parentheses clustered by degree program *** p<0.01, ** p<0.05, * p<0.1

Table 5.1 Effect of internships on the quality of job match by gender

		Skill mismatch	Educational mismatch
Pooled	Internship	-0.023**	-0.019***
		(0.010)	(0.006)
	Male	0.007	0.014*
		(0.011)	(0.008)
	Internship*Male	-0.018	-0.006
		(0.013)	(0.010)
	Obs.	24,096	24,096
Bachelor	Internship	-0.032***	-0.033***
		(0.012)	(0.009)
	Male	-0.009	0.011
		(0.012)	(0.011)
	Internship*Male	-0.007	-0.003
		(0.016)	(0.014)
	Obs.	14,886	14,886
Master	Internship	-0.019	0.003
		(0.018)	(0.008)
	Male	0.027	0.022**
		(0.021)	(0.011)
	Internship*Male	-0.029	-0.016
		(0.025)	(0.013)
	Obs.	9,210	9,210

Standard errors in parentheses clustered by degree program *** p<0.01, ** p<0.05, * p<0.1

Section E)

Table 6.1 Effect of internships on main labor market outcomes – Single-stage model

		Employed	Months to find a job	Monthly wage
Pooled		0.016**	-0.026	0.080**
		(0.007)	(0.034)	(0.033)
	Obs.	35,499	17,289	24,096
Bachelor		0.012	-0.040	0.071*
		(0.009)	(0.052)	(0.042)
	Obs.	22,168	9,871	14,886
Master		0.029**	0.005	0.074
		(0.011)	(0.047)	(0.050)
	Obs.	13,331	7,418	9,210
Labor market controls		no	yes	yes
Year of graduation FE		yes	yes	yes
University FE		yes	yes	yes
Class of degree FE		yes	yes	yes
Standard errors in parentheses clustered by degree program *** p<0.01, ** p<0.05, * p<0.1				

Table 6.2 Effect of internships on attitudes towards labor market – Single-stage model

		Intention to stay in education	NEET
Pooled		-0.018***	-0.005
		(0.006)	(0.007)
	Obs.	75,147	56,787
Bachelor		-0.022***	0.003
		(0.008)	(0.006)
	Obs.	53,516	41,905
Master		-0.018*	-0.034**
		(0.009)	(0.016)
	Obs.	21,631	14,882
Labor market controls		no	no
Year of graduation FE		yes	yes
University FE		yes	yes
Class of degree FE		yes	yes
Standard errors in parentheses clustered by degree program *** p<0.01, ** p<0.05, * p<0.1			

Table 6.3 Effect of internships on the quality of job match – Single-stage model

		Skill mismatch	Educational mismatch
Pooled		-0.030***	-0.023***
		(0.009)	(0.006)
	Obs.	24,096	24,096
Bachelor		-0.037***	-0.037***
		(0.011)	(0.009)
	Obs.	14,886	14,886
Master		-0.027*	-0.002
		(0.015)	(0.008)
	Obs.	9,210	9,210
Labor market controls		yes	Yes
Year of graduation FE		yes	yes
University FE		yes	yes
Class of degree FE		yes	yes
Standard errors in parentheses clustered by degree program *** p<0.01, ** p<0.05, * p<0.1			

Table 7.1 Effect of internships on main labor market outcomes - IPW

		Employed	Months to find a job	Monthly wage
Pooled		0.015**	-0.025	0.079***
		(0.007)	(0.032)	(0.030)
	Obs.	35,499	17,289	24,096
Bachelor		0.013	-0.048	0.080**
		(0.008)	(0.046)	(0.038)
	Obs.	22,168	9,871	14,886
Master		0.025**	0.011	0.063
		(0.011)	(0.048)	(0.045)
	Obs.	13,331	7,418	9,210
Labor market controls		no	yes	yes
Year of graduation FE		yes	yes	yes
University FE		yes	yes	yes
Class of degree FE		yes	yes	yes
Standard errors in parentheses clustered by degree program *** p<0.01, ** p<0.05, * p<0.1				

Table 7.2 Effect of internships on attitudes towards labor market - IPW

		Intention to stay in education	NEET
Pooled		-0.018***	-0.003
		(0.006)	(0.006)
	Obs.	75,147	56,787
Bachelor		-0.022***	0.004
		(0.008)	(0.006)
	Obs.	53,516	41,905
Master		-0.019**	-0.027*
		(0.009)	(0.015)
	Obs.	21,631	14,882
Labor market controls		no	no
Year of graduation FE		yes	yes
University FE		yes	yes
Class of degree FE		yes	yes
Standard errors in parentheses clustered by degree program *** p<0.01, ** p<0.05, * p<0.1			

Table 7.3 Effect of internships on the quality of job match - IPW

		Skill mismatch	Educational mismatch
Pooled		-0.033***	-0.025***
		(0.009)	-0.006
	Obs.	24,096	24,096
Bachelor		-0.040***	-0.040***
		(0.011)	(0.009)
	Obs.	14,886	14,886
Master		-0.029*	-0.003
		(0.015)	(0.008)
	Obs.	9,210	9,210
Labor market controls		yes	Yes
Year of graduation FE		yes	yes
University FE		yes	yes
Class of degree FE		yes	yes
Standard errors in parentheses clustered by degree program *** p<0.01, ** p<0.05, * p<0.1			

Chapter 3: No NEET to worry? The effect of parental background on Italian graduates' transition to employment.

Abstract

This study investigates the impact of parental background on the labor market outcomes of Italian graduates, with particular attention to the NEET (Not in Education, Employment, or Training) phenomenon, job satisfaction and career development. We analyze data from the AlmaLaurea survey to assess whether graduates from families with higher socioeconomic status (family resources, parental education, parental social class) have a smoother transition into the labor market, secure better job opportunities and have higher level of job satisfaction and job security than graduates from less privileged backgrounds. We find significant effects of parental background on various labor market outcomes, including employment prospects, wages, NEET status, inactivity, and job satisfaction. We also find a trend of increasing inactivity among Master's graduates from higher social classes, suggesting a need for targeted policies to address this issue. Overall, our study provides valuable insights into the persistent effects of parental background on graduate outcomes and offers policy recommendations to promote a more equitable labor market for all young people in Italy.

1. Introduction

Education is considered the key variable in explaining intergenerational mobility. The Human Capital Theory (Becker and Tomes, 1979; Becker, 1964) formalizes a process presented as money driven: parents' money - investment in children - children's money. In international comparisons, Italy ranks among the countries where the correlation between family background and children's labor market outcomes remains strong, even when educational attainment is held constant. This means that the impact of family origins persists significantly even after successful graduation (OECD, 2018) with a decreasing role of education premium (Cannari and D'Alessio, 2018). The persistence of socio-economic disparities, beyond the

mediating role of education, is attributed to various factors. Cognitive and non-cognitive skills, fostered by a privileged upbringing, enhance job market prospects (Farkas, 2003; Heckman et al., 2006). Additionally, individuals from higher social classes benefit from influential networks that facilitate job placements (Granovetter, 1995; Pellizzari, 2010). Financial support even after leaving university from affluent families also allows young adults to be selective in job acceptance, further amplifying the advantage (Bell and Blanchflower, 2011). Previous studies consistently demonstrates that the direct effect of social origins in the allocation of individuals to their job are markedly biased by the interference of ascriptive inequalities. However, most of them show that parental background continues to significantly affects traditional labor market outcomes in term of occupation and income across various career stages (Franzini et al., 2010; Ballarino and Bernardi, 2016; Passaretta et al., 2018). Evidences on how the socioeconomic background impact the university-to-employment transition in in terms of both employment opportunities as also job quality, stability and satisfaction, are scarce. In Italy, the interplay between high unemployment level, NEET rates and regional disparities exacerbate labor market hardship also for high skill workers and thus deserve further analysis on how SES fits into this challenge. On the one hand, it is true that graduates from high socio-economic background have an advantage over graduates of lower social origin making use of a stronger social network to quickly find work (Corak and Piraino, 2011; Oesch and Von Ow, 2017), easily exiting the unemployment and NEET status. On the other hand, in a perspective of unstable career and low skill premium, more educated Italian youth may wait for job opportunities that meet their social expectations. It is common for well-off parents to provide financial support during their children's search for a suitable employment, ensuring that investments in education are valued and the risk of their children settling for lower-level positions than their parents is reduced (Breen and Goldthorpe, 1997)

Moreover, taking into account that different proxy of socioeconomic background measure different aspect of social origin's influence (Budoki and Goldthorpe, 2013) an additional level of analysis involves comparing parental education when studying the direct effect of social origin on unemployment and NEET status. By using data from the *Graduates' Employment Status Survey*, a national level official survey carried on by the University consortium AlmaLaurea, this paper aims to disentangle the effects of parental occupation and education on the labor market status of Italian graduates. By analyzing the interplay between these

socio-economic factors and labor market outcomes, the study seeks to provide a comprehensive understanding of intergenerational mobility with a focus on unemployment, NEET condition and quality of job.

Our findings reveal the complex and often unequal challenges Italian graduates encounter in the labor market. While higher socioeconomic status generally offers advantages, the impact of each dimension of parental background varies depending on employment outcomes and education levels. Family economic resources lower unemployment and increase job satisfaction, while social class boosts wages and reduces precarious employment risks. The effects of parental education are mixed, requiring further investigation into potential mediating factors. Additionally, NEET trends show increasing inactivity among graduates from affluent families, highlighting the need for tailored approaches beyond standard labor policies.

This article is structured as follows: Section 2 provides an overview of the Italian labor market conditions for young graduates, with a particular focus on unemployment dynamics and the NEET phenomenon. Section 3 delves into the theoretical framework and key previous studies, exploring the mechanisms of intergenerational transmission and social inequalities. Section 4 describes the dataset characteristics, variable selected and descriptive statistics, while Section 5 outlines the empirical strategy. The findings, divided between traditional aspects (unemployment and wages), measures of mismatch (skill and educational mismatch) and subjective well-being (job satisfaction and career development), are discussed in Section 6. Finally, Section 7 concludes the study and offers implications for public policy.

2. Insights from the Italian labor market for young graduates

As many European countries, Italy has experienced a general worsening of young people conditions along the 2000s. The hardship faced by Italian youth is of particular concern when considering unemployment and NEET (not engaged in education, employment, or training) rates in the worst years after the 2007 financial crisis. In 2014, the youth unemployment rate in Italy was 41.4%, compared to 24.1% in the EU27 (Oecd, 2024). In the same year, ranking second only after Greece, the number of young people 15-29 in the NEET group reached its peak (Oecd, 2024). Despite the decline in the European NEET rate post-Great Recession and

before the Covid-19 Pandemic, Italy still lags significantly behind the EU target of a NEET rate below 9% by 2030. Notably, four Southern Italian regions, including Puglia, Calabria, Campania, and Sicily, continue to have NEET rates exceeding one-fifth of the young population aged 15-29 in 2022. Additionally, Calabria stands out with an employment rate below 70% among individuals aged 25-64 with tertiary education, making it the only European region with such low performance. This disparity underscores the high territorial heterogeneity within the Italian labor market, particularly between the North and South, which has been the highest in the EU for employment rates during the period 2011-2021 (Eurostat, 2023). While the unemployment rate, effectively split by age group or educational attainments, is clearly defined concept, the definition of NEET is a much complex issue. The first issue in defining NEETs concerns age group and, consequently, educational attainments. Traditionally, the term NEET refers to people aged 15 24 years[21]. However, the general increase in the years of education and the worsening conditions in the labor market for that cohort defined not as young but not adult (NYNA), has risen the average age at which the youth exit unemployment and enter a stable occupation. Consequently, in the study of NEETs it has become necessary to extend the age of analysis to 30 years, especially in examining countries such as Italy, where the transition from education to work is particularly long (Istat, 2018) and the average age of graduation is 25.6 years old, 24.4 for bachelors and 27.2 for masters (Timoteo et al., 2023). What emerged with the beginning of the 2007 financial crisis was the highest increase of NEET rate for the 25-29 years age group with at the same time the highest proportion of inactive NEETs in this age category, indicating that young people aged 25 29 years have suffered as a result of the crisis probably even more than those aged 20 24 years or younger. Furthermore, while at EU level education is confirmed as the best protection against unemployment and exclusion, Southern European and Mediterranean countries tend to have a large proportion of well-educated NEETs as a result of the crisis (Euro- found, 2016). A recent study by IRVAPP (Bazoli et al., 2022) focusing on population and prevalence effect in NEET rates, shows that in a European comparison Italy is the only country where the prevalence does not decrease with increasing education levels: young NEETs consistently remain around 24% both of those

[21] The term NEET was introduced in the late 1990s in the UK government report "Bridging the Gap"about the need to reintegrate young people aged 16-18 who had dropped out of education but had not moved into the labor market. NEETs were specifically referred to for the first time in European policy discussions in the Europe 2020 flagship initiative "Youth on the move"; the term was broadened to include those aged 15-24 and, later, those aged 15-29 (Eurofound, 2016).

with lower secondary education and the few graduates. This results in a notable fact: in our country, the contribution of graduates to the NEET rate in 2013 was 2.6% higher than that of young graduates in France and the Netherlands, despite the fact that the proportion of graduates in Italy is much more selective, roughly half of that in France and the Netherlands. Secondly, and perhaps more important, being defined as the share of young people not in employment (unemployed or inactive), education or training among the total population of young people, the NEET category includes not only conventionally unemployed young people but also other vulnerable groups such as those with disabilities and with care-giving duties. Likewise, while NEETs often face disadvantages related to education and family background (Eurofound, 2012), non-vulnerable subgroups may be part of this group. These include those soon re-enter employment, education or training, after simply taking time out or waiting for the right opportunity, and those constructively engaged in other informal activities self-directed. Exploring the diversity of NEETs, the Eurofound (2016) points out that the population of NEETs for the Mediterranean cluster of countries is characterized by a large share of long-term unemployed and discouraged workers, with a share of those who are NEETs due to illness or disability or family responsibilities well below the EU average. However, what is more striking is the high number of NEET in the residual category "other inactive[22] that for Italy is the second highest share in terms of contribution to the total rate of NEET (16%), after those who are long-term unemployed (27%). This group is likely to be an extremely heterogeneous mix that includes people at all extremes of the spectrum of vulnerability: the most vulnerable, the most privileged, and those who are holding out for a specific opportunity or who are following alternative paths, such as careers in the arts.

With regard to the condition of Italian graduates that exit the unemployment or inactivity status, even when in the labor market, young Italians experience worse condition compared to the `insider' adult workers with high employment protection (Liotti, 2020; Pinelli et al., 2017). An analysis by the European Commission (2013) that in the period 2007-2012, with an opposing

[22] Using the EU Labour Force Survey, the Eurofound report "Exploring the diversity of NEETs" (2016) splits the NEET group in the following subcategories: "Re-entrants", "Short-term unemployed", "long- term unemployed", "Unavailable due to illness or disability", "Unavailable due to family responsibilities", "Discouraged workers", "Other inactive". The Re-entrants category captures those who have already been hired or enrolled in education or training and will soon begin or resume accumulation of human capital through formal channels. "Discouraged workers" captures all young people who have stopped looking for work because they believe that there are no job opportunities for them.

trend to that observed in the EU27, there has been an 11% decrease in the share of job positions requiring higher education. During the same period, employment among graduates increased by 18.6%. However, a closer examination of the types of jobs held by the highly educated reveals a low utilization of their skills, as only 54% of the increase in highly educated employment is engaged in high-skill professions. Beside mismatch and overeducation issues, young Italian workforce is also characterized by unstable careers path. In 2022, nearly 80% of new hires in Italy were on temporary contracts, compared to an OECD average of 50%. Additionally, Italy has the highest rate of involuntary part-time (25%) in EU, followed by Spain (OECD, 2023). This combination of factors has led to a pronounced vulnerability among young people in Italy, making them the most at-risk social group for poverty (Istat, 2019) and, where possible, widely supported by parents.

3. Theoretical framework and previous studies

According to the hypothesis of social strati cation by Mare (1980), as students advance through the stages of schooling, the student population becomes progressively more homogeneous because less capable individuals drop out along the way. Since individual characteristics such as values, attitudes, and career aspirations are positively influenced by social class, this phenomenon of progressive homogenization implies a corresponding imbalance in the social composition of the student population, increasingly reflecting upper classes. Therefore, the smaller group of students from lower socio-economic backgrounds who manage to reach higher education will have similar abilities and motivations to their peers from affluent families. Consequently, the effect of parental socio-economic background diminishes across educational levels, and the accomplished group of graduates benefits from a peer effect. However, even after accounting for education, adults from lower social origins tend to have lower employment levels and earnings (Breen and Luijkx, 2004; Hällsten, 2013; Ballarino and Bernardi, 2016; Passaretta et al., 2018). While focusing on the mediating role of investment in education as the main channel through which parents influence their o spring's labor market outcomes, even Becker (1964) recognizes a residual but not restrictive link of endowed attributes between parents and children. Broadening the discussion to all channels of inequality

reproduction, Meade (1973) summarizes the initial opportunities of each individual, consisting of genetic factors, educational achievement, wealth, and social ties, with the term “fortune” (p.358). First, more recent empirical findings cofirm that growing up in a more privileged household correlates with enhanced cognitive abilities, depending on parental example, the learning environment at home, family-related stimuli, and extracurricular activities (Farkas, 2003; Anger, 2012). Non-cognitive attributes like personality traits, behaviors, and attitudes are also valued in the job market, as they impact employment prospects and wages even when educational levels are taken into account (Heckman et al., 2006). Displaying cultural traits and behaviors linked to higher social classes provides an advantage when entering the labor market (Friedman and Laurison, 2019). Second, the advantage in the labor market may depend on the opportunity and ability to activate the most effective job search channels. According to Social Capital Theory (Granovetter, 1995), belonging to upper social classes results in more influential social networks. Since a significant portion of job placements occurs through informal networks in developed economies (Pellizzari, 2010), the quality and extent of social connections play a key role in job seeking strategies and the selection process. Families from disadvantaged backgrounds may encounter difficulties leveraging their social circles to support their children, as their network connections typically lack influence (Corak and Piraino, 2011; Oesch and Von Ow, 2017). Finally, young adults from affluent backgrounds can benefit more from their parents’ financial support even after their formal education years, influencing their reservation wage and their decision whether to accept a given job or not (Mazzotta, 2008). Young adults from affluent backgrounds are less inclined to accept employment opportunities that do not align with their skills and they tend to wait for a better job (Bell and Blanchflower, 2011). Conversely, economic constraints may push young adults from disadvantaged backgrounds to accept any available job.

Even though the mechanisms and channels of intergenerational transmission of social origin are still under debate, several studies have highlighted that social background exerts a considerable "direct" influence beyond what is transmitted through education. In what follows, we discuss the most important and robust findings based on the determinants used in this paper, mainly focusing on the Italian case. In their book, Ballarino and Bernardi (2016) provide robust evidence of a significant direct effect of social origin across 14 countries, including Italy. These findings align with previous research consistently demonstrating a significant effect of social origin on occupational outcomes over time, regardless of how

parental background is measured or the career stage at which occupational attainment is assessed (Barone et al., 2011; Schizzerotto, 2002). Passaretta et al. (2018) investigate the direct impact of social class on early occupational attainment for Italian and Dutch men over the first ten years of their careers. Findings indicate that in both countries, the direct effect of socio-economic background remains consistent over time, and individuals from advantaged social backgrounds secure better occupational positions upon entering the labor market. Piraino and Mocetti (2007) demonstrate a strong and significant intergenerational income correlation in Italy. When controlling for education, this estimate drops by less than one-third. Piraino and Mocetti (2007) finds this correlation more pronounced in the top quartile of the fathers' earnings distribution. A study by Franzini et al. (2020) examines the impact of two background proxies on income: family financial distress and father's occupational class. Using OLS estimates on EU-SILC data from 13 countries, the study finds that both measures significantly affect wages in Italy, even after accounting for education. Comparatively, the situation in Mediterranean and some Continental countries mirrors Italy's, whereas in Scandinavian countries the influence of family background on income, when controlling for education, is generally not significant. While several studies have focused on the intergenerational transmission of occupation and income, i.e., labor market outcomes conditional on being employed, there is little evidence assessing the direct effect of socio-economic background on alternative labor market out- comes in the university-to-work transition. Unemployment, NEET status, and inactivity are important indicators of labor market exclusion and social disadvantage, especially for young people, also considering that prior evidence shows that early career unemployment has long-lasting scarring effects (Gregg and Tominey, 2005). Fewer studies have examined the intergenerational correlation in worklessness, particularly among young adults. A cross-country comparative study by Berloffa a et al. (2016) analyzes the intergenerational transmission of worklessness, suggesting that parental worklessness during adolescence can increase the likelihood of their children becoming unemployed, with stronger effects observed in countries with lower social mobility, traditional gender roles, and less developed youth support services like Italy. Gender differences are significant: mothers' employment during adolescence greatly increases their daughters' likelihood of employment, while fathers' employment boosts their sons' employment prospects. Mazzotta (2008) finds that graduates from deprived economic backgrounds have more difficulties in finding jobs than graduates from affluent families,

particularly in Southern Italy, with unemployment du- ration being about 52% longer for the former. Considering the economic cycle, Moawad (2022) suggests that graduates from low educational backgrounds face more disadvantages in terms of employment than young adults from high educational backgrounds in Italy and Germany. Moreover, many of the aforementioned studies only focus on a single aspect of socio-economic status: parental education, social class, or income are used as proxies for family background, assuming they are more or less interchangeable indicators. However, as pointed out by Bukodi and Goldthorpe (2013), these factors measure different aspects: education reflects cognitive skills and non-cognitive traits, occupational class indicates social status and social networks, while income is a proxy of overall economic resources. Disentangling the individual effects of these three dimensions is challenging due to their interconnected nature. Previous findings indicate that economic conditions alone are less important compared to other types of family resources (Hauser and Sweeney, 1995; Guo and Harris, 2000). Parental education, especially the mother's education, is the most significant predictor of children's education, though parental class and social status are also influential (Bukodi and Goldthorpe, 2013; Buis, 2013). Parental occupation, besides linking education and income, reflects social standing, prestige, and social capital (Weeden and Grusky, 2005). Moreover, social class is sometimes considered a particularly good proxy for permanent income (Erikson and Goldthorpe, 2010).

The integration of theory and literature shows that the persistence of differences in social and cultural capital continues to significantly influence occupational outcomes. Nevertheless, to fully understand the role of education in social mobility, it is essential to consider not only occupation and wages, but also investigate what happens all along the university-to-employment transition. This paper exploits the AlmaLaurea data to disentangle the effect of different family characteristics and understand whether and how socio-economic background directly affects activity and inactivity propensity after graduation, contributing to the limited evidence in this field.

4. Data, variables and descriptive statistics

4.1 Data

We exploit the information provided by AlmaLaurea, a national consortium that currently includes 78 Italian universities and collects data on millions of graduates, including a wide range of information on graduates' employment status, job characteristics, and earnings, as well as on their educational background and other demographic characteristics. Specifically, The Consortium conducts two primary nationwide surveys: the *Graduates' Profile Survey*, which examines graduates' characteristics and academic performance, and the *Graduates' Employment Status Survey*, which tracks their labor market outcomes one, three, and five years post-graduation. The surveys are conducted through a questionnaire that is sent to graduates one, three and five years after graduation. The response rate for the one-year follow-up questionnaire exceeds 70% on average (refer to AlmaLaurea Report 2023 for detailed survey methodologies and weighting procedures).

For this analysis, we use data from the AlmaLaurea surveys covering the academic years 2014/2015 to 2021/2022. The total sample includes 1,439,847 students, of which 847,096 completed the questionnaire one year after obtaining their Bachelor's degree and 592,751 respondents has held a Master's degree for one year at the time of the survey. AlmaLaurea also provide observation weights to account for non-respondent rate.

4.2 Variable and descriptive statistics

The definitions and descriptive statistics of all the dependent and independent variables are shown in Table 1.1 and Table 1.2 in the Appendix.

As to our treatment variable, we employ three alternative definitions of family background.

Since we do not have access to tax data for graduates and their families, we construct the variable *High Family Resources* based on eligibility for means-tested student welfare services. Graduates are classified as *High Family Resources* equal 1 if they have never received a university scholarship

or had access to university-provided housing services. This approach serves as a proxy for assessing the financial capacity of their families.

Second, *Parental Education* is a binary variable indicating whether either the student's mother, father, or both parents hold university degree. Last, *High Social Class* is determined using an AlmaLaurea classification of parental occupation. This category includes high-level executives, self-employed professionals, and entrepreneurs with at least 15 employees.

Regarding outcomes, the main novelty of this study is the analysis of the impact of different aspect of socio-economic background on *NEET* and *Inactive* status. The *NEET* variable is coded as 1 if the individual reports being unemployed or inactive (i.e., not looking for a job and not involved in training or education), and 0 otherwise. Thus, the NEET variable includes both those who are seeking work and those who are not, provided they are not involved in any education or training activities. This means that *NEET* is coded as 0 for individuals who are either in education or training. Consequently, *Inactive* are those graduates who are not seeking work at all (and at the same time nor studying or involved in training).

We also consider more traditional labor market outcomes, such as the average *Monthly Salary* (provided by AlmaLaurea in 16 categories).

Additionally, the survey allows us to define two distinct measures of how well graduates' jobs align with their competencies and educational backgrounds. The first measure is *Skill Mismatch*, which occurs when an individual's skills are either over- or under-utilized in relation to their job responsibilities. Graduates are asked to what extent they use the skills acquired during their degree program, with the options: "to a high extent," "to a low extent," or "in no way." Graduates who report using their skills to a high extent are considered to be well-matched, while those who report lower utilization are classified as mismatched.

The second measure is *Educational Mismatch*, which refers to a discrepancy between a worker's qualifications and the requirements of their job. Specifically, we focus on vertical mismatch, where a graduate is either over- or under-educated for their position. The AlmaLaurea Graduates' Employment Status Survey defines four categories regarding the necessity of a degree for a job: "the degree is a legal requirement," "the degree is not legally required, but it is necessary," "the degree is not legally required, but it is still useful," and "the degree is neither legally required nor useful." Graduates who select the last option are classified as experiencing educational mismatch according to this framework.

We therefore consider perceptive and self-declared measures of mismatch and we repeat the analyses by excluding from the sample those who report working and studying simultaneously (a category available only for undergraduate students). This is due to the fact that a significant number of graduates may choose to continue their studies while accepting low-paid jobs just to finance their education.

Finally, we analyse the impact of socio-economic background on measures of job satisfaction and job security. Regarding the *Job Satisfaction* variable, it is structured as a dummy, taking value 1 if the respondent reports a satisfaction level above the median, and 0 if it is below. The *Precarious Contracts* variable takes the value of 1 for atypical contracts, and 0 if the respondent reports being either a traditional dependent worker or self-employed.

The definitions and descriptive statistics of the treatment and control variables are shown in Table 1.2. First, we control for various socio-demographic variables including gender, area of birth and nationality. Another important group of control variable which could impact labor market outcomes proxy for cognitive ability, namely study performance and duration, measured by the high-school grade, the degree grade, the age at graduation and the condition of late graduation. We reconstruct personal knowledge and preparation by considering both the type of high school attended and the field of study, using a 15-category variable defined by the Ministry of Education, University, and Research (MUR) and employed by AlmaLaurea. When we look at the sub-sample of graduates who declared to be employed one year after graduation, controls for field of work, type of contract, working time and employment rate for the Italian Province where the study program is located are also included.

To justify the analysis, we provide an overview of the employment condition of the sample used and examine the changes over time for those falling into the *NEET* and *Inactive* categories.

As shown in Table 1 the employment rate after three years of study is lower, as many students opt for enrollment in further education after Bachelor graduation.

Table 1. Distribution of employment status

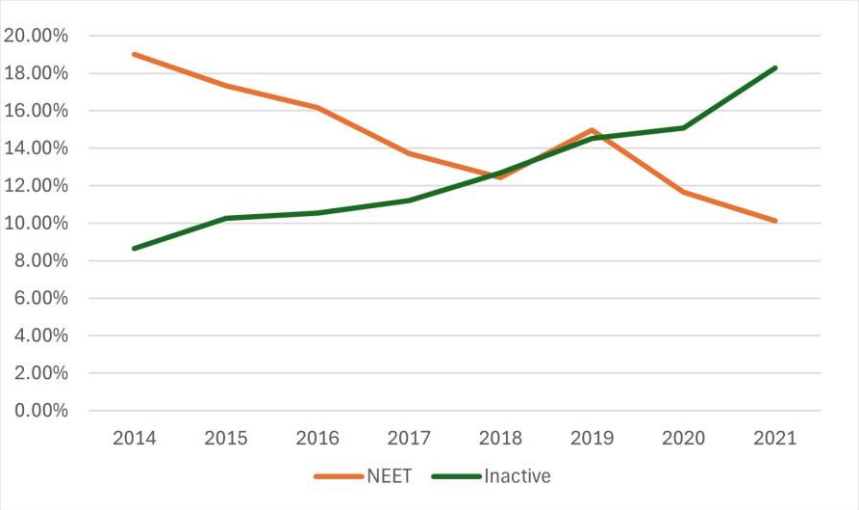
	Full Sample		BSc.		MA	
Job Status	Freq.	%	Freq.	%	Freq.	%
Employed	680,949	47.92	325,998	38.48	354,951	59.88
Full-time student	552,083	38.34	393,459	46.45	158,624	26.76
Inactive	25,235	1.75	17,495	2.07	7,740	1.31
Job Seeker	181,580	12.61	110,144	13	71,436	12.05
Total	1,439,847	100	847,096	100	592,751	100

The inactivity rate, is considerably lower for Master's degree holders (1.31%) compared to Bachelor's degree holders (2.07%), which is in line with the expectation that higher educational levels lead to better labor market outcomes. Furthermore, 13.36% of Master's graduates are either job seekers or inactive, compared to 15.07% of Bachelor's graduates which represents the rate of NEET over the total population.

More interestingly, the rate of the inactive respondents within the population of NEET is 13.71% for Bachelors and only 9.78% for Master's degree holders.

Figure 1 tracks the percentage of young people who are NEET overall, and the percent- age of those NEET individuals who are inactive (i.e., not actively seeking employment) over time. From 2014 to 2021, the NEET rate shows a general downward trend, but the inactivity rate within the NEET group has been steadily increasing. This suggests that while fewer young people are becoming NEET overall, the proportion of those NEET who are inactive is rising, indicating a potential challenge in engaging this specific group.

Figure 1: NEET vs Inactive over time



Notes: The figure compares the percentage of NEET in the full sample with the percentage of inactive subjects within the subsample of individuals NEET one year after having obtained a higher tertiary degree.

5. Methodology

We analyze the impact of the three definitions of parental background (wealth, education and social class). Since we focus on graduates only, all our results must be read as conditioned to having a degree, thus once parental effect on enrollment and university performance has already had their impact. Since the selection process until graduation may bias the distribution of individual characteristics between the two group of students defined by each parental background proxy, we perform an inverse probability weighting (Rosenbaum and Rubin, 1983) to balance the covariates.

To construct our weights, we first estimate propensity scores via separate logistic regressions for each parental background dimension (the 'treatments', in IPW terminology), predicting the probability of belonging to a given background category based on observed covariates. We estimate these scores for the pooled sample and separately for BSc and MA subgroups, acknowledging potential heterogeneity in determinants across educational levels. To mitigate collinearity among background variables, each logit model incorporates the other two dimensions as explanatory variables. While this may reduce collinearity, complete separation of effects might not be guaranteed, in particular if interaction between the different aspects were relevant.

Based on the estimated propensity scores, we then compute inverse probability weights for each parental background dimension. For a treated individual ($T_i = 1$), weights are calculated as the inverse of the propensity score $w_i = 1/\hat{p}(X_i)$, and for untreated subjects ($T_i = 0$), weights are $w_i = 1/(1 - \hat{p}(X_i))$. The resulting weights are then normalized by their mean and multiplied by the AlmaLaurea design weights to adjust for sampling bias.

Let Y_i denote the labor market outcome for individual i, T_i the indicator for the specific parental background dimension. X_i' is the vector of covariates observed for individual i and w_i represents the combined weight (IPW*AlmaLaurea design weighs). Our outcome linear probability model is straightforward:

$$(1) \quad Y_i = \beta_0 + \beta_1 T_i + \beta_2 X_i + \epsilon_i$$

The IPW-adjusted treatment effect estimate is:

$$(2) \quad \hat{\beta}_1^{IPW} = \frac{\sum_{i=1}^{n} w_i Y_i (T_i - \hat{p}(X_i))}{\sum_{i=1}^{n} w_i Y_i (T_i - \hat{p}(X_i))^2}$$

Where the term $T_i - \hat{p}(X_i)$ is the difference between whether individual i comes from a wealthy family, has parents with a degree and/or comes from a high social class (i.e., received the 'treatment') and how likely they were to having favorable parental characteristics based on their observed characteristics. In this way we control for potential confounders that affect both background and labor market outcomes. For instance, in our context we can assume that those coming from more affluent families are more likely to graduate regardless of their cognitive abilities. As a consequence, we will be more likely to have an overrepresentation of lower cognitive abilities in our 'treated' (i.e., wealthy) subsample, which could potentially bias our estimates if we simply compared the labor market outcomes of wealthy and non-wealthy individuals without any adjustment. By applying IPW we mitigate the potentially confounding impact of factors such as cognitive ability, gender, geographical area and eld of study ensuring that any observed differences in labor market outcomes can be attributed with greater confidence to the causal effect of family wealth, parental education and social class.

6. Results

6.1 Unemployment and wages

Our analysis starts by showing how parental background affects unemployment status and wages one year after graduation. Table 2 presents the likelihood of being employment, differentiating between Bachelor's and Master's graduates. Notably, for both degree levels high family resources and social class play a significant role in decreasing unemployment. Coming from a more affluent family decreases the likelihood of being unemployed by nearly 1.6% for Bachelor's graduates and by 0.8% for Master's graduates. Conversely, having one or both parents with a university degree positively affects the likelihood of unemployment only for Bachelor's graduates, decreasing the likelihood of having a paid occupation by 1.13%. Finally, belonging to a higher social class consistently and significantly decreases the likelihood of unemployment for graduates and decreases, by 2.4% for Bachelor's graduates and by 1.5% for Master's graduates.

Table 2. Unemployment 1 year after graduation

	(1) BSc	(2) BSc	(3) BSc	(4) BSc	(5) MA	(6) MA	(7) MA	(8) MA
High Family Resources (d.)	-0.0210***			-0.0157***	-0.0132***			-0.00769*
	(0.00191)			(0.00353)	(0.00172)			(0.00308)
Parental Education (d.)		0.0174***		0.0113**		0.00596***		0.000138
		(0.00203)		(0.00391)		(0.00169)		(0.00308)
High Social Class (d.)			-0.0223***	-0.0239***			-0.0170***	-0.0153**
			(0.00214)	(0.00397)			(0.00184)	(0.00307)
Number of Observations	431,659	431,659	431,659	431,659	404,867	404,867	404,867	404,867
R^2	0.098	0.095	0.093	0.088	0.077	0.074	0.073	0.073
Additional Controls								
Curricular FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
University FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Socio-demographic FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variable is "Unemployment (d.)", Method of Estimation: OLS. Standard errors are clustered at the individual student level. * p<0.05, ** p<0.01, *** p<0.001.

Table 3 shows that the impact of family background on wages measured in deciles, one year after graduations varies significantly by degree level. For Bachelor's graduates, financial family resource show no significant effects on wages, while parental education is negatively correlated with earnings. Similar to the extensive margin, i.e., the likelihood of obtaining employment one year after graduation, social class positively affects out- comes also at the intensive margin, expressed by salaries, for both degree level. Parental education is positively correlated with salaries for Master's degree holders while family resources demonstrate a negative and significant association.

In Table 4 we consider the likelihood of not being in employment, education or training (NEET). Our dependent variable, NEET, takes value 1 if the individual is a job seeker or inactive and 0 otherwise. Differently to the analysis of unemployment, where we assess unemployment, excluding inactive respondents and respondents that are in education from the sample, being NEET also include the inactive population, counterposed to a situation of activity, i.e., either education or employment with the idea of capturing a situation of social marginality. All three background dimensions are negatively and significantly correlated with the NEET status for both degree levels. This suggests that higher parental resources, education and social class are associated with a lower likelihood of being NEET.

Table 3. Average Salary 1 year after graduation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	BSc	BSc	BSc	BSc	MA	MA	MA	MA
High Family Resources (d.)	1.649			-6.305	-9.828***			-10.629**
	(3.095)			(4.927)	(2.822)			(4.525)
Parental Education (d.)		-2.895		-14.193**		17.942***		22.574***
		(2.193)		(6.625)		2.185)		(4.713)
High Social Class (d.)			16.286***	12.830*			17.323***	16.776***
			(2.422)	(7.454)			(2.393)	(4.768)
Number of Observations	293,529	293,529	293,529	293,529	296,244	296,244	296,244	296,244
R^2	0.599	0.593	0.581	0.590	0.466	0.461	0.460	0.456
Additional Controls								
Curricular FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
University FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Socio-demographic FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variable is "Average Salary" calculated in deciles, Method of Estimation: OLS. Standard errors are clustered at the individual student level. * p<0.05, ** p<0.01, *** p<0.001.

Next, we look closer into the NEET category, which comprises both inactive individuals and active labor market participants (i.e., job seekers). This contrasts with the standard unemployment calculation, which excludes inactive individuals from the sample. In Table 5 we assess the likelihood of being inactive versus unemployed within the NEET category. The purpose of this analysis is to identify the determinants that lead individuals towards inactivity as opposed to actively seeking employment. Family wealth and parental education appear to slightly increase the likelihood of inactivity after obtaining the Bachelor's degree, which might suggest that those with a financial safety net are less pressured to actively seek work. In the joint regression model only parental education maintains a positive effect on the likelihood of being inactive. In an additional analysis[23], we also look into whether the educational level of the mother or that of the father matters more and find that the overall positive and significant effect appears to be due to the father's education. Parental education ceases to play a consistent role once the Master's degree has been obtained, with parental social class showing the most significant positive correlation with inactivity.

Table 4. Likelihood of being NEET 1 year after graduation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	BSc	BSc	BSc	BSc	MA	MA	MA	MA
High Family Resources (d.)	-0.0185***			-0.0169***	-0.00997***			-0.00653***
	(0.00116)			(0.00208)	(0.00120)			(0.00228)
Parental Education (d.)		-0.00668***		-0.00762***		-0.00271**		-0.00772***
		(0.00116)		(0.00226)		(0.00125)		(0.00225)
High Social Class (d.)			-0.0175***	-0.0168***			-0.0140***	-0.0130***
			(0.00124)	(0.00232)			(0.00136)	(0.00225)
Number of Observations	847,096	847,096	847,096	847,096	592,751	592,751	592,751	592,751
R^2	0.048	0.044	0.044	0.041	0.053	0.050	0.052	0.050
Additional Controls								
Curricular FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
University FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Socio-demographic FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variable is "NEET (d.)", Method of Estimation: OLS. Standard errors are clustered at the individual student level. * p<0.05, ** p<0.01, *** p<0.001.

[23]Regression Tables available upon request.

However, this effect diminishes and becomes non-significant once we jointly control for all three dimensions. In model (8) we observe a significant positive effect only for family resources.

The separate and joint regression models reveal underlying correlations between the three background definitions, making it difficult to disentangle the contributions of each dimension. To gain a clearer understanding, we analyze pairwise interactions between these factors in Table 6. Across both Bachelor's and Master's degree levels, high family resources consistently exhibit a positive and robust influence on inactivity in all pairwise interactions. Similarly, for Bachelor's graduates, parental education demonstrates a positive effect. However, the role of social class is less pronounced for Bachelor's graduates, while it appears to exert a robust positive effect on inactivity for Master's graduates.

Table 5. Likelihood of being Inactive 1 year after graduation

	(1) BSc	(2) BSc	(3) BSc	(4) BSc	(5) MA	(6) MA	(7) MA	(8) MA
High Family Resources (d.)	0.00607**			0.00619	0.00370			0.00917*
	(0.00275)			(0.00532)	(0.00316)			(0.00539)
Parental Education (d.)		0.00853***		0.0160**		-0.00132		-0.000953
		(0.00309)		(0.00629)		(0.00309)		(0.00528)
High Social Class (d.)			0.00304	0.00886			0.00971***	0.00629
			(0.00335)	(0.00646)			(0.00364)	(0.00540)
Number of Observations	127,639	127,639	127,639	127,639	79,176	79,176	79,176	79,176
R^2	0.024	0.025	0.024	0.031	0.024	0.025	0.025	0.040
Additional Controls								
Curricular FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
University FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Socio-demographic FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variable is "Inactive (d.)", Method of Estimation: OLS. Standard errors are clustered at the individual student level. * p<0.05, ** p<0.01, *** p<0.001.

Table 6. Likelihood of being Inactive 1 year after graduation - background interactions

	(1) BSc	(2) BSc	(3) BSc	(4) MA	(5) MA	(6) MA
High Family Resource (d.)	0.00813***		0.00741***	0.00762***		0.00639**
	(0.00238)		(0.00233)	(0.00274)		(0.00264)
Parental Education (d.)	0.01452**	0.00897***		0.00681	-0.00061	
	(0.00598)	(0.00309)		(0.00650)	(0.00309)	
Par. Resources*Education	-0.00561			-0.00474		
	(0.00652)			(0.00701)		
High Social Class (d.)		0.00690*	0.00555		0.01153**	0.01411*
		(0.00401)	(0.00668)		(0.00482)	(0.00761)
Par. Education * Class		-0.00039			0.00089	
		(0.00586)			(0.00631)	
Par. Resources * Class			0.00432			-0.00368
			0.00729			(0.00820)
Number of Observations	127,639	127,639	127,639	79,176	79,176	79,176
R^2	0.027	0.027	0.027	0.022	0.022	0.022
Additional Controls						
Curricular FE	Yes	Yes	Yes	Yes	Yes	Yes
University FE	Yes	Yes	Yes	Yes	Yes	Yes
Socio-demographic FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variable is "Inactive (d.)", Method of Estimation: OLS. Standard errors are clustered at the individual student level. * p<0.05, ** p<0.01, *** p<0.001.

6.2 Skill mismatch and educational mismatch

Table 7 examines the likelihood of skill mismatch among Italian graduates by considering the student self-evaluation. The analysis reveals a subtle relationship between parental background and skill mismatch. For Bachelor's graduates, high family resources appear to decrease skill mismatch by 1.13%, while parental education shows a positive effect of approximately the same size. High social class alone significantly decreases the likelihood of skill mismatch for Bachelor's graduates, but the effect becomes non-significant in the joint model. For Master's graduates, high social class shows a significant and negative association with skill mismatch both in the separate and in the joint models. These findings suggest that the impact of parental background on skill mismatch varies depending on the level of education attained and the specific dimension of parental background considered.

Considering that skill mismatch is relatively common among Bachelor's degree holders and since a consistent number of graduates choose to continue their studies and accept low-paid jobs to finance their education, we further refine our analysis by excluding individuals who study and work at same time. Table 8 presents the results of this adjusted analysis, focusing exclusively on Bachelor's graduates.

All three background dimensions result to play a significant role. Coming from an affluent family reduces the likelihood of skill mismatch by 1.9%, while belonging to a high social class decreases it by 1.31%. Conversely, the effect of parental education remains robust, increasing the probability of skill mismatch by 1.75%.

Table 7. Likelihood of Skill Mismatch 1 year after graduation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	BSc	BSc	BSc	BSc	MA	MA	MA	MA
High Family Resources (d.)	-0.00229			-0.0113**	0.00415			0.00166
	(0.00248)			(0.00453)	(0.00275)			(0.00490)
Parental Education (d.)		0.00663**		0.0122**		-0.00345		-0.00664
		(0.00258)		(0.00520)		(0.00258)		(0.00504)
High Social Class (d.)			-0.00708***	-0.00575			-0.0123***	-0.0117**
			(0.00273)	(0.00530)			(0.00282)	(0.00510)
Number of Observations	293,529	293,529	293,529	293,529	296,244	296,244	296,244	296,244
R^2	0.278	0.272	0.262	0.283	0.125	0.117	0.118	0.127
Additional Controls								
Curricular FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
University FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Socio-demographic FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variable is "Skill Mismatch (d.)", Method of Estimation: OLS. Standard errors are clustered at the individual student level. * p<0.05, ** p<0.01, *** p<0.001.

Table 8. Skill Mismatch after 1 year from graduation (excluding "Work & Education)

	(1) BSc	(2) BSc	(3) BSc	(4) BSc
High Family Resources (d.)	-0.00469			-0.0193***
	(0.00319)			(0.00591)
Parental Education (d.)		0.00833**		0.0175**
		(0.00331)		(0.00684)
High Social Class (d.)			-0.0102***	-0.0131*
			(0.00349)	(0.00690)
Number of Observations	193,575	193,575	193,575	193,575
R^2	0.276	0.275	0.261	0.29
Additional Controls				
Curricular FE	Yes	Yes	Yes	Yes
University FE	Yes	Yes	Yes	Yes
Socio-demographic FE	Yes	Yes	Yes	Yes

Notes: The dependent variable is Skill Mismatch (d.), Method of Estimation: OLS. The sample includes Bachelor's graduates only and does not include individuals who declared a "Work and Education" status. Standard errors are clustered at the individual student level. * p<0.05, ** p<0.01, *** p<0.001.

We then analyze with the same approach also educational mismatch which is defined as the case in which the degree title is nor mandatory nor actually necessary for the job at stake. As for skill mismatch, examining the results for Master's graduates reveals a more consistent pattern than for Bachelor's graduates. High family resources, parental education and high social class are consistently associated with a lower likelihood of educational mismatch.

Excluding those working and studying at same time, as in the previous analysis, high family resources and high social class both result to have significant negative influence on the likelihood of educational mismatch (see Table 10). However, this significance diminishes in the joint model, suggesting potential contextual interdependencies between these factors.

Table 9. Likelihood of Educational Mismatch 1 year after graduation

	(1) BSc	(2) BSc	(3) BSc	(4) BSc	(5) MA	(6) MA	(7) MA	(8) MA
High Family Resources (d.)	-0.0102***			-0.0106***	-0.00317*			-0.00570**
	(0.00219)			(0.00365)	(0.00156)			(0.00280)
Parental Education (d.)		-0.00266		0.00738		-0.00882***		-0.00879***
		(0.00206)		(0.00481)		(0.00147)		(0.00283)
High Social Class (d.)			-0.0143***	-0.00676			-0.00553***	-0.00791***
			(0.00216)	(0.00512)			(0.00164)	(0.00288)
Number of Observations	293,529	293,529	293,529	293,529	296,244	296,244	296,244	296,244
R^2	0.277	0.265	0.257	0.279	0.170	0.156	0.161	0.176
Additional Controls								
Curricular FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
University FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Socio-demographic FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variable is "Educational Mismatch (d.)", Method of Estimation: OLS. Standard errors are clustered at the individual student level. * p<0.05, ** p<0.01, *** p<0.001.

Table 10. Educational Mismatch after 1 year from graduation (Excluding "Work & Education")

	(1) BSc	(2) BSc	(3) BSc	(4) BSc
High Family Resources (d.)	-0.00883***			-0.00843
	(0.00267)			(0.00460)
Parental Education (d.)		-0.00368		0.00823
		(0.00236)		(0.00602)
High Social Class (d.)			-0.0135***	-0.00472
			(0.00238)	(0.00625)
Number of Observations	193,575	193,575	193,575	193,575
R^2	0.209	0.199	0.193	0.221
Additional Controls				
Curricular FE	Yes	Yes	Yes	Yes
University FE	Yes	Yes	Yes	Yes
Socio-demographic FE	Yes	Yes	Yes	Yes

Notes: The dependent variable is Educational Mismatch (d.), Method of Estimation: OLS. The sample includes Bachelor's graduates only and does not include individuals who declared a "Work and Education" status. Standard errors are clustered at the individual student level. * p<0.05, ** p<0.01, *** p<0.001.

6.3 Subjective well-being and career development

Having examined the influence of parental background on traditional labor market outcomes, such as unemployment and wages, as well as the likelihood of being NEET and inactive within the NEET category, we now shift our focus to broader impacts on subjective well-being and career development. This section explores various dimensions affect job satisfaction and career progression, including skill mismatch, educational mismatch, and the prevalence of precarious employment.

By analyzing these factors, we aim to gain a more holistic understanding of how parental background shapes the overall career trajectories and well-being of Italian graduates.

Table 11 presents a clearer picture of the relationship between parental background and job satisfaction. High family resources consistently and significantly increase the likelihood of job satisfaction for both Bachelor's and Master's graduates (2.3% and 1.3%, respectively), suggesting that graduates from wealthier backgrounds tend to be more satisfied with their jobs. Parental education shows a negligible effect on job satisfaction for both groups. Alongside family resources, high social class also exhibits a strong positive association with job satisfaction, particularly for Bachelor's graduates. This indicates that graduates from higher social classes are more likely to report being satisfied with their jobs, even after controlling for other factors. Overall, we find a significant role of family background, particularly family resources and social class, in increasing job satisfaction among Italian graduates.

Table 11. Likelihood of being Satisfied with the Job 1 year after graduation

	(1) BSc	(2) BSc	(3) BSc	(4) BSc	(5) MA	(6) MA	(7) MA	(8) MA
High Family Resources (d.)	0.0206***			0.0227***	0.0084***			0.0133***
	(0.00275)			(0.00501)	(0.00277)			(0.00490)
Parental Education (d.)		0.00117		-0.000375		-0.00242		-0.00687*
		(0.00280)		(0.00589)		(0.00254)		(0.00503)
High Social Class (d.)			0.0263***	0.0200***			0.0175***	0.0143***
			(0.00292)	(0.00604)			(0.00276)	(0.00508)
Number of Observations	293,529	293,529	293,529	293,529	296,244	296,244	296,244	296,244
R^2	0.101	0.094	0.099	0.107	0.071	0.069	0.067	0.072
Additional Controls								
Curricular FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
University FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Socio-demographic FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variable is "Job Satisfaction (d.)", Method of Estimation: OLS. Standard errors are clustered at the individual student level. * p<0.05, ** p<0.01, *** p<0.001.

Table 12 examines the likelihood of being in precarious employment one year after graduation. Also in this case, high family resources consistently show a negative association with precarious employment across both degree levels, suggesting that graduates from wealthier backgrounds are less likely to find themselves in insecure jobs. Parental education, on the other hand, shows a positive relationship with precarious employment, particularly for Bachelor's graduates, indicating that those with educated parents might be more likely to accept temporary or less secure positions, possibly to gain experience or pursue further studies. High social class demonstrates a negative association with precarious employment for both groups, implying that graduates from higher social classes have an advantage in securing more stable employment. These findings highlight the complex interplay of family background factors in influencing job security for Italian graduates.

Table 12. Likelihood of being in Precarious Contract 1 year after graduation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	BSc	BSc	BSc	BSc	MA	MA	MA	MA
High Family Resources (d.)	-0.0169***			-0.0172***	-0.0184***			-0.0123***
	(0.00259)			(0.00489)	(0.00274)			(0.00483)
Parental Education (d.)		0.0155***		0.0132**		0.00941***		0.00485
		(0.00265)		(0.00558)		(0.00247)		(0.00497)
High Social Class (d.)			-0.0302***	-0.0376***			-0.0240***	-0.0320***
			(0.00285)	(0.00575)			(0.00273)	(0.00495)
Number of Observations	293529	293529	293529	293529	296244	296244	296244	296244
R^2	0.132	0.123	0.127	0.127	0.104	0.103	0.103	0.103
Additional Controls								
Curricular FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
University FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Socio-demographic FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variable is "Precarious Contract (d.)", Method of Estimation: OLS. Standard errors are clustered at the individual student level. * p<0.05, ** p<0.01, *** p<0.001.

7. Conclusion

This study provides evidence of the significant and persistent effects of parental back- ground on early labor market outcomes of Italian graduates. Our analysis, based on a comprehensive dataset from AlmaLaurea, reveals that family resources, parental education, and social class all play a crucial role in shaping various aspects of graduates' careers, including employment prospects, wages, job satisfaction, and skill mismatch.

Our findings highlight the complex and often unequal opportunities that Italian graduates face in the labor market just after graduation. While higher socioeconomic status generally confers advantages in terms of employment and career progression, the specific impact of each dimension of parental background varies depending on the outcome being measured and the level of education attained.

We find that family economic resources consistently reduce the likelihood of being unemployed and increase job satisfaction, while social class positively influences wages and reduces the probability of precarious employment, which is likely due to the intergenerational

transfer of a more influential network. The role of parental education is less clear-cut, with mixed effects on unemployment, wages, and skill mismatch. This phenomenon with regards to parental education is in line for example with Kodde and Ritzen (1988) who analyze the demand for higher education. Hence, it is not completely clear how parental education impacts their o spring's educational and career paths and more research is needed to explore potential mediating factors.

Descriptive evidence on the NEET population reveals a trend of increasing inactivity among graduates, particularly Master's graduates from higher social classes. This suggests that while the overall NEET rate may be decreasing, the challenge lies in engaging those who are not actively seeking employment, even though they are not in education or training. The NEET population is indeed composed of both active and inactive labor market participants with active labor force participants being unemployed but actively looking for a job. Inactive labor force participants are not looking for a job and can be further divided into two categories: voluntary and involuntary inactive. Voluntary inactive individuals choose not to participate in the labor market, perhaps taking "gap years" or rejecting low wages and poor working conditions. These individuals are likely to have access to parental safety nets. Involuntary inactive individuals on the other hand are discouraged or demotivated due to circumstances beyond their control, such as disability, illness or caregiving responsibilities. In this group also fall those that are involved in the shadow economy. It becomes clear, that NEET cannot be directly compared to standard unemployment statistics and policies, given that the very composition of the sample is different. We find that all three background dimensions negatively impact on the probability of being NEET, whereas they all positively correlate with the inactivity status within the sub-group of NEET.

Different policy approaches are needed to address these distinct NEET categories, with active labor market policies targeting the active labor force, Decent Work Promotion[24] for the voluntary inactive, and activation policies necessary for the involuntary inactive.

Policy interventions could consist in improving budget planning and allocation of said active labor market policies to prevent the loss of skilled workers and reduce brain drain,

implementing targeted policies to mitigate the multiplicative effects of disadvantaged parental

[24]See https://www.ilo.org/topics/decent-work

backgrounds and providing additional support, such as mentoring and psycho- logical support, to inactive youth to avoid social exclusion and financial strain.

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Appendix

Table 1.1 Descriptives (dependent variables)

	Obs.	M(SD) / n(%)	Min	Max
NEET	1,439,847	0.144 (0.351)	0	1
Inactive	1,439,847	0.017 (0.131)	0	1
Conditional on having searched for a job				
Unemployed	836,526	0.217 (0.412)	0	1
Conditional of being employed				
Monthly salary (average)	589,773		1	16
200.00 €	589,773	42,153 (7.14%)	0	1
375.50 €	589,773	58,590 (9.93%)	0	1
625.50 €	589,773	53,143 (9.01%)	0	1
875.50 €	589,773	70,758 (12,00%)	0	1
1,125.50 €	589,773	86,553 (14,68%)	0	1
1,375.50 €	589,773	148,307 (25.14%)	0	1
1,625.50 €	589,773	73,575 (12.47%)	0	1
1,875.50 €	589,773	31,119 (5.28%)	0	1
2,125.50 €	589,773	8,685 (1.47%)	0	1
2,375.50 €	589,773	5,454 (0.92%)	0	1
2,625.50 €	589,773	2,527 (0.43%)	0	1
2,875.50 €	589,773	2,898 (0.49%)	0	1
3,125.50 €	589,773	259 (0.04%)	0	1
3,250.00 €	589,773	4,860 (0.82%)	0	1
3,375.50 €	589,773	200 (0.03%)	0	1
3,625.50 €	589,773	101 (0.02%)	0	1
3,875.50 €	589,773	167 (0.03%)	0	1
4,250.00 €	589,773	424 (0.07%)	0	1
Skill mismatch	589,773	0.529 (0.499)	0	1
Educational mismatch	589,773	0.157 (0.364)	0	1
Skill mismatch (excluding "Work & Education")	489,819	0.494 (0.499)	0	1
Educational mismatch (excluding "Work & Education")	489,819	0.117 (0.321)	0	1
Job satisfaction	589,773	0.656 (0.475)	0	1
Precarious contract	589,773	0.616 (0.486)	0	1

Table 1.2. Descriptives (independent variables - treatment and controls)

	Obs.	M(SD) / n(%)	Min	Max
High Family Resources	1,439,847	0.758 (0.428)	0	1
Parental Education	1,439,847	0.298 (0.457)	0	1
High Social Class	1,439,847	0.223 (0.417)	0	1
Female	1,439,847	0.595 (0.471)	0	1
Degree cycle	1,439,846		1	2
Bachelor	1,439,847	847,096 (58.83%)	0	1
Master	1,439,847	592,751 (41.17%)	0	1
Macro-region	1,439,846		1	6
North-West	1,439,847	271,678 (18.87%)	0	1
Nord-East	1,439,847	256,761 (17.83%)	0	1
Centre	1,439,847	281,556 (19.55%)	0	1
South	1,439,847	422,981 (29.37%)	0	1
Islands	1,439,847	169,668 (11.78%)	0	1
Foreign	1,439,847	37,203 (2.58%)	0	1
High school type	1,439,846		1	8
Gymnasium	1,439,847	225,513 (15.66%)	0	1
Scientific	1,439,847	639,189 (44.39%)	0	1
Linguistic	1,439,847	113,697 (7.90%)	0	1
Arts and music	1,439,847	25,665 (1.78%)	0	1
Humanities	1,439,847	119,955 (8.33%)	0	1
Technical (economics)	1,439,847	162,397 (11.28%)	0	1
Technical (technology)	1,439,847	123,495 (8.58%)	0	1
Professional	1,439,847	29,936 (2.08%)	0	1
Year of graduation	1,439,846		1	16
2014	1,439,847	161,545 (11.22%)	0	1
2015	1,439,847	182,051 (12.64%)	0	1
2016	1,439,847	183,945 (12.77%)	0	1
2017	1,439,847	189,994 (13.19%)	0	1
2018	1,439,847	181,002 (12.57%)	0	1
2019	1,439,847	181,466 (12.60%)	0	1
2020	1,439,847	176,586 (12.26%)	0	1
2021	1,439,847	183,258 (12.73%)	0	1
Field of study	1,439,846		1	15
Education and training	1,439,847	67,257 (4.67%)	0	1
Art and design	1,439,847	43,831 (3.04%)	0	1
Literature and humanities	1,439,847	73,813 (5.13%)	0	1
Languages	1,439,847	93,715 (6.51%)	0	1
Political science and communication	1,439,847	113,619 (7.89%)	0	1
Psychology	1,439,847	69,262 (4.81%)	0	1
Economics	1,439,847	211,543 (14.69 %)	0	1
Law	1,439,847	79,186 (5.50%)	0	1
Science	1,439,847	146,166 (10.15%)	0	1
Computer Science and ICT technologies	1,439,847	19,537 (1.36%)	0	1

Architecture and civil engineering	1,439,847	82,730 (5.75%)	0	1
Industrial and information engineering	1,439,847	156,445 (10.86%)	0	1
Agriculture, forest, and vet	1,439,847	41,858 (2.91%)	0	1
Med, healthcare, and pharmaceutical	1,439,847	212,533 (14.76%)	0	1
Sports sciences	1,439,847	28,352 (1.97%)	0	1
High final grade (high school)	1,439,847	0.206 (0.405)	0	1
High final grade (university)	1,439,847	0.497 (0.499)	0	1
Age at graduation	1,439,846		1	4
less than 23	1,439,847	352,618 (24.49%)	0	1
23-24	1,439,847	448,579 (31.15%)	0	1
25-26	1,439,847	344,800 (23.95%)	0	1
more than 26	1,439,847	293,850 (20.41%)	0	1
Late graduation	1,439,847	0.463 (0.499)	0	1
Employment rate (Province of studies)	1,439,847	63.310 (11.449)	35.552	79.165
Field of work	589,773		1	16
Agriculture	589,773	8,291 (1.40%)	0	1
Metalworking	589,773	26,275 (4.45%)	0	1
Construction	589,773	21,085 (3.57%)	0	1
Chimical/ Energy	589,773	20,184 (3.42%)	0	1
Manifacturing	589,773	25,818 (4.38%)	0	1
Trade	589,773	87,497 (14.83%)	0	1
Credit/ Insurance	589,773	20,537 (3.48%)	0	1
Transport/ Telecommunication	589,773	27,118 (4.60%)	0	1
Consulting	589,773	51,436 (8.72%)	0	1
Information technology	589,773	27,648 (4.70%)	0	1
Services to business	589,773	13,259 (2.25%)	0	1
Public administration	589,773	14,424 (2.44%)	0	1
Education/ Research	589,773	65,060 (11.03%)	0	1
Healthcare	589,773	86,924 (14.74%)	0	1
Other services 1	589,773	87,687 (14.87%)	0	1
Other services 2	589,773	6,530 (1.11%)	0	1
Working time	589,773		1	2
Full-time	589,773	390,319 (66.18%)	0	1
Part-time	589,773	199,454 (33.82%)	0	1
Type of contract	589,773		1	22

Notes: the variable "type of contract" includes all types of contracts recognized under Italian law from 2014 onward. In addition to the standard categories of employee, self-employed, fixed-term, and permanent contracts, it also covers the categories "Co.Co.Co" (Coordinated and Continuous Collaboration), "Occasional Service Contract", "Apprenticeship", "Occasional and Autonomous Collaboration", etc.

Conclusion

This dissertation addresses key factors influencing the educational and labor market transitions of Italian students and graduates, with a particular focus on gender disparities, the role of internships, and the impact of parental background. The findings across the three chapters highlight the complex interactions between individual decision-making, structural factors, and policy frameworks, providing a deeper understanding of persistent inequalities and offering actionable insights for future interventions.

Chapter 1 examines the environmental influences on the gender gap in STEM fields, focusing on the role of informational channels such as family, teachers, peers, and university students. The analysis reveals that information from teachers and peers tends to reinforce gender stereotypes, while inputs from parents and university students appear to mitigate these effects. The study highlights the importance of addressing these disparities, particularly among disadvantaged students, and underscores the need for policies aimed at improving high school mentoring and utilizing university students as role models to counteract gender-based self-segregation in educational choices.

In Chapter 2, the research explores the impact of intra-curricular internships on the intentions, aspirations, and labor market outcomes of Italian graduates. The findings indicate that internships play a significant role in enhancing the employment prospects of master's graduates, while they primarily serve to reduce skill mismatches for bachelor's graduates. However, internships appear to discourage further study among bachelor's graduates, raising concerns regarding the potential trade-offs between immediate labor market entry and long-term educational attainment. Additionally, the study reveals gender-specific differences in how internships shape aspirations, suggesting that male and female students may experience distinct outcomes. These results highlight the need for a more nuanced approach to internship design, particularly in terms of balancing employability with opportunities for further academic development.

Chapter 3 investigates the influence of parental background on the labor market outcomes of Italian graduates, with a particular focus on the NEET (Not in Education, Employment, or Training) phenomenon. The analysis demonstrates that family resources, parental education, and social class play a substantial role in shaping employment opportunities, wages, and job satisfaction.

Furthermore, the findings reveal a concerning trend of increasing inactivity among master's graduates from higher social classes, suggesting that inactivity within the NEET group cannot be explained solely by traditional measures of unemployment. This points to the need for a more comprehensive understanding of the NEET phenomenon, where policies should distinguish between different categories of inactivity and develop targeted interventions for both active and inactive NEETs.

The implications of these findings are far-reaching for both policy and practice. In order to address gender disparities in STEM fields, educational policies should prioritize the training of high school teachers, improve career guidance services, and promote the use of university students and alumni as accessible role models. Additionally, internship programs should be tailored to the specific needs of bachelor's and master's students, ensuring that these initiatives not only enhance employability but also facilitate continued academic engagement when appropriate. Finally, addressing the inequalities associated with parental background requires multifaceted policy interventions, including active labor market programs for NEETs and additional support for disadvantaged graduates to prevent social exclusion and enhance job satisfaction.

This dissertation contributes to a broader understanding of the challenges faced by Italian graduates as they transition from education to the labor market. It also offers insights into the structural and social factors that shape these transitions, particularly the role of gender and parental background. Future research could further explore the long-term effects of internships on career progression, the mediating role of parental education in shaping labor market outcomes, and the dynamics of NEET status across different socioeconomic groups. These fields of study would contribute to the development of more targeted and effective policies aimed at improving the labor market integration of all graduates, regardless of their background.