



UNIVERSITÀ DEGLI STUDI DI TRENTO

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e Ricerca Sociale

Selectivity in Higher Education: Implications for Student Academic Outcomes and Social Inequalities in Italy

Ph.D. Candidate:

Elena Vettoretto

Supervisor:

Prof. Dr. Moris Triventi, University of Milan

Doctoral Committee:

Dr. Claudia Finger, WZB - Berlin

Prof. Dr. Ruud Luijkx, University of Tilburg

Dr. Loris Vergolini, University of Bologna

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Introduction

Tertiary education has expanded significantly throughout the Twentieth century in all developed countries. The schooling rate and the average number of years of education have increased significantly, and secondary education is almost universally achieved in most developed countries. However, more interesting is the case of tertiary education, which has experienced considerable growth in recent decades (Meyer et al., 1992; Windolf, 1997; Schofer and Meyer, 2005; Breen, 2010). Tertiary enrolments worldwide nearly quadrupled during the last decades of the Twentieth century (Gradstein and Nikitin, 2004).

These changes have occurred alongside two general trends. The first is the consolidation of the link between education and employment. In industrialized societies, the qualifications acquired within the education system have become valuable requirements for entering the labor market and attaining an occupational position (Bell, 1973). As a second trend, after World War II, the idea of "meritocracy" - introduced by Young in 1958- was also developed and spread as a regulatory principle for the allocation of individuals in occupational roles and positions within society (Breen and Goldthorpe, 1999; Themelis, 2008).

The above situation conceals the transformation of élite systems of higher education into systems of mass higher education during the second half of the 20th century (Trow, 1972). This transformation reflects social and economic policies in the broader context of technological change, globalization, and greater international competition (Clancy, 2007). This has led to an increasing differentiation of the university systems, in terms of new functions, organization, and type of institutions.

In recent years policymakers and observers in many developed countries have focused on the poor retention rate of HE systems. In Italy the dropout rate decreased by about 10 percentage points due to the new university structure promoted by the Bologna process; however, Italy qualifies as one of the worst performers (Cingano and Cipollone, 2007). Moreover, Di Pietro and Cutillo (2008) state that the cohort dropout rate declined from 18% in 1995 to 13.7% in 1998 but increased to 15.5% in 2001. Anvur (2023) reports that from the analysis of data from undergraduate degree courses, it emerges that among the cohort of students enrolled in the academic year 2017/18, 20.1% dropped out after three years from enrolment, and 22.6% dropped out after four years. For those enrolled in the academic year 2018/19, the dropout rate increased to 20.4% after three years. Observing the six-year dropout rates, 24.2% of students from the most recent cohort, enrolled in the academic year 2015/16, have abandoned their studies. Sweden and France (Vossensteyn et al., 2015) show standards similar to the Italian ones, while the dropout rates of the Netherlands, Germany, and the United Kingdom remain close to or below the OECD average of around 30% (OECD 2019).

Even though a low dropout rate is to some extent acceptable, such a high proportion of students not completing tertiary education is a major concern. Dropping out signifies a loss of time for students and a depletion of both public and private financial resources. Additionally, human capital accumulation is an important determinant of national economic growth (Mincer, 1984).

In light of this, regulating the quantity-quality tradeoff between students seems important. One regulatory mechanism identified for this purpose is the implementation of selective admission policies in higher education. This need has surged within a neoliberal public policy context. Neoliberal trends in higher education entail a shift in academic institutions into corporate boards, with an emphasis on market processes and measured outputs (Olssen and Peters, 2007). In this model, has emerged an institutional stress on performativity. In this vein, becoming more selective is essential to enrolling students who are more likely to graduate, thereby enhancing the university's position in performance-based funding allocations (Orphan, 2015).

Selective admission policies are strongly ideologically tied to the idea of merit. Despite societal pressures for equal access to tertiary education, merit still prevails. That is students are conditionally admitted contingent upon demonstrating academic skills and prior educational achievements. However, no admission system solely reliant on pure merit has ever successfully achieved the goal of identifying capable students without regard to their background: To the extent that access to higher education is competitive, educational systems will always favor those students with superior economic social, and cultural resources (Clancy, 2007). As both social closure theory (Weber, 1978) and social and cultural reproduction theory (Bourdieu and Passeron, 1977) predict, selective admission policies align with the cultural capital of their preferred students, thus contributing to the reproduction and perpetuation of class advantages (O'Sullivan et al., 2019).

Admission systems generally rely on specific class-based measures of merit, represented either by high school grades or standardized tests. This is what Guinier (2015) labeled as “testocracy”, implying that the most reliable measure of an applicant's value is derived from their standardized test scores. Selective admission policies may thus represent a further barrier for low-income students accessing tertiary education.

This dissertation focuses on the role of selectivity in higher education and seeks to contribute to further understanding the determinants of social inequalities substantially and empirically in educational systems. Additionally, it endeavors to assess the effectiveness of selective admission policies in influencing student academic outcomes and their potential as tools for bolstering student retention rates. This aim is achieved through the following chapters.

The first chapter is devoted to the outline of a selectivity-centered theoretical framework. Through this chapter, we first attempt to define selectivity, conceptually separating it from institutional quality. Afterward, we review the theories and mechanisms at play in the educational decision-making process and those related to the student's academic outcomes. The inclusion of selectivity within a theoretical framework has been infrequent in prior literature, and there has been a notable lack of effort to comprehend its potential mechanisms. This is particularly salient for the subsequent analyses since examining the influence of selective admission policy on students' performances and educational choices necessitates a comprehensive evaluation of potential causal chains and the careful exclusion of confounding factors.

In the last paragraph of this chapter, we present the theoretical framework that provides a roadmap to guide the empirical investigation of the next chapters.

The second chapter is devoted to assessing the effect of university rankings and institutional selectivity on enrolment decisions in Italy. We focus on the total first-year enrolments and enrolments of specific categories of students, particularly those who graduated from the academic track and with high grades in upper secondary school.

The novelty of this paper relies on five main aspects: First, by focusing on university rankings and institutional selectivity, we investigate the role of key features of higher education supply as potential drivers of enrolment choices. Second, we do not only focus on enrolments in general but look at specific types of students as well, first to assess if some categories are more sensitive to information conveyed by university rankings than others, and second to investigate if institutional selectivity could affect differently general enrolments and top students' enrolments. Third, we adopt a multidimensional view of university rankings by measuring quality in different aspects (research, teaching, student performance, internationalization) at the faculty level, a more disaggregated level of analysis than most previous studies that focused on the university level. Fourth, we deal with institutional quality and selectivity separately, thus assessing their independent and potentially opposite effects on our outcomes. Five, we perform a panel data analysis, which allows us to account for important unobserved variables and thus provide more credible estimates of the causal effects of university rankings and selectivity than cross-sectional studies.

We rely on two data sources, MIUR and CENSIS-Ia Repubblica, which were integrated into a pooled macro-level longitudinal dataset. MIUR provides annual information on the number of students newly enrolled in the first year of any three-year degree course offered by Italian universities, together with course-level information about selectivity. Censis, in collaboration with the national newspaper La Repubblica from 2001, has annually released reports regarding university quality indicators. The

report includes an annual quality ranking of higher education institutions (HEIs) by faculty (the so-called Censis-Repubblica University Guide). The resulting ranking is based on a composite index that includes several university quality dimensions. In this paper, we focus on four dimensions, namely student performance (productivity), research, teaching, and internationalization, measured at the faculty (*facoltà universitarie*) by university level.

Exploiting the longitudinal structure from 2003 to 2011, we perform fixed-effect regression models to account for unobserved heterogeneity at the faculty level. We regress our enrolment variables separately, first on the overall faculty quality then adding institutional selectivity, and second on the four separate quality indicators, adding selectivity in a second specification. As a sensitivity check, we include spatial autoregressive models to account for potential spillover effects.

The analysis shows that university quality rankings positively influence the number and quality of students' enrolments: changes in the overall faculty quality are followed by a growth in enrolments and by an improvement in the "quality" of incoming students, thus suggesting an increased attractiveness of those faculties that climb the rankings. Although the effect sizes are not very large, they are substantially relevant and statistically significant in most statistical models. Selectivity instead has a not surprising negative effect on enrolments: what is interesting is that this effect diminishes for top students.

Focusing on the different dimensions of faculty quality, generally, students seem more attracted by attributes such as teaching and research quality rather than productivity and internationalization.

In the third empirical chapter, we assess the role of admission tests in creating inequalities in access to university among a recent cohort of Italian high school leavers. Our aim is twofold: first, we assess if the choice and access to selective degree programs are stratified by social background and at which stages of the enrolment process (early preferences, application, admission, actual enrolment) social inequalities are more effectively reproduced. Second, we questioned the role of the compensatory advantage mechanism and resource substitution theory in shaping educational choices.

We use unique data from the longitudinal survey of the project 'Family background, beliefs about education and participation in higher education', first fielded in October 2013, to give us information on the student's socio-demographics, prior academic performances, and university choices.

We provide an important contribution to the understanding of unequal access to university degrees in terms of social background. The main novelty is the introduction of selectivity into this stream of studies in education, and how these effects differ according to social background. Furthermore, instead of focusing only on the final stage of the educational decision-making process, we consider the different steps embodying the decisional path to a selective degree program – the expression of a

preference, application, admission, and actual enrolment. This allows us to distinguish the two dimensions of selectivity, as we argue in the theoretical chapter: self-selection, expressed by degree preferences and application, and institutional selection, represented by admission and enrolment decisions. Finally, we provide new evidence on a specific type of compensatory advantage (CA) mechanism in educational transitions and attainment, applying it to the horizontal dimension of higher education.

Our results suggest how the choice and access to selective degree programs are strongly stratified by social background, at all the four stages of the educational path. Students from advantaged social backgrounds are more likely to express a preference for and choose selective degrees than their disadvantaged counterparts. That is the presence of an admission test may dissuade lower backgrounds students from accessing particular degree programs.

Furthermore, differences in the choice of a selective degree course between students from lower and higher social backgrounds are visible among students who achieve lower marks and tend to disappear among high-achieving students. Students from higher social backgrounds show a greater advantage among low achieving students compared to students from lower backgrounds at all the stages of the educational path and tend to choose more selective degrees irrespective of previous performance.

Finally, the last empirical chapter of this dissertation delves into the not obvious relationship between institutional selectivity and students' academic outcomes. More precisely, we aim to understand if degree programs that select their enrollees, may enhance the students' chances of academic progression.

For the analyses, we rely once again on the data collected within the "Family background, beliefs about education and participation in higher education" project. This dataset allows us to effectively address the potential selection bias, by employing both a self-revelation model and propensity score matching techniques. By properly addressing the potential selection bias we can determine whether higher academic progression in selective degree courses is due to the highly qualified student body or the institution's selectivity itself. Failing to do so hinders our ability to identify whether institutional selectivity or student body quality primarily drives better academic outcomes.

Our findings indicate that institutional selectivity enhances students' progression. That is students enrolled in a selective degree program have higher chances of academic progression than those enrolled in non-selective degrees.

The contribution of this chapter relies on two main aspects: first, we move away from correlational studies and provide evidence of a causal relationship between institutional selectivity and academic progression. Second, we focus on a broader national context, rather than single institutions.

This dissertation offers novel insights contributing to important theoretical discussion within the field of educational studies. However, by uncovering new evidence regarding the impacts of selectivity, it aims also to inform policymakers on possible side effects stemming from widespread educational practices, including the implementation of selective admission policies. A more comprehensive understanding of the potential consequences associated with implementing selective admission policies serves as a valuable resource for shaping future educational policies and practices in ways that promote equity, accessibility, and excellence in higher education.

References

- Anvur (2023). Rapporto 2023 sul Sistema della formazione superiore e della ricerca. Agenzia Nazionale di Valutazione del Sistema Universitario e della Ricerca.
- Bell, D. (1973). *The coming of post industrial society*. New York, NY: Harper.
- Bourdieu, P., & Passeron, J.-C. (1977). *Reproduction in education, society, and culture*. Beverly Hills, CA: Sage
- Breen, R. (2010) Educational Expansion and Social Mobility in the 20th Century. *Social Forces*, 89(2), 365–388
- Breen, R., & Goldthorpe, J. H. (1999). Class inequality and meritocracy: a critique of Saunders and an alternative analysis¹. *The British Journal of Sociology*, 50(1), 1–27.
- Clancy, P., and Goastellec, G. (2007). Exploring Access and Equity in Higher Education: Policy and Performance in a Comparative Perspective. *Higher Education Quarterly*, 61(2), 136–154
- Cingano, F., Cipollone, P. (2007). University drop-out. The case of Italy. *Temi di discussione (Economic working papers) 626*, Bank of Italy, Economic Research and International Relations Area
- Di Pietro, G., Cutillo, A. (2008). Degree flexibility and university drop-out: The Italian experience," *Economics of Education Review*, Elsevier, 27(5): 546-555.
- Gradstein, M., Nikitin, D. (2004). *Educational Expansion: Evidence and Interpretation*. Policy Research Working Paper Series 3245, The World Bank.
- Guinier, L. (2015). *The tyranny of the meritocracy: Democratizing higher education in America*. Boston, MA: Beacon Press
- Meyer, J. W., Ramirez, F. O., Soysal, Y. N. (1992). World Expansion of Mass Education, 1870-1980. *Sociology of Education*, 65(2): 128
- Mincer, J. (1984). Human capital and economic growth. *Economics of Education Review*, 3(3), 195–205.
- Organization for Economic Co-Operation and Development. *Education at a glance: OECD indicators*. (2019).
- Orphan, C. (2015). *Democracy's Colleges" Under Pressure: Examining the Effects of Neoliberal Public Policy on Regional Comprehensive Universities*. Publicly Accessible Penn Dissertations. 1925
- Olssen, M., Peters, M. (2005). Neoliberalism, higher education and the knowledge economy: from the free market to knowledge capitalism. *Journal of Education Policy*, 20:3, 313-345

O'Sullivan, K., Bird, N., Robson, J. and Winters, N. (2019), Academic identity, confidence and belonging: The role of contextualised admissions and foundation years in higher education. *Br Educ Res J*, 45: 554-575

Schofer, E., & Meyer, J. W. (2005). The Worldwide Expansion of Higher Education in the Twentieth Century. *American Sociological Review*, 70(6), 898–920

Themelis, S. (2008). Meritocracy through education and social mobility in post-war Britain: a critical examination. *British Journal of Sociology of Education*, 29:5, 427-438

Trow, M. (1972). The expansion and transformation of higher education. *Int Rev Educ* 18, 61–84

Vossensteyn, J. J., Kottmann, A., Jongbloed, B. W. A., Kaiser, F., Cremonini, L., Stensaker, B., Hovdhaugen, E., & Wollscheid, S. (2015). Dropout and completion in higher education in Europe: main report. European Union

Weber, M. (1978). *Economy and Society: An Outline of Interpretive Sociology*. Berkeley, CA: University of California Press.

Windolf, P. (1997). *Expansion And Structural Change* (1st ed.). Routledge.

**Unraveling Selectivity: A Proposed Theoretical Framework for Understanding
its Impact on Higher Education Outcomes**

Introduction

In the 1960s many efforts were put in place to expand HE participation. With more students achieving the minimum educational attainment required to enter tertiary institutions, the potential demand for tertiary education increased. At the same time, the stronger positive relationship between educational attainment levels and opportunities in the labor market has further increased the demand. However, tertiary education is also affected by the number of places available for students within institutions. Given the rapid expansion, in the 1970s, institutional barriers that regulate the access to limit the number of matriculations were introduced, or, where already present, increased. Systems that have undergone rapid expansion have been forced to restrict access to avoid overcrowding. Also, decisions about access restriction in the different fields of tertiary education were taken to meet the demands of the labor market to control access to some specific professions (e.g. medicine, architecture, and engineering).

In most industrialized countries, the basic entry requirement to a first-degree tertiary program is the achievement of an upper secondary school diploma or an equivalent certificate. Moreover, alongside educational credentials, HE institutions may provide additional selection policies for prospective students. The aim of these selection procedures is the regulation of the quantity-quality trade-off of students attending HE: selective admission requirements may be used to ensure that applicants have the skills and previous knowledge to complete the educational program they apply to. Consequently, selecting high-achieving students may in turn increase the prestige of the institution itself. On the other hand, less restrictive admission criteria may help to widen access to tertiary studies and meet equity concerns.

Despite the critical role of selectivity in regulating access to higher education, research has paid limited attention to its effects on student outcomes. Moreover, a lack of consensus exists in the conceptualization of selectivity, ranging from focusing on student body quality to, at worst, a misconception of institutional quality. Furthermore, besides being an understudied issue, in addressing selectivity there remains a gap in understanding how it influences the educational experiences and achievements of individuals.

This theoretical chapter is devoted to understanding the role of selectivity in higher education and its relationship with educational choices, student achievements, and social inequalities, highlighting the potential underlying mechanisms, borrowing from existing sociological and economic theories and studies. Furthermore, we aim to provide a conceptualization of selectivity.

This theoretical endeavor is motivated by the belief that a deeper comprehension of selectivity is essential for developing informed policies and interventions that promote equitable access and

positive educational outcomes in higher education systems. In doing this, it is of primary importance to separate the concept of selectivity from institutional quality: while selectivity may result in a better student body, it is not synonymous with the quality of an institution.

The paper is organized as follows: I will start with a short introductory paragraph delineating the characteristics of selectivity in higher education, how it has been conceived in previous studies, and its relationship with institutional quality. Based on this, I will draw my conceptualization of selectivity. In the second paragraph, I will then review theories relevant to the educational decision-making process and connect them to class inequalities. The third paragraph is devoted to understanding the theories and concepts that may explain the effect of institutional selectivity on students' academic careers and the mechanisms by which institutional selectivity works. The fourth and final part draws the proposed theoretical framework.

1. Selectivity Worldwide: Access and Admission Procedures

There are three main ways to limit access to tertiary education: a) restrictions at the national or local level; b) restrictions established by the institutions; and c) a combination of the two previous types. Strategies usually vary by institution and may include additional entry exams, minimum entry scores, or personal interviews. Additionally, a further institutional barrier to access higher education is represented by upper secondary school qualifications: In many secondary school systems, not all streams or tracks provide the necessary qualifications or preparation for entry into tertiary education.

In the US and Australia, the degree of selectivity and the admission criteria vary depending on the institution: in both countries, the most prestigious universities receive a much higher number of applications than the available positions, therefore they can afford to select students using numerous procedures and criteria (Jerrim, et al., 2015): for example, in the USA, in addition to the marks obtained at high school, many universities take into consideration the score obtained in the SAT (a standardized test at the national level) and participation in extra-curricular activities (Alon and Tienda, 2007; Jerrim et al. 2015). While in Australia access to HE is determined by pupils' course grades (Tertiary Entry Rank—TER) during the last two years of high school (Jerrim et al., 2015). In Europe, restrictions are to be found in specific fields of study, such as engineering, architecture, medicine, and para-medical disciplines. While some countries have set up a complex admission system: in Germany, France, and Italy access is regulated by different procedures and criteria depending on the field of study and the type of institution. In Italy, selectivity varies both on national and institutional levels, depending on the field of study: admission to specific fields may be regulated at the national level (medicine and surgery; veterinary medicine; dentistry; nursery; architecture), while the access to most degrees is regulated at the local level by universities; still, non-selective degrees provide free access upon successful completion of secondary school. On the other hand, North European countries also provide for restrictions, and usually, the criteria are established both at the central level and by the institution itself.

1.2 Selection Strategies

Admission strategies in higher education exhibit significant diversity and vary considerably from one country to another, showcasing a range of approaches to student selection. We here present and group the most widely used strategies for student selection. It is crucial to note that variations exist within a country. A single country may employ various strategies, and in turn, exhibit each of these groups of strategies. Variations may occur between private or public institutions or even within single

institutions. Given this variability between and within educational systems the aim of this paragraph is not to provide a systematic classification of the different procedures or to attribute a single admission procedure to an entire educational system in a country, but to offer an international overview to contextualize the national case of interest of this manuscript.

Standardized Tests

The probably best-known admission strategy involves using standardized test scores to select students for admission. These tests aim to provide a standardized, objective measure of an individual's general cognitive capabilities, rather than focusing solely on acquired knowledge or specific subjects. These tests are administered and scored under standardized conditions for fairness and consistency among test-takers, enabling fair comparisons.

A well-known example of standardized tests is the SAT which is widely employed for US college admissions. It ranges from 400 to 1600, combining results from two subject areas: Mathematics, focusing on algebra, problem-solving, and data analysis, as well as advanced math topics; and Evidence-Based Reading and Writing (EBRW), assessing reading comprehension, grammar, and analytical writing skills. The scores are calculated based on the number of correct answers, and there is no penalty for incorrect answers. However, it is important to notice that SAT scores are not the sole means of admission: some colleges take into consideration factors like high school GPA, letters of recommendation, extracurricular activities, and personal essays. Furthermore, the weight given to SAT scores in the admissions process may vary among institutions.

Besides the US, Sweden employs standardized test scores to select students to admit. The Swedish admission system is to a large extent centralized, applications are addressed to the Swedish Council for Higher Education. The minimum entry requirement is a high school leaving certificate, additionally, several programs may have field-specific requirements. If there are more applicants than places available, all applicants within a quota are ranked, and the highest ranked gain admission (Hallsten, 2010). Instruments for selection are the grade point average (GPA) from upper-secondary school or the Swedish Scholastic Aptitude Test (SweSAT).

Not Standardized Examinations

Another strategy involves the administration of non-standardized admission tests. Admission tests are frequently conducted nationally or regionally by governments in respective countries, thereby often involving centralized coordination of admission procedures. However, certain systems deviate from this norm, with entrance exams being institution-specific, and administered independently by universities or departments. In such cases, these institutions may set cutoff scores, so that students to

be eligible for admission have to reach a minimum test score. Comparable to secondary school leaving exams, university entrance assessments primarily evaluate candidates' knowledge acquired in high school subjects.

For example, in Italy, institutions or study programs may autonomously require taking an admission test. The type of test and its content can vary based on the chosen program. Students are admitted to the program based on the score obtained on the test; the allocation of available seats occurs following the order of the ranking until exhaustion.

No entrance exam

Some educational systems do not rely on additional exams as a strategy for admission to tertiary education. This constitutes an exception in the global landscape of university entrance procedures, and often applies to less competitive systems that do not impose restrictions, while another strategy places significant emphasis on evaluating students' secondary school academic achievements and experiences.

Norway's higher education system, for instance, often places less emphasis on standardized tests and may emphasize a comprehensive evaluation of an applicant's academic career. This approach highlights the applicant's overall profile rather than solely relying on a single examination score. However, as a general rule, admissions to all fields only require a secondary school leaving certification. In addition, some programs may also require certain high school subjects, such as mathematics and other sciences. When a program receives more applicants than it has available spots, a ranking system is employed. For the *first diplomas* quota, only high school results are considered in the ranking process for applicants under the age of 21 or those turning 21 in the application year. In the ordinary quota, supplementary points are awarded for factors such as military service, attendance at a folk high school, or other higher education. Additionally, age points are given for four years from the year the applicant turns 20. Some programs may also award additional gender points for under-represented genders.

Similarly, in the United States, some colleges and universities are moving away from placing sole importance on standardized tests (like the SAT or ACT) and instead considering a broader spectrum of an applicant's accomplishments, personal attributes, and unique experiences. This shift aims to create a more inclusive and holistic approach to evaluating potential students beyond their performance in a single test (Helms, 2009).

2. Policies for Social Inclusion

Scholars and policymakers have raised concerns over equity in university admissions. For instance, the SAT has long faced criticism for potentially contributing to educational inequalities. Following this line of thinking, efforts are made to create more inclusive admission processes, aiming to mitigate these barriers and promote greater diversity in educational institutions. Institutions and governments implement indeed some strategies that create a sort of priority path for underrepresented groups.

Affirmative Action

Affirmative action in higher education stands as one of the most hotly debated and prominent social inclusion policies implemented by tertiary institutions. This approach involves the use of race-based preferences in the admissions process, particularly prevalent in the United States. These affirmative action policies typically focus on addressing the underrepresentation of African American and Hispanic students within higher education institutions.

The foundation of affirmative action in the United States is rooted in the historical and ongoing underrepresentation of these specific demographic groups within the postsecondary sector. These policies aim to counteract systemic barriers and historical discrimination that have limited access to higher education for African American and Hispanic individuals.

Expanding upon this topic, affirmative action initiatives often extend beyond admissions processes. They may encompass various strategies within educational institutions, such as targeted recruitment efforts, financial aid programs, support services, and diversity initiatives. The overarching goal is to foster greater diversity and inclusivity within campuses, providing opportunities for historically marginalized groups to access and thrive in higher education.

Currently, the fundamental demographic trends are well-known: the presence of Black individuals in higher education has risen since the onset of affirmative action measures, and so has the count of Black students attaining university degrees (Cross and Slater, 1999). Similarly, Hispanics have experienced positive outcomes from affirmative action, with a slightly larger percentage of Hispanic students enrolling in and completing college compared to Black students (Fischer and Massey, 2007). Despite these advancements, both Black and Hispanic students remain notably underrepresented among college attendees when considering their respective population shares. This discrepancy is frequently cited as a reason to advocate for the continued utilization of affirmative action policies in admission processes (Howell, 2010).

However, the path of affirmative action has been marked by criticism. The main arguments can be summarized as follows: a) allegations of reverse discrimination, suggesting that it reduces admission

opportunities for more qualified white and Asian students; b) the creation of a mismatch between the skills of admitted students and the necessary abilities for success at selective universities, potentially leading beneficiaries of affirmative action toward failure; c) perpetuation of a stigma that unfairly labels all members of the targeted group as unqualified, resulting in demoralization and substandard performance among individuals in the group, regardless of their qualifications (Fischer and Massey, 2007).

Concerning allegations of a bias against white and Asian applicants, the SFFA (Students for Fair Admission) initiated legal action against Harvard in November 2014, claiming that Harvard infringed upon Title VI of the 1964 Civil Rights Act through four actions: (1) discriminating against Asian-American applicants, (2) practicing "racial balancing" in its admissions procedures, (3) assigning race a weight greater than merely a supplemental factor and utilizing it to occupy more than a limited number of spots in its freshman cohort, and (4) neglecting to employ race-neutral alternatives in pursuit of its diversity goals. Complaints were dismissed one year after in 2015 by the Department of Education, and resubmitted by the Asian-American coalition in 2017 under Trump administration. The investigations persisted throughout 2020, and the case elicited high-profile reactions. Interestingly, the lawsuit engaged two prominent economists in the dispute. Arcidiacono testifying on behalf of the plaintiffs concluded that Harvard's admission procedure favors Hispanic and Black applicants, thereby confirming a penalty against Asian American applicants. On the other hand, Harvard, through economist Card, rejects the accusations of racial discrimination and believes that Arcidiacono has arrived at skewed results due to his limited understanding of the university's admission process and the arbitrary exclusion of a fraction of applicants. David Card concluded that there is no evidence of discrimination against Asian-American applicants.

Following this criticism, some states eliminated affirmative action policies. However, in these states, there has been a sharp decline in minority admission (Barr, 2002; Howell, 2010; Harris and Tienda, 2012). Also, simulating a national ban on affirmative action, Howell (2010), finds that implementing race-neutral college admissions policies nationwide would result in a 2% decrease in Black and Hispanic representation across all 4-year colleges. However, a ban on affirmative action is projected to lead to a significant 10.2% decline in minority representation specifically on the most selective college campuses. Additionally, when affirmative action is replaced with alternatives such as a top 10% program, increased recruitment efforts by colleges, or initiatives aimed at improving a college's

perception among minority communities, none of these programs are predicted to effectively restore minority representation on the most selective campuses¹.

Internationalization

Academic institutions or educational systems worldwide may offer scholarships and grants tailored specifically for international students. These programs often allocate a set number of spots or funding opportunities reserved for foreign applicants, aiming to attract a diverse range of students and promote global engagement. Additionally, in pursuit of fostering diversity and internationalization, certain institutions actively set targets or quotas for international student enrolment within their student body, emphasizing the importance of cross-cultural exchange and a globally inclusive learning environment.

For instance, Norway has implemented the Quota Scheme program, which offers scholarships to students from underdeveloped countries (South Asia, Africa, Eastern Europe, and Central Asia) who enroll in any Norwegian higher education institution. It's open for bachelor's, master's, and doctoral programs, aiming to contribute to home country development. This scheme is widely used by Norwegian universities, allotting a set number of students annually for various degree levels. Students receive the same stipend as Norwegian peers, with 40% as a grant and 60% as a loan, forgivable upon returning home after studies. Repayment of the loan is required if students stay in Norway or relocate elsewhere after education.

3. The Italian Education System

In Italy, upper secondary education in Italy is differentiated into school tracks. Until grade 9, all students follow the same path. Around age 14, they choose among three broad tracks: academic, technical, and vocational. The academic track is widely recognized as the primary route for students aiming to attend university. At the end of the fifth year of upper secondary education, students must take a final state examination, which consists of written and oral tests in multiple subjects. The completion of a final state examination grants students from any track access to tertiary education.

Upon obtaining a high school diploma, the student has met the minimum requirement to access bachelor's degree courses. However, some programs have limited spots, requiring entrance exams for enrolment. Limiting available spots serves a dual purpose: to maintain teaching quality and align graduates with job market demand.

¹ The Supreme Court rejected affirmative action at U.S. colleges and universities on June 29, 2023

There are two main types of degree courses with limited spots (in Italian referred to as *numero programmato*):

- Nationally regulated, for which admission tests are held on the same day throughout Italy. The dates of the tests, the number of available places, test methods and contents, and evaluation criteria, are directly determined by the Ministry of Education, University and Research (MIUR). These degree courses are regulated by Law 264 of August 2, 1999, and include Medicine and Surgery, Dentistry and Dental Prosthetics, Veterinary Medicine, Architecture, Education, and Health Professions (bachelor's and master's).
- Locally regulated, it is the single university that autonomously decides, for internal and structural reasons, to admit only a certain number of students for a specific degree program by instituting an entrance exam. In the case of locally regulated degrees, dates and criteria for any admission tests vary from university to university, and the same degree program can be restricted at one university and open access at another.

In other cases, access to degree courses is open, and anyone who has obtained a high school diploma can enroll without further limitations. However, in some cases, open-access courses may require a non-selective orientation test to assess students' initial preparation. In these cases, universities specify a minimum admission score, but those who score below the minimum threshold are not prevented from enrolling; instead, they must fulfill specific educational requirements in the first year of the course. These tests have been formally introduced by the Ministerial Decree 270/2004 (art. 6), aiming at evaluating students entering a curriculum. Some universities also offer preparatory courses to bring students up to the knowledge level of the rest of the class.

There are no formal limits on registration for admission exams, as long as tests are held on different days. Finally, the costs are not particularly high: generally, all admission procedures require the payment of a participation fee for the admission test, the amount of which varies from 40 euros to the 120 euros required by some private universities for the entrance exam to nationally regulated *numerus clausus* degree courses (e.g., Medicine).

Once enrolled students are required to acquire a specific amount of CFU (Crediti formativi universitari equivalent to ECTS credits). To secure a first-cycle degree, a student must accumulate a total of 180 CFU. Following this, they are eligible to take the final exam, which upon passing, grants them the degree title. CFUs assigned to each exam gauge the level of effort required by a student to pass that particular exam. Examination sessions are held after the first and second semesters of each academic year. Within each session, students have two opportunities to sit for the exam. Noteworthy, failure does not limit the number of attempts a student can make; they can retake a single exam as

many times as they wish. Moreover, even if a student has already achieved a passing grade, they still have the option to retake the exam. This practice is quite common among Italian students because by retaking an exam, a student can potentially improve their grade, thereby enhancing their overall average, which plays a significant role in determining the final grade (Delogu et al., 2024).

4. Institutional quality

Public concern about quality and standards grew in the mid-80s, triggered by the rise of knowledge-based economies and the increasing competition among HE institutions (Harvey and Askling, 2003). Before this period, any debate was mainly internal to the higher education system. Traditionally, academic quality has been considered an implicit duty of academic professionals, whose natural purpose is to deliver high-quality teaching and research. In the early 1990s, institutional quality was attached with a new meaning: governments now emphasized value-for-money and fitness-for-purpose. Quality has then turned into an explicit requirement to be demonstrated, and expressed in comparable measures, a mechanism of control.

To this new perspective, central is the concept of accountability, according to which institutions are accountable from a financial and managerial point of view and that they are accountable for their work and their results. Accountability, together with the aforementioned expansion of and growing differentiation within tertiary education, and the new universities' autonomy, have all contributed to promoting development and economic competitiveness (Gulbrandsen and Sliperstaeter 2007).

This new way of conceiving higher education has produced two important consequences. First, it ensured that universities should make themselves more visible and assessable from the outside, increasing transparency and providing information on their structural endowments, internal organization, strategic planning, as well as results from teachers, researchers, and student body. Second, competition among institutions has increased to attract more public funding for research and high-profile students (Harvey and Askling, 2003).

The worldwide expansion of access to higher education, the increased autonomy of universities, and the rise of entrepreneurial universities created a new national and global demand for consumer information on academic quality. Given that with the expansion of access, the value of university degrees in general tends to decrease, differences in training within tertiary education are becoming increasingly important. The university and the field of study therefore become crucial aspects of the choice that students and their families have to make, and they must have information on which to make their school choices. Demand for consumer information on academic quality has led to the development of university rankings in many countries of the world.

5. Conceptualizing Selectivity

In the literature and empirical research, selectivity and institutional quality have often been treated as interchangeable concepts: The prevailing notion suggests that the best educational institutions are those that exhibit a high degree of selectivity in their admissions processes. Nonetheless, selectivity, understood as the average ability of the enrollees, has been perhaps the most common single criterion by which scholars, make inferences about the quality of education (Kuh and Pascarella, 2004; Bowen and Bok, 1998; Pascarella and Terenzini, 1991; Rumberger and Thomas, 1993). This perspective is notably prominent in the United States, driven by the U.S. News & World Report rankings that use a proxy for selectivity such as the average ACT or SAT scores of enrolled students as a primary measure of quality. According to this line of thinking, highly selective institutions, coupled with high graduation rates, are presumed to be positively correlated with higher educational returns (Kuh and Pascarella, 2004).

This focus on selectivity as a proxy for institutional quality reflects a belief that the academic caliber of admitted students is indicative of the overall excellence of the institution. The assumption is that institutions with stringent admission criteria attract and produce high-achieving students, contributing to a positive educational environment and, consequently, better outcomes in terms of graduation rates and, by extension, perceived educational quality. However, it is essential to note that while selectivity is a widely used and acknowledged metric, debates persist about whether it comprehensively captures the multifaceted dimensions of institutional quality and the overall educational experience.

Generally, institutional quality should be conceived as a more comprehensive measure than selectivity. Still, selectivity may play little to no role in the most used university quality indexes, or quality rankings: indicators or quality may refer to a) teaching quality b) quality of services offered by the institution c) degree of internationalization d) research quality, and e) productivity of the student body. Productivity may be the nearest quality indicator to selectivity as it refers to the composition and performances of the student body. This metric delves into the composition and performances of the student body, shedding light on how well students engage with the educational environment and contribute to the academic community. While selectivity often focuses on the caliber of admitted students, productivity provides insights into the outcomes and contributions of the entire student body.

Within the body of literature that examines institutional selectivity and its effects, there is little consistency regarding its definition and indicators. Indeed, prior research has used various definitions of institutional selectivity, contributing to a varied landscape of interpretations within scholarly discussions.

The most straightforward definition of selectivity is the ratio between the number of applications received and the number of students ultimately admitted to a particular institution. This fundamental definition forms the basis for gauging the degree of selectivity exhibited by an institution. In simpler terms, selectivity is operationalized as the ratio of applicants to admitted students (Skopek, Triventi, & Blossfeld, 2023). Consequently, institutions that admit nearly every student are often classified as "non-selective," whereas those engaging in a discerning admissions process, choosing students from a competitive pool of applicants, fall under the category of "selective".

While the definition of institutional selectivity has taken on various forms across scholarly discourse, a prevailing perspective, shared by many scholars (Bowen and Bok, 1998; Flowers et al., 2001; Rumberger and Thomas, 1993), often aligns it with the average quality of the student body. This conceptualization underscores the idea that the selectivity of an institution is inherently tied to the caliber of students it attracts. However, this prevailing viewpoint may warrant a critical reevaluation, as I contend that measuring institutional selectivity solely based on the average quality of the student body might be more indicative of its consequences rather than the essence of selectivity itself. Additionally, it conflates distinct aspects that it should be better to keep apart for analytical clarity.

The conventional approach to defining selectivity often revolves around the competitiveness of an institution's admissions process, with a focus on admitting students with higher academic achievements and qualifications. This line of reasoning posits that the average quality of the student body serves as a tangible outcome of the selectivity exercised during the admission process. However, the crux of selectivity extends beyond the resultant average quality and encompasses the deliberate and discerning choices made during the selection of students.

Elaborating on these definitions and perspectives the formulation of a comprehensive framework of selectivity (Figure 1) within higher education is undertaken.

Higher education selectivity encompasses an institutional component, here termed *institutional selection*. This component includes an array of strategic measures implemented at both national and local levels to govern access to study programs and institutions. These strategies encompass diverse modes of selection, such as admission tests, personal interviews, and minimum high school grade requirements, along with the regulatory mechanism of *numerus clausus*, dictating the permissible number of students entering a given institution or study program. Typically, institutions integrate a combination of these strategies to refine their selection processes.

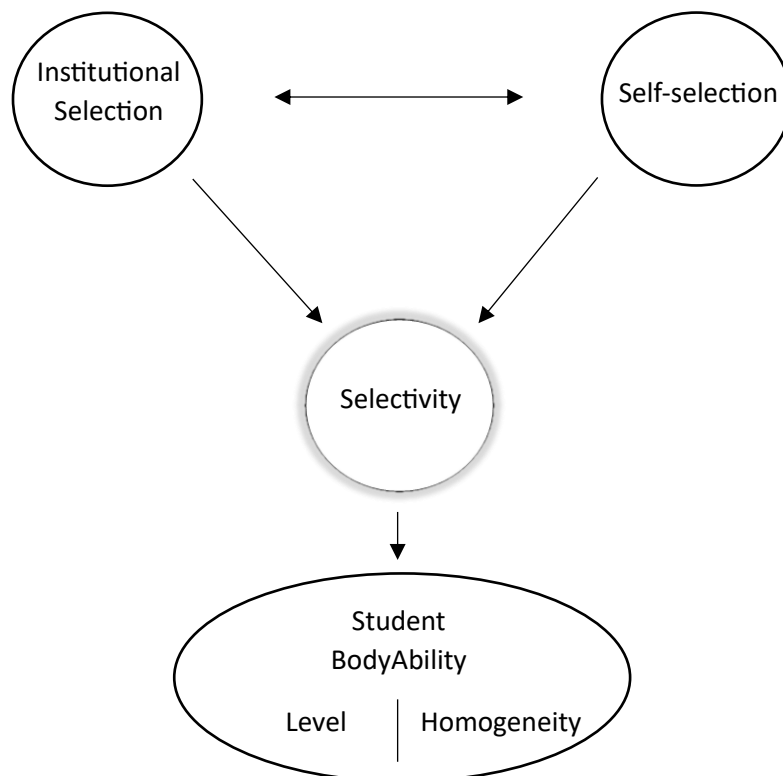
Institutions "select" from a pool of applicants. This entails an individual choice of whether to participate and where. That is individuals select themselves into institutions or study programs. Those self-selected prospective students are those upon whom institutional selection exerts its influence.

However, the influence of institutional selectivity may vary, depending on the level of stratification of the secondary education system. Highly stratified school systems already select prospective students leading to a selected pool of applicants, thus diminishing the effect of institutional selectivity. Consequently, the higher education system may have a student body composition that equates that achieved by institutional selection.

The interplay between institutional selection and self-selection forms the crux of higher education selectivity, ultimately shaping the composition of the student body.

Degrees of selectivity among institutions or study programs vary based on the stringency of the rules embedded in institutional selection. The degree of selectivity, a key determinant in this framework, not only influences the types of students admitted but also impacts the level of self-selection among prospective students. In this context, the rules of institutional selection play a pivotal role in enhancing or limiting the degree of self-selection within the higher education landscape.

Fig.1 Conceptualization of selectivity



Diverging degrees of selectivity lead to distinct scenarios in the composition of the student body. Less selective institutions may attract a diverse pool of applicants, potentially including those with varied academic backgrounds. This may result in a student body with lower academic skills by the effect of no institutional selection and a lower degree of homogeneity in terms both of abilities and students’

characteristics, as an effect of both self and institutional selection. Conversely, highly selective institutions, not only attract high-quality students but also witness a phenomenon where these students self-select themselves into and are selected by the institution. This reciprocal selection process contributes to a student body characterized by a both higher ability level and homogeneously high academic skills and motivation. This resulting homogeneity in both academic performances and sociodemographic attributes underscores the cumulative impact of institutional and self-selection processes on the composition of the student body. It reflects the alignment of academic and personal characteristics among the admitted students, creating an environment where individuals with similar aspirations and motivations converge.

6. First stage: The Educational Decision Making, Application and Enrolment

University choice is the result of a complex and long process. Hossler and Gallagher (1987) suggest that the decision to enroll in a university is the result of a three-stage process. During this process, 1) high school students develop certain predispositions to attend tertiary education or develop an interest in pursuing higher education as they nurture their academic and occupational ambitions, 2) search for general and specific information about university institutions that students consider or may apply to, and 3) make effective choices about what institution of higher education to attend. These three stages are intertwined with each other, each influencing one another in a complex manner (Cabrera and La Nasa, 2010).

The higher education choice entails both institutional and individual factors and rational and intuitive processes that result in one's decision to apply to and consequently enroll at an institution (Nora, 2004).

Research on university choice has been guided by two major theoretical perspectives, an economic perspective based on human capital investment and sociological approaches to status attainment (Perna, 2006). While the latter is discussed in the following paragraph, human capital investment (Becker, 1962, 1993) predicts that individuals make decisions regarding further education by balancing the expected benefits with the expected costs. The main assumption is that individuals act rationally, aiming to maximize their utility based on their personal preferences, tastes, and expectations. Becker's theory emphasizes not only monetary gains but also non-monetary benefits like better health and increased social status resulting from education. Whereas the costs of investing in a college education encompass direct expenses (like tuition, fees, accommodation, books, and supplies), as well as opportunity costs like foregone earnings, leisure time, and travel expenses between home and institution (Becker, 1993). Differences in higher education choices stem from disparities in factors influencing the demand for human capital and available resources for

investment. Variations in demand for higher education reflect differences in academic readiness, while resource availability for covering costs, like financial aid and parental support, also affects enrolment likelihood (Perna, 2006). Individuals with stronger academic readiness and financial means are expected to enroll more, as they're better positioned for success in education and future employment.

Perna (2006) proposes a conceptual model for studying student university choices that draws both on economic and sociological models, ending up with a proposal that encompasses four contextual layers: (1) the individual's habitus; (2) school and community context; (3) the higher education context; and (4) the broader social, economic, and policy context.

Focusing on the third layer, Perna acknowledges the significant role played by higher education institutions in shaping the decisions students make about college. These institutions have the potential to impact this process in multiple ways. First, they are a source of information for students and their families regarding options for enrolment after completing secondary education. Higher education institutions provide vast information and resources for high school students. They organize events like campus tours and college fairs, maintain detailed websites, and conduct outreach activities in high schools. These efforts help students explore academic programs, campus life, financial aid, and admission requirements, guiding them in making informed decisions about their future education and career paths.

Secondly, the distinct attributes and features of higher education institutions influence students' choices regarding colleges. According to the result of these studies, there are several institutional attributes that students consider important when choosing what university to attend, that are: (a) specific academic programs, (b) affordable tuition costs, (c) financial aid availability, (d) general academic reputation/general quality, (e) location (distance from home), and (f) size (Nora, 2004). Students generally lean towards institutions that align with their personal and social identities, seeking acceptance and support (Nora, 2004). Moreover, higher education institutions shape student decisions by having control over the selection of applicants allowed to enroll. Studies indicate that students consider the admissions decisions of institutions in their choice of college, often preferring institutions with similar SAT scores to their own (Manski and Wise, 1983).

Higher education institutions wield significant influence by regulating the number of enrolment slots they offer. Researchers have hypothesized that trends like population growth and improved readiness for college may create a surge in demand for higher education that surpasses the available capacity of conventional colleges and universities (Perna, 2005).

This heightened demand might trigger several consequences, notably an upswing in tuition fees and intensified competition for the limited available enrolment positions. Unfortunately, these repercussions tend to disproportionately affect students from disadvantaged backgrounds, including those from low-income families, and African-American, and Hispanic communities, casting a negative impact on their access to higher education (Hemelt and Marcotte, 2011; Allen, 2019).

6.1 Socioeconomic Background

Socioeconomic background exerts a strong influence in each stage of the university choice process (Cabrera and La Nasa, 2010). The students' socioeconomic characteristics are indeed one of the most relevant individual-level attributes included in the university decision-making process (Perna, 2006). The growth in participation in higher education does not affect equally individuals from different social backgrounds. Furthermore, there is empirical evidence that pupils from lower socioeconomic backgrounds choose less prestigious and less selective fields or institutions (Lucas, 2001; Ayalon and Yogev, 2005).

Research since Blau and Duncan (1967) shows that an individual's social position is influenced by inherited factors like parental social class and education and acquired factors like individual educational attainment. Moreover, they demonstrate how an individual's education is strongly connected to his/her family background. Since then, at the center of research on the link between education and social stratification is the concept of inequality of educational opportunities (IEO henceforth), with which we mean the extent to which the social position of origin, affects the educational careers of pupils with equal capacity and commitment (Ballarino and Schadee, 2006). Sociological research has increasingly challenged meritocracy and modernization ideals, focusing on the persistent existence of Inequality of Educational Opportunities (IEO) in developed countries with expanding educational systems. Until the early 2000s, the prevailing view was that inequalities persisted in advanced societies (Shavit et al., 2007). However, recent comparative studies indicate a decrease in IEO in many developed nations.

However, two arguments are often made to support the prevailing argument of persisting inequality (Shavit and Blossfeld, 1993). First, the decrease occurs in the lower educational levels, while inequalities seem to persist at the higher ones (Raftery and Hout, 1993; Shavit, et al., 2007). Second, when expansion increases participation, inequality can nevertheless persist on the horizontal axis: Lucas (2001) argued that the decreasing effect of social background is an artifact of analyzing only the vertical dimension of education. Following Lucas's theory of Effectively Maintained Inequality (EMI), higher-class families take into account qualitative differences between institutions in their

educational decision-making process. This is to guarantee advantages to their children when almost all individuals in society attain a given level of education. Horizontal stratification is one such strategy, and therefore, individuals from less advantaged social backgrounds enroll in less selective and privileged institutions and with less advantageous occupational prospects. EMI suggests that it is possible that when quantitative differences are common, qualitative differences are also important; if so, as Lucas (2001) posits, the socioeconomically advantaged families will use their advantages to guarantee their children both quantitatively and qualitatively better educational and occupational outcomes.

Major Theoretical Paradigms

When discussing the association between a student's social background and their attainment in higher education, sociological research relies on two primary paradigms within social stratification research. The first paradigm is rational choice theory. According to Boudon (1974) and Breen and Goldthorpe (1997), class-based differences in educational choices primarily stem from risk aversion. The fundamental premise is that children and their families make rational decisions based on the direct and indirect costs (C), subjective and objective educational benefits (B), and the likelihood of success (P). Within a myriad of educational options, the decision-making principle hinges on selecting the option offering the highest subjectively perceived utility ($U=(B*P)-C$). Essentially, children opt for pathways that promise greater benefits and success probabilities while incurring lower costs. The rationale behind these educational choices involves a sensitivity to loss aversion: each social class aims to prevent downward mobility. Consequently, to sustain their societal status, children from higher social strata feel compelled to pursue higher education. Conversely, those from lower social classes often veer toward less demanding and less risky educational tracks. This choice minimizes the risk of downward mobility and the associated costs, ensuring intergenerational stability in social standing (Breen and Goldthorpe, 1997). Furthermore, when lower-class families opt for a more privileged educational path or institution, this decision can result not only in a loss but also entail additional costs if shifting to a less privileged alternative. This model implies that socioeconomically disadvantaged individuals exhibit more pronounced risk aversion, prioritizing risk minimization over potentially higher returns. In contrast, individuals from privileged backgrounds seek higher returns and are willing to undertake greater risks to access these opportunities.

The second major paradigm is the cultural reproduction theory by Bourdieu & Passeron (1977), which highlights how selective institutions' admission policies tend to align with the cultural capital of desired prospective students. This alignment perpetuates and sustains class advantages (O'Sullivan

et al., 2019). Central to this discourse is the Cultural Capital Theory (CCT), which is underpinned by several fundamental assumptions.

Firstly, the CCT posits that each social stratum within a society possesses its distinct culture characterized by shared values, lifestyle, and language. Secondly, within this framework, there exists a perceived hierarchy among these different cultures, with implicit recognition of the standards set by the upper classes as dominant cultural norms. These norms implicitly influence and shape the cultural landscape within educational institutions.

This brings us to the third assumption of CCT: educational institutions often adopt and perpetuate the dominant cultural standards, largely conveyed through the teachings and educational materials prevalent in these institutions. Teachers and textbooks, knowingly or unknowingly, often reflect and perpetuate the cultural norms associated with the upper classes. As a result, the educational system tends to favor children from more advantaged backgrounds.

Consequently, children from more privileged backgrounds often exhibit better academic performances because they are inherently advantaged by their familiarity with the cultural standards perpetuated by educational institutions. Their proximity to the cultural norms prevalent in these institutions gives them an edge in adapting and meeting the educational requirements, resulting in relatively smoother navigation and fulfillment of academic expectations.

The alignment between the cultural standards of educational institutions and the cultural capital possessed by more advantaged children creates a conducive environment for their success. This scenario inadvertently perpetuates social inequalities by favoring those from higher social strata, who have a closer alignment with the dominant cultural norms embedded in educational systems. Conversely, individuals from less privileged backgrounds might face greater challenges in adapting to and meeting these cultural standards, contributing to the reproduction of social inequalities within educational settings.

In the literature, we can find several other theories and mechanisms in the educational decision-making process. Since we are interested in the socioeconomic factors that influence the decision to apply to a selective institution, we here intertwine these mechanisms with social background.

Risk and Reward Preferences

This group of theories and mechanisms shed light on the relationship between risk, expected returns, and how social background influences individuals' attitudes towards risk-taking in educational and career choices. Besides the Rational Action Theory, insights from economic literature provide valuable perspectives on the relationship between risk, expected returns, and how social background influences decision-making processes. The Modern Portfolio Theory (MPT) posits a positive

correlation between risk and expected returns. According to Halaby (2003), individuals may opt for a high-risk "entrepreneurial" strategy in pursuit of higher returns or choose a low-risk "bureaucratic" strategy with lower returns. As Hallsten (2010) highlights, accessing social and private goods often necessitates taking on some level of risk. Therefore, individuals less economically advantaged might prefer lower risk over potential returns, potentially putting them at a disadvantage compared to their more risk-tolerant, advantaged peers.

Economics research has demonstrated various connections between social background and risk aversion, that is people's inclination to favor outcomes with minimal uncertainty over those with higher uncertainty, even when the average value of the latter is equal to or greater in monetary terms than the more certain outcome. Evidence indicates a negative relationship between risk aversion and income, wealth, and education (Hartog et al., 2002; Hallahan et al., 2004). Additionally, there's a direct association between social background and risk aversion, where individuals from more advantaged backgrounds tend to exhibit lower risk aversion (Hartog et al., 2002).

Furthermore, the choice of a selective degree program or institution is often influenced by individuals' social backgrounds and perceptions. Building on Halaby's (2003) insights, individuals from privileged backgrounds, with access to better education and cognitive abilities, may lean towards selecting prestigious or selective educational paths. This inclination may stem from their exposure to risk-taking behaviors and a belief in the potentially higher rewards associated with such choices.

Research suggests that individuals from advantaged backgrounds tend to prioritize factors like high pay and attractive job characteristics when making career decisions. This preference may align with an "entrepreneurial" mindset, as described in economic theory, where individuals seek out selective opportunities with the expectation of greater returns. Therefore, their social background, education, and family influences may drive them towards pursuing selective degree programs or institutions that promise higher rewards and status, further perpetuating unequal access to education based on social background.

Information and Family Social Resources

Family resources encompass not only financial capabilities but also the wealth of information, planning, and parental influence that significantly shape a student's perceptions, aspirations, and choices regarding higher education (Olson and Rosenfeld, 1984; Barone et al., 2017). The intergenerational transmission of educational preferences and the impact of parental role models are pivotal in guiding a child's educational journey and shaping their future decisions regarding academic institutions.

More affluent students often possess access to a variety of informational sources, exhibit greater awareness of higher education costs, and tend to consider more prestigious institutions. Additionally, their parents may have meticulously planned and saved for university expenses over the years (Cabrera and La Nasa, 2000), allowing them to cultivate a college-bound identity for their children. Individuals armed with comprehensive knowledge about the labor market and the educational system tend to gravitate towards academic institutions associated with higher returns on investment (Hallsten, 2010). Research indicates that graduates from more selective universities tend to experience greater earnings in the labor market (Dale and Krueger, 2002). Consequently, opting for selective or prestigious institutions becomes a strategy to potentially maximize future earnings. Affluent students and their families are often more attuned to differences in returns among institutions, influencing their decision-making process.

Moreover, children often inherit educational preferences from their parents, who provide valuable information based on their own educational experiences (Hallsten, 2010). Parental education and occupation serve as influential role models for children. Throughout the socialization process, parental influence occurs through encouragement and as a result of the child's decision to emulate their parent's educational path (Dryler, 1998).

Furthermore, parental education and occupation significantly contribute to a child's interest in and knowledge about the field of higher education or specific institutions. Parents serve as specific role models associated with their occupation and educational background. The influence of these role models shapes a child's perceptions and aspirations, leading to parental encouragement and the child's inclination to follow in their parent's footsteps.

Peer Influence: Social Circle

Similarly, to family networks and social resources, peers can significantly influence individuals' educational aspirations and attainment.

Aspirations are strongly linked to educational and occupational outcomes (Feliciano and Rumbaut, 2005). In turn, individuals' aspirations are shaped by the social context, that is by peers and teachers, besides the families (Sewell, Haller, and Portes, 1969).

As Hallinan and Williams (1990) point out, friendships significantly influence students' aspirations, especially regarding college plans. Starting high school, consistent inquiries from both peers and adults about future education create susceptibility due to students' limited knowledge about the university system. Close friends, perceived as trustworthy, heavily impact students' decisions, particularly when sharing similar backgrounds and academic experiences.

Buchmann and Dalton (2002) in a comparative study found that in countries like the United States with less stratified secondary education, peers have a notable impact on educational aspirations. However, in societies with more stratified secondary education systems, the influence of significant others becomes less significant. In these systems, a student's aspirations seem more tied to the type of school they attend, minimizing interpersonal effects. The impact of significant others on student aspirations seems closely linked to the structural features of the educational systems they are part of. However, in some contexts, educational aspirations are homogeneous, because students are sorted into different tracks based on parental socio-economic status (Raabe and Woelfer, 2018).

Structural factors

Differentiation in upper secondary education is a crucial element influencing further education and social reproduction mechanisms within societies (Breen and Jonsson, 2005). A pivotal aspect of educational systems is educational differentiation, a practice involving the categorization of students into distinct tracks (Sørensen, 1970). Typically observed in secondary education, tracking has been linked to significant implications for educational outcomes. Existing studies propose that educational systems implementing early between-school tracking during secondary education tend to exhibit heightened levels of social inequality in both school performance and educational attainment in comparison to systems embracing comprehensive schooling or late between-school tracking models (Skopek et al., 2019; Terrin and Triventi, 2022). Notably, the impact of such tracking and segregation practices on educational attainment is contingent upon an individual's social background, thereby contributing to varying levels of advantage or disadvantage for students across diverse socio-economic strata. Drawing from Triventi et al. (2016), it is evident across educational systems that pupils from privileged family backgrounds have greater chances of accessing the most privileged educational pathways during secondary education compared to their counterparts from disadvantaged social origins. In this context, the choice of selective degree programs becomes intertwined with the educational trajectories established during secondary education. Students who have been channeled into more privileged educational tracks are often better positioned to access prestigious universities and selective degree programs. Conversely, those from disadvantaged social origins may face greater barriers to accessing these opportunities due to systemic inequalities perpetuated by early tracking practices.

The cost of education and the families' economic constraints are also likely to affect educational choices. Also, the availability of scholarships, grants, loans, and financial aid programs can determine whether students from disadvantaged backgrounds can afford higher education. Research consistently shows a significant and negative relationship between tuition increases and enrolment (Cabrera and La Nasa, 2000). Those students who are mostly affected by these increases and also by the presence

of financial aid programs are low-income students (Long, B.T., 2004). Several studies show that the increasing cost of higher education has pushed low-income students to enroll in less expensive institutions (McPherson and Schapiro, 1998). However, the affordability gap between selective institutions and less expensive alternatives poses a significant barrier for low-income students. Despite the availability of financial aid programs, scholarships, and grants, the perceived costliness of selective institutions may deter economically disadvantaged students from applying or enrolling. Another cost is tied to the distance from where the university is located. Social classes are unevenly distributed across the country due to differences in local labor market characteristics, and so are university institutions (Hallsten, 2010). These spatial constraints represent a further limitation for individuals in their educational decisions and this is especially true for lower-class families. This spatial inequality means that certain areas may have greater accessibility to prestigious and more selective universities, while others lack such opportunities. Consequently, lower-income students residing in areas with fewer nearby selective institutions may face even greater challenges in accessing these institutions due to the logistical and financial burdens associated with relocating for education. On the contrary, living with parents gives them the possibility to minimize living costs. However, Griffith (2009) found distance to a selective 4-year college has a significant impact on the probability that a student will apply to a selective school. As the distance to the closest selective college increases, students are less likely to apply to this type of college, all else equal. Low-income students do not seem to be any more sensitive to distance than their high-income peers.

7. Stage Two: From Enrolment to Graduation

In recent years, policymakers and observers in numerous developed countries have directed their attention toward the issue of poor retention rates within higher education systems. The significant expansion of education in developed nations has resulted in escalated public spending on educational institutions. Consequently, the cost-effectiveness of higher education has emerged as a major concern. Ensuring students complete their studies is paramount since prolonged graduation periods lead to escalated spending on tertiary education. This, in turn, amplifies the financial burden on students, their families, and taxpayers alike (Bound, et al., 2010).

The functions of higher education have evolved over the last century (Trow, 2007). Pre-World War II, higher education primarily served as a means to enrich one's intellect. However, post-war, the primary role of higher education shifted towards the allocation of individuals within the occupational structure (Borgen, S. and Borgen, N., 2016). This transformation in the function of higher education systems is intricately tied to the emergence of the new knowledge economy, characterized by 'man-made brainpower industries.' This economy is marked by rapid advancements and increased utilization of new information and communication technologies, leading to the formation of a globally interconnected economy (Thurow, 2000). Consequently, within a knowledge-based economy, augmenting the count of skilled workers is perceived as pivotal for economic development. Consequently, graduating students and thereby augmenting the pool of skilled workers is a top priority within political agendas.

Institutional selectivity is an emerging factor associated with degree completion and enhanced performance. Completion rates are linked to institutional selectivity, especially with the level of autonomy of higher education institutions. This suggests that the more selective a system is, the higher the completion rate, and therefore the more efficient it is at graduating students (Orr, et al., 2017). However, the empirical evidence on the effects of implementing selective admission policies is mixed. Moreover, the research on selectivity effects lacks a comprehensive theoretical framework. Therefore, we here review the major theoretical models to understand student academic achievement. The extensive array of sociological theoretical models concerning students' academic performance and retention originated in the 1970s. These studies have emphasized the interplay between the student and the university environment. Starting with Spady's seminal work (1970), many others have emerged, including pivotal contributions such as Tinto's Institutional Departure Model (1975, 1993), Bean's Student Attrition Model (1980, 1982), the Student-Faculty Informal Contact Model (Pascarella, 1980), Astin's Student Involvement Model (1984), and the Student Retention Integrated Model (Cabrera, Nora, & Castaneda, 1993).

Tinto's Model of Institutional Departure (1975, 1993) stands as one of the most influential frameworks, having undergone extensive examination and validation over the past four decades. In its final version (1993), this model posits that universities operate within two distinct systems: academic and social. Successful student persistence hinges on integrating into both spheres. Academic integration is gauged by factors such as academic performance and intellectual growth, whereas social integration is measured through interactions within the college community (including peers and faculty). The model contends that upon entering higher education, students harbor certain goals and commitments influenced by their pre-existing attributes—such as family background, skills, and prior education—that shape these initial aspirations. Crucially, the student's experience, encompassing both academic and social integration, continually alters the strength of these initial goals and commitments, which in turn significantly influence the student's retention decision (Tinto, 1975, 1993).

Central to Tinto's theory on student retention, both in his initial work and subsequent expansions, is the concept of student integration. Tinto (1993) asserted that students are more likely to achieve integration when they feel connected to both the social and academic dimensions of their university. Actively engaging in academic and social activities, such as forming relationships or participating in institution-sponsored events, increases the likelihood of completing a degree compared to those who remain less involved. For less active students, feelings of not fitting into the institution, isolation, or experiencing difficulties in social interactions might hinder their integration (Tinto, 1993). Students who struggle to find a sense of belonging and fail to establish meaningful social connections have a lower likelihood of completing their degree programs.

In alignment with Tinto's perspective, others propose that interactions with faculty members can stimulate students' critical thinking abilities. Additionally, some posit that positive faculty-student interactions may enhance student learning due to the conveyed expectations about students' capabilities to succeed. This notion aligns with the concept of a "self-fulfilling prophecy," influencing students to perform in ways that validate those expectations (Lundberg and Schreiner, 2004).

Drawing from Tinto, Pascarella (1980) developed his theoretical model of student retention that emphasizes the positive associations between the level of informal interaction between students and faculty and student retention, particularly during the initial year. Pascarella (1980) suggests that the quality of informal interactions outside the classroom setting between students and faculty is influenced by several factors. These factors encompass initial variations among students, the prevailing faculty culture, classroom encounters, engagement in peer culture, and the scale of the institution.

Student-faculty interaction has been broadly defined as any in-person contact between students and faculty members outside of scheduled class time. The literature has identified different types of student-faculty interactions: interactions can occur briefly before and after class, in their professors' office, or they can meet in a more social and informal setting (Pascarella and Terenzini, 1977). The nature of the interaction can vary as well. Interactions may regard course-related matters, career development, or even more personal matters. According to Astin (1984), student-faculty interaction is a key factor that may retain dropouts and enhance academic attainment. Interaction with faculty is a strong predictor of student learning (Lundberg and Schreiner, 2004).

An interesting addition for our purposes is the introduction of institutional factors to retention models. Pascarella emphasizes the role of institutional characteristics, such as organizational structure, institutional size, and selectivity in shaping educational outcomes. Besides directly impacting educational outcomes, these institutional factors significantly influence various aspects of the university experience, including student-faculty informal interactions, engagement in peer culture, and participation in extracurricular and leisure activities. Indeed, selective institutions have greater academic engagement and better student-faculty interaction (Mayhew, M.J., et al., 2016).

Moreover, institutional characteristics influence students' characteristics, such as aptitudes, aspirations, and expectations regarding university studies, and conversely, these student attributes can also impact institutional factors.

Following this line, empirical studies have demonstrated how the structural characteristics of institutions, encompassing factors like size, selectivity, and control, exhibit noteworthy correlations with student persistence and dropout rates. Specifically, research by Ryan (2004) and Titus (2004) indicates a negative relationship between institution size and student dropout. Moreover, studies by Kim (2007), Titus (2004, 2006), and Gansemer-Topf and Schuh (2006) suggest a similar negative association between selectivity and student dropout. Additionally, institutional control emerges as a significant factor, with private institutions demonstrating higher retention rates, as supported by findings from Kim (2007), Titus (2006), and Ryan (2004).

7.1 The Learning Environment

Consistent with the aforementioned theories, interpersonal relationships both within and beyond the academic environment significantly influence a student's educational achievements. In this vein it's crucial to acknowledge the divergent values and norms prevalent in students' home life versus the academic environment: This viewpoint aligns with a social networks perspective, emphasizing the relationships students foster with faculty, staff, peers, as well as family, friends, and mentors (Kuh, et al., 2006). These connections contribute substantially to student academic achievements and

attainment (Pascarella, 1991; Tinto 1975, 1993). This perspective not only complements previous theories but also sheds light on potential underlying mechanisms influencing student paths.

Peer Effect

As posited by Pascarella et al. (2006), students' interactions with their peers stand as a significant dimension of how an institution's educational impact affects individual students. The quality of these interactions plays a vital role, as higher-skilled peers tend to offer greater intellectual stimulation during engagements. Attending a selective institution often ensures access to a cohort of high-achieving peers and robust social networks. The concept of peer effect refers to the influence exerted by a reference group on individuals' behaviors or outcomes. This effect manifests in various ways; it can be direct, where one student's performance influences another's educational outcome without altering their behavior, such as when a student excels in answering questions, leading others to learn from them. Additionally, the peer effect can be indirect, where a student seeks to emulate another or when a peer's actions influence the behavior of teachers, motivating them and fostering discussions that benefit other students (Epple, et al., 2003). Students surrounded by capable and motivated peers experience enhanced in-class and out-of-class discussions, contributing to better comprehension of course material and class content (ibid).

The significance of peer effects in higher education becomes evident in understanding why institutional selectivity influences student outcomes, as outlined by Porter (2006). Despite limited theoretical discussion, aside from the work of Pascarella et al. (2006), Porter highlights the pivotal role of selectivity. Porter's argument centers on the notion that attending a college with high-achieving peers positively impacts students' behavior and academic performance compared to being among low-achieving peers. Interaction with classmates who dedicate substantial time to studying could influence a student to allocate more time to their studies as well. Conversely, if surrounded by peers who invest less time in studying, the same student might follow suit and study less. Utilizing selectivity as a gauge for average student quality, Porter concludes that student achievement tends to be higher in more selective institutions due to the triggering effect of peer influence. (Porter, S., 2006).

Teaching Quality

Academically proficient students have the potential to influence faculty members to elevate their academic expectations and demands on students, thereby amplifying the institution's impact on its student body (Pascarella, E.T, et al., 2006). Both experimental and correlational evidence affirms that effective teaching, particularly focusing on teacher clarity and organization, yields positive outcomes for students, encompassing knowledge acquisition and broader soft skill development (Pascarella et al., 1996; Wood and Murray, 1999). Teachers working with highly skilled students tend to invest more

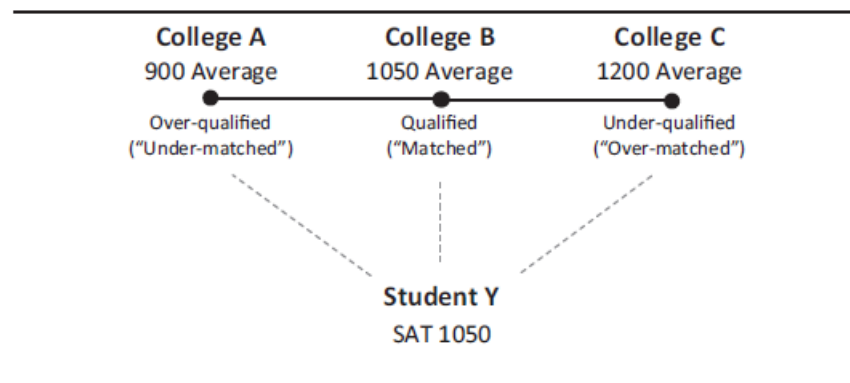
time and effort in crafting and preparing their lessons, articulating precise learning objectives, and employing effective feedback strategies (Schneider, M. and Preckel, F., 2017). Notably, research also indicates that effective teaching in the undergraduate setting positively impacts students' degree completion, irrespective of background characteristics, tested ability, grades, and social involvement (Pascarella, E.T, et al., 2006).

Furthermore, institutional selectivity fosters an environment conducive to student-centered teaching, a crucial element for promoting effective teaching and facilitating high-quality learning experiences (Gillis et al., 2008).

7.2 The Student-University Mismatch

In the literature, a popular explanation for the degree attainment gap – the difference between groups of students in degrees awarded - is matching between students and institutions (Bowen et al. 2009). The study of student-college matches is situated at the “nexus of both college access and degree completion” (Hudes, 2016). This concept was initially used regarding whether students attending selective institutions were considered a “match” or “mismatch” (Alon and Tienda, 2005). Although varying definitions and methodologies are used to assess student-college match, it generally refers to a student who does not attend an institution with a selectivity level that matches his or her academic potential. As a result, students are considered either an undermatch, overmatch, or a match (see Figure 3). Undermatch is the most frequently studied and is generally defined as “occurring when a student’s academic credentials permit them access to a college or university that is more selective than the postsecondary alternative they choose” (Smith et al., 2013). Conversely, a student is considered an overmatch if enrolled in an institution with a selectivity level higher than the most selective institution the student would likely be admitted based on his or her qualifications (Hudes, 2016).

Figure 2 Three hypothetical college choices for a student with a SAT score of 1050



(Source: Heil, et al., 2014)

Although the extensive array of match types, among the few studies examining the concept of student-college match, most focus exclusively on undermatch, instead of all match types. However, very few have focused on its relationship with students' academic outcomes, such as performances and degree completion.

As above mentioned, scholars have begun to examine undermatching, as it was considered a potential solution to the poor retention rate. Theoretically, undermatched students are not necessarily less likely to graduate than matched students: they might enjoy all other dimensions and characteristics of attending a selective institution. For example, an undermatched student may profit from being the “big fish in a small pond” (Smith, 2013; Heil, 2014). The Big-Fish-Little-Pond Effect is one of the most common theories about students' *Academic Self-Concept*²(ASC) forming process. It was first introduced by Marsh (1984) to study the phenomenon of students attending selective institutions who always show lower ASC levels compared to those students with similar skills but who are attending less selective institutions (Fang, J., 2018). That is, when you are a “big fish” (high-achieving student) in a “little pond” (lower-achieving school), you have a more positive academic self-concept. This may lead to better academic outcomes. Undermatched students might also be less likely to graduate for a variety of reasons. For example, less selective institutions typically have smaller budgets dedicated to students (Hoxby, 2009; Smith, 2013). This translates into less academic support and fewer services to students that may enhance their probability of graduating. However, empirical evidence seems to show that undermatched students are less likely to graduate (Bowen and Bok, 1998; Light and Strayer, 2000; Bowen et al., 2009; Smith, 2013).

² Academic Self-Concept (ASC) is defined as students' self-perception in either specific disciplines (e.g. math or science) or more general academic areas.

8. A Proposed Theoretical Framework

A primary contribution of this theoretical chapter is to propose a conceptual model for studying the role of selectivity in higher education in shaping educational choices and student academic achievement. We here show the links between selectivity and educational steps analyzed through this dissertation. Drawing from sociological and economic models, the mechanisms through which these concepts are connected have been discussed in the previous sections.

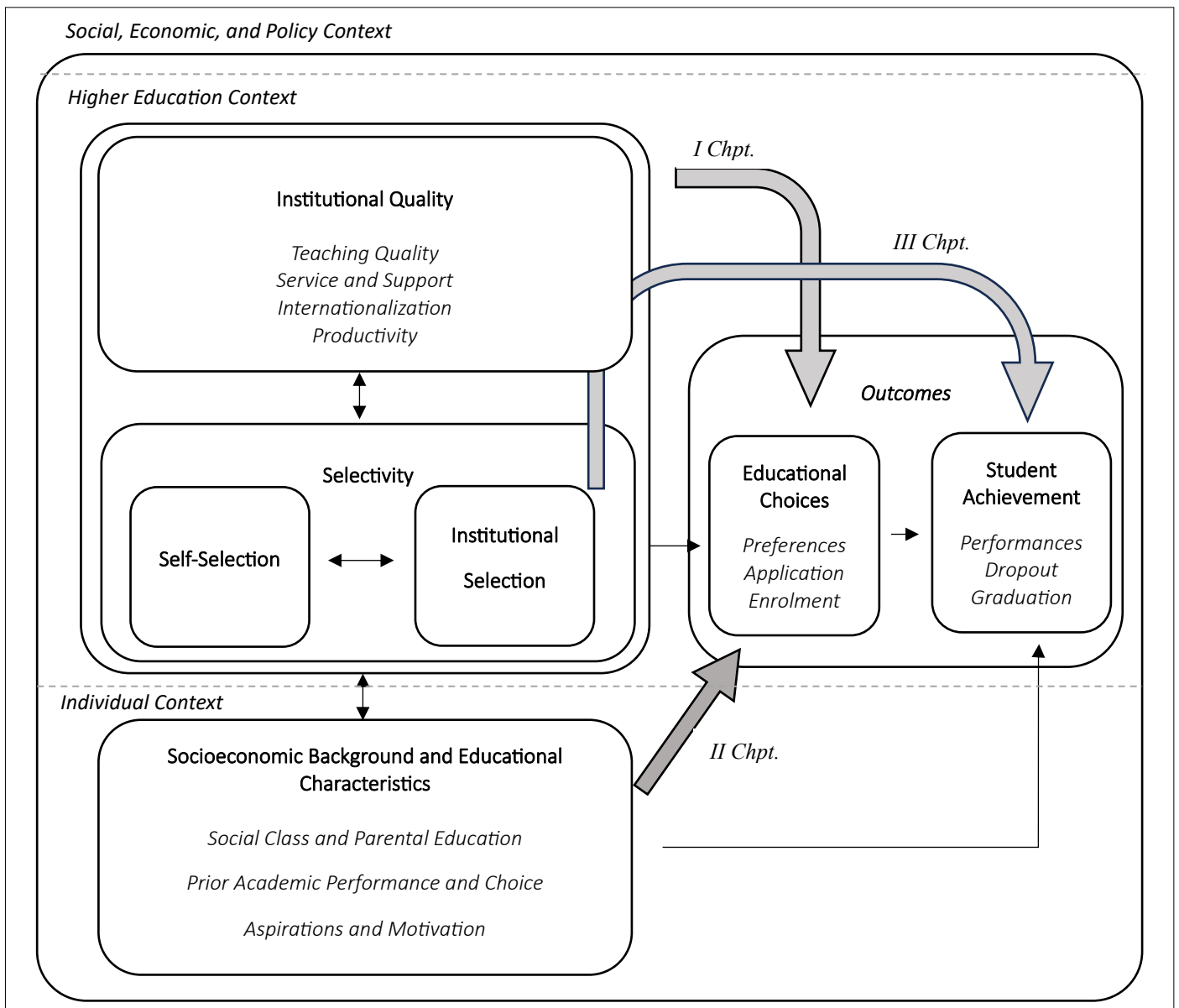
The model assumes that micro factors, such as social background, academic skills, motivation, and aspirations, shape individual choices about educational careers, as well as students' achievements. Student outcomes are in turn shaped also by the higher education environment, encompassing institutional characteristics at the core of this dissertation, that is selectivity and institutional quality as separated concepts, and the broader social, economic, and policy landscape.

Central to our conceptual framework is the understanding that institutional selectivity plays a pivotal role in shaping individual educational choices, as well as exerting an influence on students' achievements. This influence is manifested through the dual selectivity components of self-selection and institutional selection, as described in the previous sections.

We assume that individuals' decisions about their educational pathways are shaped by three layers: a) their individual ascribed and not characteristics; b) the institutional characteristics of institutions or fields of study; c) the broader socio-economic context.

The degree of selectivity is shaped by students' characteristics: students with lower performances and aspirations, and those coming from lower socioeconomic backgrounds select themselves into study programs or institutions. Also, self-selection is influenced by institutional selection, that is the strategies at play to select and admit prospective students. In turn, the degree of selectivity affects students' characteristics, exerting an influence on their aspirations, motivation, and performances. For instance, students may strategically enhance their academic performances to align with the admission requirements of more selective institutions or programs. This reciprocal relationship between selectivity and individual attributes underscores the dynamic nature of this relationship.

Fig.3 Selectivity-centered proposed theoretical framework



The model acknowledges institutional quality and selectivity as two distinct concepts, influencing one another.

Finally, this theoretical framework acknowledges the overarching impact of external factors, such as government policies, economic conditions, and societal expectations, which collectively contribute to the opportunities and constraints individuals confront when making critical decisions about their higher education path and supporting their academic careers.

To explore the association between institutional characteristics, namely institutional quality and selectivity is the aim of the first empirical chapter of this dissertation. The chapter examines the impact of university rankings and institutional selectivity on enrolment decisions in Italy, particularly

focusing on first-year enrolments and specific student categories, such as those with high grades from academic tracks in secondary school. This study contributes to the discussion by investigating how university rankings and selectivity influence enrolment choices, emphasizing higher education supply factors. It examines the sensitivity of different student categories to university rankings and assesses if selectivity affects general enrolments versus top students' enrolments differently. It adopts a multidimensional approach to university rankings, evaluating quality across various aspects (research, teaching, student performance, internationalization) at the faculty level. It distinguishes between institutional quality and selectivity, analyzing their independent effects on enrolment outcomes. It utilizes panel data analysis techniques for a dynamic assessment, which enhances credibility in estimating the causal effects of university rankings and selectivity compared to cross-sectional studies.

In the second empirical chapter, we delve into the relationship between individual characteristics, selectivity, and educational choices: we ask empirically if the choice of a selective degree program is stratified by social background. We offer a significant contribution to understanding the unequal access to university degrees based on social background. Our main innovation lies in introducing selectivity into this educational research area and examining how these effects vary by social background. Additionally, instead of solely focusing on the final decision-making stage, we analyze the various steps involved in pursuing a selective degree program, including expressing preferences, applying, gaining admission, and enrolling. This approach allows us to differentiate between self-selection, demonstrated through degree preferences and applications, and institutional selection, reflected in admission and enrolment decisions, as discussed in this theoretical chapter.

In the last section, we explore the relationship between selectivity and student achievement: we aim to test empirically if institutional selectivity enhances student progression, thereby contributing to research on the institutional factors impacting students' achievement and attainment. The influence of institutional selectivity on students' degree attainment, timely completion, and academic achievements has received significant attention. Theoretical frameworks suggest various mechanisms at play, including peer interactions and faculty engagement. However, empirical evidence on this association remains inconclusive, with conflicting results due to differences in data and methodologies. This study addresses this gap by examining a representative sample of educational institutions across Italy, contrasting with previous research focused on specific institutions or demographics. Our analysis sheds light on the impact of selective admission policies on students' academic progression within the Italian higher education context.

References

- Acemoglu, D. and Autor, D. (2011) Lectures in Labor Economics, Web note
- Allen, D., & Wolniak, G. C. (2019). Exploring the Effects of Tuition Increases on Racial/Ethnic Diversity at Public Colleges and Universities. *Research in Higher Education*, 60(1), 18–43.
- Alon, S., & Tienda, M. (2005). Assessing the “mismatch” hypothesis: Differences in college graduation rates by institutional selectivity. *Sociology of Education*, 78(4), 294.
- Alon, S., & Tienda, M. (2007). Diversity, opportunity, and the shifting meritocracy in higher education. *American Sociological Review*, 72, 487–511.
- Anvur (2016). Rapporto biennale sullo stato del Sistema universitario e della ricerca. Tech. Report
- Arum, R., Roksa, J., & Budig, M. J. (2008). The romance of college attendance: Higher education stratification and mate selection. *Research in Social Stratification and Mobility*, 26, 107–121.
- Astin, A. W. (1975). *Preventing Students from Dropping Out*. Jossey-Bass.
- Astin, A. W. (1984). Student involvement: A developmental theory for higher education. *Journal of College Student Personnel*, 25(4): 297–308.
- Ayalon, H., & Shavit, Y. (2004). Educational Reforms and Inequalities in Israel: The MMI Hypothesis Revisited. *Sociology of Education*, 77(2): 103–120.
- Ayalon, Hanna, and Abraham Yogev. (2005). Field of Study and Students’ Stratification in an Expanded System of Higher Education: The Case of Israel. *European Sociological Review* 21:227–41.
- Ballarino, G., Bernardi, F. et al. (2009). Persistent inequalities? Expansion of education and class inequality in Italy and Spain. In: *European Sociological Review* 25(1): 123–138.
- Ballarino, G. and Schadee, H. (2006). Espansione dell'istruzione e diseguaglianza delle opportunità educative nell'Italia contemporanea. In: *Polis, Ricerche e studi su società e politica in Italia*. 2: 207-232
- Barone, C., Schizzerotto, A., Abbiati, G., & Argentin, G. (2016). Information Barriers, Social Inequality, and Plans for Higher Education: Evidence from a Field Experiment. *European Sociological Review*, jcw050.
- Barr Rita. (2002) Interim News. Texas House of Representatives, House Research Organization; Austin, TX: Top 10 percent policy: Higher Education Diversity after Hopwood. pp. 77–9.

- Bean, J. (1980). Dropouts and turnover: The synthesis and test of a causal model of student attrition. *Research in Higher Education*, 12(2), 155-187.
- Bean, J. (1982). Conceptual models of student attrition: How theory can help the institutional researcher. *New directions for institutional research*, 1982(36), 17-33.
- Becker, G. S. (1993) *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education*, Chicago, IL: The University of Chicago Press
- Behrman, Jere R., Rosenzweig, Mark R, Taubman, Paul, (1996). College Choice and Wages: Estimates Using Data on Female Twins. *The Review of Economics and Statistics*, MIT Press, vol. 78(4), pages 672-685
- Bell, D. (1973). *The coming of post-industrial society*. New York: Basic Books, Inc.
- Betts, J.R., and Morell, D. (1999). The determinants of undergraduate grade point average: the relative importance of family background, high school resources, and peer group effects. *Journal of Human Resources*, 34 (2), 268-293.
- Bills, D. B. (2004) *The Sociology of Education and Work*, Malden, MA: Blackwell
- Black, D., & Smith, J. (2006). Estimating the Returns to College Quality with Multiple Proxies for Quality. *Journal of Labor Economics*, 24(3), 701-728.
- Blau, P. and Duncan, O. D. (1967). *The American Occupational Structure*, New York: John Wiley
- Boliver, V. (2013). How fair is access to more prestigious UK universities? *The British Journal of Sociology*, 64(2), 344-364. doi: 10.1111/1468-4446.12021
- Borgen, N. T. (2014) 'College quality and hourly wages: Evidence from the self-revelation model, sibling models, and instrumental variables', *Social Science Research* 48: 121–34.
- Borgen NT. (2015). College quality and the positive selection hypothesis: The 'second filter' on family background in high-paid jobs. *Research in Social Stratification and Mobility* 39, 32-47
- Borgen, NT. (2015). Changes in the economic returns to attending prestigious institutions in Norway
European Societies 17 (2), 219-241
- Borgen, NT. (2014). College quality and hourly wages: Evidence from the self-revelation model, sibling models, and instrumental variables. *Social Science Research* 48, 121-134
- Borgen ST, Borgen NT. (2016). Student retention in higher education: Folk high schools and educational decisions. *Higher Education* 71 (4), 505-523
- Borgen, NT. and Mastekaasa, A. (2018). Horizontal Stratification of Higher Education: The Relative Importance of Field of Study, Institution, and Department for Candidates' Wages. *Social Forces* 97 (2), 531-558

- Boudon, R. (1974). *Education, Opportunity, and Social Inequality: Changing Prospects in Western Society*. New York: Wiley.
- Bound, J. Lovenheim, and Turner. 2010. "Why Have College Completion Rates Declined? An Analysis of Changing Student Preparation and Collegiate Resources." *American Economic Journal: Applied Economics*, 2 (3): 129-57
- Bourdieu P. e Passeron J.C. (1964), *Les Héritiers*, Les éditions de Minuit, Paris (transl. it. 1971 I delfini. *Gli studenti e la cultura*, Guaraldi, Bologna-Firenze)
- Bourdieu P. (1996). *The State Nobility*. Stanford, CA: Stanford University Press.
- Bowen, W. G., and Bok, D. (1998). *The shape of the river: Long-term consequences of considering race in college and university admissions*. Princeton, NJ: Princeton University Press.
- Bowen, W. G., Chingos, M. M., & McPherson, M. S. (2009). *Crossing the finish line: Completing college at America's public universities*. Princeton, NJ: Princeton University Press.
- Brand, J. E., & Halaby, C. N. (2006). Regression and matching estimates of the effects of elite college attendance on educational and career achievement. *Social Science Research*, 35, 749–770.
- Brand, J. E., and Xie, Y. (2010). Who benefits most from college? Evidence for negative selection in heterogeneous economic returns to higher education. *American Sociological Review*, 75, 273–302.
- Breen, R., & John H. Goldthorpe. (1997). Explaining Educational Differentials: Towards a Formal Rational Action Theory. *Rationality and Society* 9:275–305.
- Breen, R. and Goldthorpe, J.H. (1999). Class inequality and meritocracy: a critique of Saunders and an alternative analysis. *The British Journal of Sociology*, 50: 1-27.
- Breen, R., and Jonsson, J. O. (2005). Inequality of Opportunity in Comparative Perspective: Recent Research on Educational Attainment and Social Mobility. *Annual Review of Sociology*, 31, 223-243.
- Breen, R. et al. (2009). Non-persistent inequality in educational attainment: Evidence from eight European countries. In: *American Journal of Sociology* 114(5): 1475–1521.
- Breen, R. (2010). Educational Expansion and Social Mobility in the 20th Century. *Social Forces*, 89(2): 365–388.
- Bridgeman, B., Pollack, J., and Burton, N. (2004). Understanding what SAT reasoning test scores add to high school grades: a straightforward approach. (College Board Research Report No. 2004-4). New York: College Entrance Examination Board.
- Buchmann, C., & Dalton, B. (2002). Interpersonal Influences and Educational Aspirations in 12 Countries: The Importance of Institutional Context. *Sociology of Education*, 75(2), 99–122.

Cabrera, A., Nora, A., & Castaneda, M. (1993). College Persistence: Structural Equations Modeling Test of an Integrated Model of Student Retention. *The Journal of Higher Education*, 64(2), 123-139.

Cabrera, A.F. and La Nasa, S.M. (2000), *Understanding the College-Choice Process*. *New Directions for Institutional Research*, 2000: 5-22.

Carrieri, V., D'Amato, M., & Zotti, R. (2013). Selective admission tests and students' performances. Evidence from a natural experiment in a large Italian University (No. 0/00). CELPE-Centre of Labour Economics and Economic Policy, University of Salerno, Italy.

Cingano, F. and Cipollone, P. et al. (2007). University drop-out: the case of Italy. *Bank of Italy*, No.626.

Cohn, E., Cohn, S., Balch, D.C., and Bradley, J. Jr. (2004). Determinants of undergraduate GPAs: SAT scores, high school GPA, and high-school rank. *Economics of Education Review*, 23(6), 577-86.

Cross, T., & Slater, R. B. (1999). Only the Onset of Affirmative Action Explains the Explosive Growth in Black Enrolments in Higher Education. *The Journal of Blacks in Higher Education*, 23, 110–115.

Dale, S. and Krueger A. B. (2002). Estimating The Payoff Of Attending A More Selective College: An Application Of Selection On Observables And Unobservables, *Quarterly Journal of Economics*, v107(4, Nov), 1491-1527

Davies, S., & Guppy, N. (1997). Fields of Study, College Selectivity, and Student Inequalities in Higher Education. *Social Forces*, 75(4), 1417-1438. doi:10.2307/2580677

Delogu, M., Lagravinese, R., Paolini, D., Resce, G. (2024). Predicting dropout from higher education: Evidence from Italy. *Economic Modelling*, 130(4), 106583

DesJardins, S.L., Ahlburg, D.A., and McCall, B.P. (2002). A temporal investigation of factors related to timely degree completion. *The Journal of Higher Education*, 73(5), 555-581.

Desjardins, S. L., Dundar, H., & Hendel, D. D. (1999). Modeling the college application decision process in a land-grant university. *Economics of Education Review*, 18(1), 117–132.

Dillon, E. W., & Smith, J. A. (2017). Determinants of the match between student ability and college quality. *Journal of Labor Economics*, 35(1), 45-66.

Di Pietro, G. and Cutillo, A. (2008). Degree Flexibility and University drop-out: The Italian experience. *Economics of Education Review*, 27(5): 546-555

Dryler, H. (1998). Parental Role Models, Gender and Educational Choice. *British Journal of Sociology* 49:375–98.

Epple, D., Romano, R. and Sieg, H. (2003), Peer effects, financial aid and selection of students into colleges and universities: an empirical analysis. *J. Appl. Econ.*, 18: 501-525

- Eurydice. (2007). Focus on the Structure of Higher Education in Europe. 2006/07 National Trends in the Bologna Process, Lussemburgo, European Commission.
- Fang J, Huang X, Zhang M, Huang F, Li Z, Yuan Q. (2018). The Big-Fish-Little-Pond Effect on Academic Self-Concept: A Meta-Analysis. *Front Psychol.* 9:1569.
- Feliciano, C. and Rumbaut, R. G. (2005). Gendered paths: educational and occupational expectations and outcomes among adult children of immigrants. *Ethnic and Racial Studies*, 28, 1087–1118.
- Fischer, M. J., and Massey, D. S. (2007). The effects of affirmative action in higher education. *Social Science Research*, 36(2), 531–549
- Flowers, L. A., Osterlind, S. J., Pascarella, E. T., and Pierson, C. T. (2001). How much do students learn in college?: Cross-sectional estimates using the College BASE. *J.Higher Educ.* 72: 565–583
- Francesconi, M., Aina, C., and Cappellari, L. (2011). Student performance may not improve when universities are choosier. *Evaluation & Research in Education*, 24 (4), 231-242.
- Gansemmer-Topf, A., & Schuh, J. (2006). Institutional selectivity and institutional expenditures: Examining organizational factors that contribute to retention and graduation. *Research in Higher Education*, 47(6), 613-642.
- Geiser, S., and Santelices, M. (2007). Validity of high-school grades in predicting student success beyond the freshman year. *Chronicle of Higher Education, Research & Occasional paper series, CSHE* (6).
- Gerber, T. P. and Cheung, S. Y. (2008) ‘Horizontal stratification in postsecondary education: Forms, explanations, and implications’, *Annual Review of Sociology* 34: 299–318.
- Gilis, A., Clement, M., Laga, L. et al. Establishing a Competence Profile for the Role of Student-centred Teachers in Higher Education in Belgium. *Res High Educ* 49, 531–554 (2008)
- Glebbeek, A., Wim, N. and Schakelaar, R. (1989). “The labor-market position of Dutch sociologists – an investigation guided by a theoretical model”, *Netherlands Journal of Social Sciences*, 25: 57-74.
- Goldin, C., and Katz, L.F. *The Race between Education and Technology*. Cambridge, MA: Harvard University Press, 2008.
- Griffith, A. L., & Rothstein, D. S. (2009). Can’t get there from here: The decision to apply to a selective college. *Economics of Education Review*, 28(5), 620-628.
- Gulbrandsen, M., and Sliperstaeter, S. (2007). The third mission and the entrepreneurial university model. In Bonaccorsi A., Daraio C. (eds). *Universities and Strategic Knowledge Creation* (pp. 112-143). Cheltenham; Northampton: Edward Elgar
- Halaby, C. (2003). Where Job Values Come From Family and Schooling Background, Cognitive Ability, and Gender. *American Sociological Review* 68:251–78.

- Hallahan, T.A., et al. (2004). An Empirical Investigation of Personal Financial Risk Tolerance. *Financial Services Review* 13: 57–78.
- Hallinan, M. T., & Williams, R. A. (1990). Students' Characteristics and the Peer-Influence Process. *Sociology of Education*, 63(2), 122.
- Hällsten, M. (2010). The Structure of Educational Decision Making and Consequences for Inequality: A Swedish Test Case. *American Journal of Sociology* 116:3, 806-54
- Hanushek, E.A., and Woessmann, L. (2012). Do better schools lead to more growth? Cognitive skills, economic outcomes, and causation. *Journal of Economic Growth*, 17 (4), 267-321.
- Harris AL, Tienda M. (2012). Hispanics in Higher Education and the Texas Top Ten Percent Law. *Race Soc Probl.* Apr;4(1):57-67.
- Hartog, J. et al. (2002). Linking Measured Risk Aversion to Individual Characteristics. *Kyklos* 55:3–26.
- Harvey L., and Askling B. (2003). Quality in Higher Education. In: Begg R. (eds) *The Dialogue between Higher Education Research and Practice*. Springer, Dordrecht.
- Heil, S., Reisel, L., & Attewell, P. (2014). College selectivity and degree completion. *American Educational Research Journal*, 51(5), 913-935.
- Heller, D. (2004). Pell grant recipients in selected colleges and universities. In D. Richard, & Kallenberg (Eds.), *America's untapped resources: Low-income students in higher education* (pp. 157–166). New York: Century Foundation Press.
- Helms, R. (2009). University Admissions: Practices and Procedures Worldwide. *International Higher Education*, (54)
- Hemelt, S. W., & Marcotte, D. E. (2011). The Impact of Tuition Increases on Enrolment at Public Colleges and Universities. *Educational Evaluation and Policy Analysis*, 33(4), 435–457.
- Hill, C., Winston, G., & Boyd, S. (2005). Affordability: Family incomes and net prices at highly selective private colleges and universities. *Journal of Human Resources*, 40(4), 769–790.
- Hossler, D. and Gallagher, K. (1987) Studying Student College Choice: A Three-Phase Model and the Implications for Policymakers. *College and University*, 62, 207-221.
- Howell, J. S. (2010). Assessing the Impact of Eliminating Affirmative Action in Higher Education. *Journal of Labor Economics*, 28(1), 113–166
- Hoxby, C., (2009). The Changing Selectivity of American Colleges. *Journal of Economic Perspectives*, American Economic Association, vol. 23(4), pages 95-118

- Hudes, Ryan P. (2016). "Student-College Match and Bachelor's Degree Completion". Seton Hall University Dissertations and Theses (ETDs). 2211
- Ishida, H., Spilerman, S. and Su, K.-H. (1997) 'Educational credentials and promotion chances in Japanese and American organizations', *American Sociological Review* 62: 866–82.
- Jerrim, J., Chmielewski, A. K & Parker, P. (2015). Socioeconomic inequality in access to high-status colleges: A cross-country comparison. *Research in Social Stratification and Mobility*, 42 20-32. Retrieved from <https://doi.org/10.1016/j.rssm.2015.06.003>
- Karabel, J. (2005). *The chosen: The Hidden History of Admission and Exclusion at Harvard, Yale, and Princeton*. Boston: Houghton Mifflin Company
- Karabel, J., and A. W. Astin. 1975. "Social Class, Academic Ability, and College 'Quality.'" *Social Forces* 53(March):381-98.
- Kim, D. B. (2007). The effect of loans on students' degree attainment: Differences by student and institutional characteristics. *Harvard Educational Review*, 7
- Kjelland, J. (2008) *Economic Returns to Higher Education: Signaling v. Human Capital Theory; An Analysis of Competing Theories*. The Park Place Economist: Vol. 16
- Klein, M. (2010). Mechanisms for the Effect of Field of Study on the Transition from Higher Education to Work. *WP Mannheimer Zentrum für Europäische Sozialforschung*, 130.
- Klugman, J. (2012). How resource inequalities among high schools reproduce class advantages in college destinations. *Research in Higher Education*, 53(8), 803-830.
- Koffman, D., & Tienda, M. (2008). *Missing in application: The Texas Top 10% Law and Socioeconomic Diversity*. Unpublished working paper. Princeton University.
- Kuh George D. and Pascarella, Ernest T. (2004) What Does Institutional Selectivity Tell Us About Educational Quality? *Change: The Magazine of Higher Learning*, 36(5): 52-59
- Light, A. & Strayer, W. (2000). Determinants of college completion: School quality or student ability? *The Journal of Human Resources*, 39(3), 299-332.
- Liu, X., Thomas, S., & Zhang, L. (2010). College quality, earnings, and job satisfaction: Evidence from recent college graduates. *Journal of Labor Research*, 31, 183–201.
- Loury, L. D., & Garman, D. (1995). College selectivity and earnings. *Journal of Labor Economics*, 13, 289–308.
- Long, B.T. (2004). How have college decisions changed over time? An application of the conditional logistic choice model. *Journal of Econometrics*, 121 (1-2), 271-296
- Long, M. C. (2008). College quality and early adult outcomes. *Economics of Education Review*, 27, 588–602.

- Lucas, S. (2001). Effectively Maintained Inequality: Education Transitions, Track Mobility, and Social Background Effects. *American Journal of Sociology* 106: 1642–90.
- Lundberg, C. A., and Schreiner, L. A. (2004). Quality and Frequency of Faculty-Student Interaction as Predictors of Learning: An Analysis by Student Race/Ethnicity. *Journal of College Student Development*, 45(5), 549–565
- Manski, C and Wise (1983). *College Choice in America*. Harvard University Press
- Manski, C. F. (1989). Schooling as experimentation: a reappraisal of the postsecondary dropout phenomenon. *Economics of Education Review*, 8 (4), 305–312
- Marsh H. W. (1984). Self-concept: the application of a frame of reference model to explain paradoxical results. *Aust. J. Educ.* 28, 165–181.
- Mayhew, M., et al. (2016). *How College Affects Students: 21st Century Evidence that Higher Education Works*. Wiley
- McPherson, M. S., and Schapiro, M. O. *The Student Aid Game: Meeting Need and Rewarding Talent in American Higher Education*. Princeton, N.J.: Princeton University Press, 1998.
- Melguizo, T. (2008). Quality matters: Assessing the impact of attending more selective institutions on college completion rates of minorities. *Research in Higher Education*, 49(3), 214–236.
- Meyer, John W., Francisco O. Ramirez, and Yasemin Nuhoglu Soysal. (1992). World Expansion of Mass Education, 1870-1980. *Sociology of Education* 65(2)): 128–49.
- Niu, S. X., & Tienda, M. (2013). High school economic composition and college persistence. *Research in higher education*, 54(1), 30-62.
- Nora, A. (2004). The role of habitus and cultural capital in choosing a college, transitioning from high school to higher education, and persisting in college among minority and nonminority students. *Journal of Hispanic higher education*, 3(2), 180-208.
- OECD (2009, 2010 and 2016), *Education at a Glance 2009, 2010 and 2016: OECD Indicators*, OECD Publishing, <http://www.oecd.org/>
- Olson, L., and Rosenfeld, R. A. Parents and the Process of Gaining Access to Student Financial Aid. *Journal of Higher Education*, 1984, 55(4), 455–480.
- Orr, D., Usher, A., Atherton, G., Cezar, H., & Geanta, I. (2017a). *Study on the impact of admission systems on higher education outcomes Volume I: Comparative report Vol. I*. Publications Office of the European Union.
- O’Sullivan, K., Byrne, D., Robson, J., & Winters, N. (2019). *Who Goes to College via Access Routes? A Comparative Study of Widening Participation Admission in Selective Universities in Ireland and England*. *Social Inclusion*, 7(1), 38-51.
- Page M (2010) Signaling in the labor market. In: Baker E, Peterson P, McGaw B (eds) *International encyclopedia of education*, 3rd ed. Elsevier, Oxford

- Pascarella, E. T. (1980). Student-faculty informal contact and college outcomes. *Review of educational research*, 50(4), 545.
- Pascarella, E. T., & Terenzini, P. T. (1977). Patterns of student-faculty informal interaction beyond the classroom and voluntary freshman attrition. *The Journal of Higher Education*, 540-552.
- Pascarella, E. T., & Terenzini, P. T. (1979). Interaction Effects in Spady and Tinto's Conceptual Models of College Attrition. *Sociology of Education*, 52(4), 197-210.
- Pascarella, E. T., & Terenzini, P. T. (1980). Predicting Freshman Persistence and Voluntary Dropout Decisions from a Theoretical Model. *The Journal of Higher Education*, 51(1), 60-75
- Pascarella, E. T., & Terenzini, P. T. (1983). Predicting voluntary freshman year persistence/withdrawal behavior in a residential university: A path analytic validation of Tinto's model. *Journal of Educational Psychology*, 75(2), 215.
- Pascarella, E. T., & Terenzini, P. T. (1991). *How College Affects Students: Findings and Insights from Twenty Years of Research*. John Wiley & Sons.
- Pascarella, E. T., & Terenzini, P. T. (1995). The Impact of College on Students: Myths, Rational Myths, and Some Other Things That May Not Be True. *NACADA journal*, 15(2), 26-33.
- Pascarella, E.T., et al. (2006). Institutional selectivity and good practice in undergraduate education: How strong is the link? *Journal of Higher Education*, 77(2), 251-285
- Perkhounkova, Y., Noble, J.P., and McLaughlin, G. (2006). Factors related to persistence of freshman, freshman transfers, and non-freshman transfer students, AIR Professional File, N.99. The Association for Institutional Research.
- Perna, L. W. (2006). Understanding the Relationship Between Information About College Prices and Financial Aid and Students' College-Related Behaviors. *American Behavioral Scientist*, 49(12), 1620–1635.
- Porter, RK Toutkoushian (2006). Institutional research productivity and the connection to average student quality and overall reputation. *Economics of Education Review* 25 (6), 605-617
- Porter, PD Umbach. (2006). College major choice: An analysis of person–environment fit *Research in higher education* 47, 429-449
- Raabe, I. J., & Wölfer, R. (2018). What Is Going on Around You: Peer Milieus and Educational Aspirations. *European Sociological Review*.
- Radford, A. W. (2013). *Top student, top school?: How social class shapes where valedictorians go to college*. University of Chicago Press.
- Raftery, Adrian E., and Michael Hout. (1993). Maximally Maintained Inequality: Expansion, Reform, and Opportunity in Irish Education." *Sociology of Education* 66: 41-62.

- Ragan J.F., Li, D., and Matos-Diaz, H. (2011). Using admission tests to predict success in college evidence from the University of Puerto Rico. *Eastern Economic Journal* 37, 470-487.
- Rivera, L. (2011). Ivies, extracurriculars, and exclusion: Elite employers' use of educational credentials. *Research in Social Stratification and Mobility* 29 (1), 71-90
- Rivera, L. (2012). Hiring as cultural matching: The case of elite professional service firms. *American Sociological Review* 77 (6), 999-1022
- Rumberger, R.W., and Thomas, S.L. (1993). The economic returns to college major, quality and performance: A multilevel analysis of recent graduates. *Economics of Education Review*, 12: 1-19.
- Ryan, J. F. (2004). The relationship between institutional expenditures and degree attainment at bacca laureate colleges. *Research in Higher Education*, 45(2)
- Schizzerotto A. e Barone C. (2006), *Sociologia dell'istruzione*, Bologna, il Mulino.
- Schneider, M., and Preckel, F. (2017). Variables Associated With Achievement in Higher Education: A Systematic Review of Meta-Analyses. *Psychological Bulletin*. Advance online publication
- Sewell, W. H., Haller, A. O. and Portes, A. (1969). The educational and early occupational attainment process. *American Sociological Review*, 34, 82–92
- Shamsuddin, S. (2016). Berkeley or bust? Estimating the causal effect of college selectivity on bachelor's degree completion. *Research in Higher Education*, 57(7), 795-822.
- Shavit, Y. and Blossfeld, H.P. (1993). *Persistent Inequality: Changing Educational Attainment in Thirteen Countries*. Boulder (CO): Westview Press.
- Shavit, Y. et al. (2007). *Stratification in higher education: A comparative study*. Stanford University Press.
- Schofer, Evan, and John W. Meyer. (2005). The Worldwide Expansion of Higher Education in the Twentieth Century. *American Sociological Review* 70(6): 898–920.
- Skopek, J.; Triventi, M.; Buchholz, S (2019) How do educational systems affect social inequality of educational opportunities? The role of tracking in comparative perspective. 214-232
- Skopek, J., Triventi, M., Blossfeld, H. P. (2022). How do institutional factors shape PhD completion rates? An analysis of long-term changes in a European doctoral program. *Studies in Higher Education*, 47(2), 318-337.
- Smith, J., Pender, M., Howell, J. (2013). The full extent of student-college academic undermatch. *Economics of Education Review*, 32, 247-261.
- Sørensen, A. B. (1970). Organizational Differentiation Of Students And Educational Opportunity. *Sociology of Education*, 43(4), 355–376.

- Stevens, M. L., Armstrong, E. A., Arum, R. (2008). Sieve, incubator, temple, hub: Empirical and theoretical advances in the sociology of higher education. *Annual Review of Sociology*, 34, 127–151.
- Shwed, U. and Shavit Y. (2006). Occupational and Economic Attainments of College and University Graduates in Israel. *European Sociological Review* 22:431– 42.
- Spady, W. (1970). Dropouts from higher education: An interdisciplinary review and synthesis. *Interchange*, 1(1), 64-85.
- Spady, W. (1971). Dropouts from higher education: Toward an empirical model. *Interchange*, 2(3), 38-62.
- Spence, M. (1973). Job Market Signaling. *The Quarterly Journal of Economics*, 87(3), 355-374
- Terrin, É., Triventi, M. (2022). The Effect of School Tracking on Student Achievement and Inequality: A Meta-Analysis. *REVIEW OF EDUCATIONAL RESEARCH*.
- Themelis, S. (2008). Meritocracy through education and social mobility in post-war Britain: a critical examination. *British Journal of Sociology of Education*, 29:5, 427-438
- Tholen, G., Brown, P., Power, S. and Allouch, A. (2013). The role of networks and connections in educational elites' labor market entrance', *Research in Social Stratification and Mobility* 34: 142–54.
- Thurow, L. C. (1975). *Generating Inequality. Mechanisms of Distribution in the U.S. Economy*. New York
- Thurow, L. C. (1979). A Job-Competition Model. In: Piore, Michael J. (Ed.): *Unemployment and Inflation: Institutional and Structuralist Views*. New York, 17-32
- Thurow, L. C. (2000). Globalization: The Product of a Knowledge-Based Economy. *The ANNALS of the American Academy of Political and Social Science*, 570(1), 19–31
- Tinto, V. (1975). Dropout from higher education: A theoretical synthesis of recent research. *Review of educational research*, 45(1), 89-125.
- Tinto, V. (1982). Limits of Theory and Practice in Student Attrition. *The Journal of Higher Education*, 53(6), 687-700.
- Tinto, V. (1987). *Leaving College: Rethinking the Causes and Cures of Student Attrition*. University of Chicago Press, Chicago, IL.
- Tinto, V. (1988). Stages of Student Departure: Reflections on the Longitudinal Character of Student Leaving. *The Journal of Higher Education*, 59(4), 438-455.
- Tinto, V. (1993). *Leaving College: Rethinking the Causes and Cures of Student Attrition* (2nd ed.). University of Chicago Press, Chicago, IL.

- Tinto, V. (2006). Research and practice of student retention: What next? *Journal of College Student Retention: Research, Theory and Practice*, 8(1), 1-19.
- Titus, M. A. (2004). An examination of the influence of institutional context on student persistence at 4-year colleges and universities: A multilevel approach. *Research in Higher Education*, 45(4), 673-699.
- Titus, M. A. (2006). Understanding college degree completion of students with low socioeconomic status:
- Toutkoushian, R. K. (2001). Do parental income and educational attainment affect the initial choices of New Hampshire's college-bound students? *Economics of Education Review*, 20(3), 245–262.
- Triventi, M. (2010). L'istruzione terziaria in prospettiva comparata. Assetti istituzionali, partecipazione e disuguaglianze sociali. [PhD. Thesis] University of Milan
- Triventi, M. (2011). Stratification in higher education and its relationship with social inequality. Evidence from a recent cohort of European graduates. *European Sociological Review*
- Triventi, M. (2013) 'The role of higher education stratification in the reproduction of social inequality in the labor market', *Research in Social Stratification and Mobility* 32: 45–63.
- Triventi, M. Skopek, J.; Kulic, N.; McMullin, P.; Buchholz, S.; Blossfeld, H. P., (2016). Differentiation in secondary education and social inequality in educational opportunities. Results from a large-scale international comparison. in *ŽURNAL SOCIOLOGII I SOCIALNOJ ANTROPOLOGII*, v. 88, n. 5 (2016), p. 54-75
- Trow, M. (1972) 'The expansion and transformation of higher education', *International Review of Education* 18: 61–84.
- Trow, M. (2007). Reflections on the Transition from Elite to Mass to Universal Access: Forms and Phases of Higher Education in Modern Societies since WWII. In: Forest, J.J.F., Altbach, P.G. (eds) *International Handbook of Higher Education*. Springer International Handbooks of Education, vol 18. Springer, Dordrecht
- Trusheim, D., Crouse, J. (1981) Effects of college prestige on men's occupational status and income. *Res High Educ* 14, 283–304
- Vossensteyn, H. et al. (2015). Dropout and completion in higher education in Europe: main report.
- Weber, M. (1978). *Economy and society: An outline of interpretive sociology*. Edited by Guenther Roth and Claus Wittich. Berkeley: Univ. of California Press.
- Wood, A., and Murray, H. (1999). Effects of teacher enthusiasm on student attention, motivation, and memory encoding. Paper presented at the annual meeting of the American Educational Research Association, Montreal, Canada.

Weiler, W. (1994). Transition from consideration of a college to the decision to apply. *Research in Higher Education*, 35(6), 631–646.

Windolf, P. (1997). *Expansion and Structural Change: Higher Education in Germany, the United States, and Japan, 1870-1990* (1st ed.). Routledge.

Zhang, L. (2005) ‘Do measures of college quality matter? The effect of college quality on graduates’ earnings’, *Review of Higher Education* 28: 571–96.

Zhang, L. (2008). The way to wealth and the way to leisure: The impact of college education on graduates’ earnings and hours of work. *Research in Higher Education*, 49, 199–213.

Do University Rankings affect Student Enrolment Patterns in Italy? A panel data analysis

Abstract.

Amidst rising participation rates, costs, and university supply diversification, demands for information about university institutions have grown. Neoliberal trends have heightened the need for transparency, efficiency, and accountability, resulting in the proliferation of university rankings. While the methodology of these rankings has been extensively debated, their impact on students' educational choices has received less attention. We aim to investigate the impact of these rankings and selectivity on student enrolment within Italy's evolving higher education landscape. Employing fixed effect regression models, enhanced by spatial models to capture spillover effects, the study analyzes enrolment patterns. This analysis is based on data from the MIUR archive, Censis-La Repubblica rankings, and Scheda-SUA records from 2003 to 2011. Aligning with expectations, findings reveal that Censis rankings positively affect enrolments. Notably, selectivity negatively impacts overall enrolments. Intriguingly, this effect diminishes significantly, dropping to less than half, when focusing on high-performing students.

Introduction

The surge in tertiary education enrolment worldwide prompts concerns about over-qualification, labor market impacts, and the diminishing value of higher education qualifications due to massification, potentially leading to degree inflation. This phenomenon prompts heightened emphasis on distinctions between institutions, such as their quality or prestige, especially when vying for coveted employment opportunities. This evolution has led to an increasing stratification within higher education, where institutions vary significantly in the quality of educational offerings they provide. Empirical studies emphasize this growing disparity, indicating that certain institutions ensure better career outcomes for their graduates (Brand and Halaby, 2006; Long, 2008; Liu et al., 2010; and Zhang, 2008). Consequently, it becomes crucial to consider access to higher education not merely in terms of students' participation but also in terms of the specific institutions they attend.

A second important feature in higher education is the emergence of neoliberal trends. The neoliberal theories involve the priority of the market, the system of competition, and the reduction of the welfare state (Friedman, 1981, 1991). These political and economic globalization theories have repercussions on higher education (Kandiko, 2010). The resulting changes include privatization, commercialization, and corporatization (Slaughter and Leslie, 1997). These neoliberal trends in education have boosted competition among institutions. Due to the intensifying international and domestic competition amongst higher education institutions, HEIs are increasingly behaving as corporations, exploiting managerial techniques to improve the quality of their educational offer and services they provide to students and the academic staff (Telford and Masson, 2005).

Increasing participation rates (Bowman and Bastedo, 2011), higher costs (Bowman and Bastedo, 2009; Hazelkorn, 2012), and growing and diversification of the university supply (Dill and Soo, 2005), have led to a growing demand for information about university institutions (Veloutsou, 2004). Also, neoliberal trends of HEIs have led to increasing demands for transparency, efficiency, and accountability. Consequently, to meet these demands, rankings of higher education institutions and programs have emerged. Rankings were produced by magazines, newspapers, research centers, as well as several governing institutions. The rise of new forms of mass communication and the global spread of the internet and networks have favored access to information, leading to a growth in publications of university guides. University guides were published to satisfy the growing need for information. Over the last decade, the number and type of rankings have grown all over the world, providing both national and international guides aiming at satisfying a “public demand for transparency and information that institutions and government have not been able to meet on their own” (Usher and Savino, 2006). Today, university rankings exist in more than 50 countries, while

global rankings are getting more and more popular (Hazelkorn, 2012). They are nowadays believed to be an important tool through which prospective students can gather information for their educational choices, as well as marketing devices for university institutions (Amsler and Bolsmann, 2012).

However, while the methodology used to create these rankings has been widely debated (Van Dyke, 2005), the issue of the impact they have on students has been addressed less extensively. This strand of research is popular, especially in the USA, where scholars have studied the effects of the rankings produced by private intermediaries, especially newspapers or research centers (e.g. the US News & World Report College Rankings) on students' educational choices (McManus-Howard, 2002; Bowman and Bastedo, 2009; Luca and Jonathan, 2013). Whereas studies on the Italian case are very few. Most empirical evidence on educational choices focuses on the demand side. They have investigated the individual determinants of matriculation decisions and the role of socioeconomic characteristics in HE participation concerning the issue of low intergenerational mobility in educational attainment (Barone, Triventi, and Assirelli, 2018), without considering the decision of where to go to university. There are however some exceptions that analyze the role of supply-side attributes in shaping educational choices in Italy (Ciriaci, 2013). What these studies have in common is that they often analyze university rankings at the institutional level, less often the focus is on faculties or departments: there is indeed variability in quality and reputation between different faculties within the same institution. Furthermore, these are cross-sectional studies that often look at only one measure of institutional quality. Finally, a further limitation of these studies is that they do not consider restricted admissions when dealing with enrolments. Selectivity in access may be an important supply-side attribute that drives students' educational decisions, significantly limiting their chances of getting enrolled. Additionally, conceptually we here distinguish between institutional quality and selectivity: two university attributes that have often been conceived as interchangeable in empirical research and theoretical discussions. University quality, here expressed by rankings, represents the holistic assessment of an institution's educational offerings, resources, faculty, student support, and outcomes. On the other hand, selectivity primarily focuses on the standards and criteria used during the admissions process to accept students into the institution.

We aim to fill this research void in Italy by providing a panel data analysis that looks at how rankings and selectivity variations lead to variations in enrolment rates. We focus not only on enrolments in general but also on enrolments of specific groups of students, that is high achieving students and students that graduated from the academic track. Moreover, we analyze at the faculty level different

disaggregated dimensions of institutional quality, focusing on four indicators that compose the overall quality ranking.

By employing fixed effect regression models, we aim to investigate the effect of university quality rankings produced by private intermediaries on students' enrolments in Italy. We use a unique dataset coming from two different data sources, that is the MIUR archive and the Censis-LaRepubblica rankings. We then merge information about selectivity at the faculty level using data extracted by the Scheda-SUA³ of every degree course offered by public universities in Italy from 2003 to 2011. This dataset represents, to our knowledge, an unicum, as such detailed data coming from Censis rankings are unpublished.

Italy represents an interesting case study. An important feature of the Italian education system is the presence of the so-called legal value of HE qualifications. According to this principle, any university diploma of the same level issued by Italian institutions has the same weight in accessing the public sector labor market, thus making all Italian universities formally equal. However, in the last decades, the Italian education system has undergone several organizational changes (e.g. reduction of public funding of universities) which have resulted in greater autonomy of HE institutions and higher differentiation. Nevertheless, for a long time in Italy, there was no official guide or an overall evaluation of university institutions. Since the early 2000s, popular newspapers, such as La Repubblica and Il Sole 24 Ore have made up for this lack of information by publishing detailed rankings and collecting information about the entire body of university institutions.

This paper is organized as follows: the first part is devoted to the review of the literature, followed by the description of the Italian context. We end this theoretical section by exposing our research hypothesis. The second part is dedicated to the presentation of the data and the methodology we employ, while the third part reports some descriptive statistics for both the dependent and independent variables. The main results on enrolments and enrolments of top students are shown in section four. The last section is reserved for the conclusions and some further developments of this paper.

³ Scheda-Sua" refers to the "Scheda di Segnalazione Unica per l'Accesso," which translates to "Single Report Card for Access." It's a document used in the process of applying for undergraduate degree programs at Italian universities.

1. University Quality Rankings and Related Literature

Increasing participation rates to HE, higher costs, and value-for-money concerns have contributed to turning educational decision-making into a more complex process. In the sociological literature, college choice has often been conceptualized as a three-stage process. During this process, high school students develop certain predispositions to attend tertiary education, search for general and specific information, and make choices about what institution of higher education to attend (Cabrera and La Nasa, 2000). Research on the final stage of the student educational decision-making process has focused on single universities and their specific institutional characteristics (Nora, 2004). According to the result of these studies, there are several institutional attributes that students consider important when choosing what university to attend, that are: (a) specific academic programs, (b) affordable tuition costs, (c) financial aid availability, (d) general academic reputation/general quality, (e) location (distance from home), and (f) size (Nora, 2004).

The role of HE supply-side characteristics in shaping individual educational choices has been mostly studied in the US literature, focusing particularly on how the private costs of higher education and institutional quality relate to participation and enrolment choices. According to Hazelkorn (2012), in the last decades, students have started adopting a consumerist approach, assessing their educational choices as an opportunity cost. Similarly, James et al. (1999) suggest that students seek to “maximize the payoff from their academic results in a largely reputational market” in “which the implicit ranking of institutional prestige is closely associated with entry scores”.

However, students are not a homogeneous group. Indeed, several individual and socio-economic characteristics influence educational choices. Furthermore, most students are not aware of the costs and benefits of education in general and of attending a particular institution (Brewer et al, 2002). There are few empirical studies and little knowledge regarding the effect of research quality on the capacity of HE to attract students. For research quality to influence student enrolment, high school graduates must be aware of the positive association between their educational choice and their returns in the labor market. However, some students, especially those from lower socio-economic backgrounds, do not have thorough information about institutional quality (Hazelkorn, 2012).

The effect of ratings and rankings of higher education institutions produced by private intermediaries on student enrolment decisions has been mostly investigated in the USA. Generally, empirical research demonstrated that rankings have a positive effect on student enrolment decisions however there is some variation among those studies. For example, Bowman and Bastedo (2009) found that moving onto the front page of the U.S. News rankings leads to a boost in the following year’s admissions indicators for all institutions. Furthermore, the effect of moving up or down within the

top tier has a stronger impact on top institutions. However, several studies also point out that the way information is presented is important. According to Luca and Jonathan (2013), highly ranked universities are found to be more attractive to new students when those institutions are listed by their ranking rather than in alphabetical order. Empirical studies in the US also show that rankings are especially important for high-ability students. According to Spies (1978), high-achieving students tend to make educational choices independently from financial factors and give more importance to e.g. the prestige of the academic institution; these students are more likely to choose higher ranked institutions even if the score in the rank is slightly higher than the score of the institution ranked in a lower position. Furthermore, as distance to college increases, students tend to take more into account rankings in their choice (McManus-Howard, 2002); similarly, students choosing private universities are more sensitive to the information about institutional quality contained in league tables (Hazelkorn, 2012).

This line of research is popular also in the UK, where researchers have assessed the effect on educational choices of the rankings focusing particularly on those produced by popular newspapers such as *The Guardian* or *The Times*. These studies generally find a positive effect as well. Moreover, similarly to the US, also UK studies confirm that how the information is presented matters. Gibbons et al. (2015) show that rankings are positively associated with enrolment choices, but also this impact is greater for more able students, for more selective universities, and for subject departments where there is more competition. Furthermore, they found that information contained in the league tables is more salient.

Studies on the Italian case have focused mainly on individual choices without explicitly considering the role of HE policies (Ciriaci, 2013). In particular, they have studied the factors influencing participation decisions (Barone et al., 2017, 2018) and the role of parental background in HE participation concerning the issue of low intergenerational mobility in educational attainment (Barone, Triventi, and Assirelli, 2018), without taking into account the decision of where to go to university. There are however some exceptions. For example, Bratti et al. (2008), investigated the association between the geographical distribution of higher education supply and educational attainment. Employing a quasi-experimental design, they found that the cost reduction linked to the possibility of enrolling without having to move to another location positively affected the participation of HE of socioeconomically disadvantaged students. In 2019 Bratti and Verzillo investigated whether research quality is positively associated with the enrolments of students coming from other provinces in Italy. Their results suggest that research quality is a significant predictor of student enrolment. Furthermore, Bratti and Biancardi (2018) evaluated the impact of the first Italian Research Evaluation Exercise (VTR 2001- 2003) on enrolment choices. Their results show a positive

impact of VTR on enrolments and also demonstrate that the effects are larger for high-achieving students, namely those with better high school final marks.

Italian studies on the HE supply side have also contributed to a more migration-oriented literature. Ciriaci (2013) investigated the determinants of moving-to-study decisions of Italian high school graduates. Ciriaci found that both research and teaching quality of HE institutions are likely to affect students' moving. Pignini and Staffolani (2016) analyze the effects of costs, geographical accessibility, and university quality on enrolments and the characteristics of the enrollees, in terms of educational and socioeconomic backgrounds. Their results suggest that lower costs and a more even distribution of HE institutions are positively associated with enrolments by students from lower socio-economic backgrounds. While talented students are more likely to choose higher-quality institutions regardless of their educational and socio-economic backgrounds.

2. Institutional Background

Over the years, several reforms have concurred in shaping the Italian university system, granting institutions increasing organizational and financial autonomy. This has led to a major differentiation of university degrees and an increase in the aggregate supply of university slots, particularly in the southern regions of the country.

The 1960s marked the transition from an elite to a mass education system, which led to greater participation in tertiary education by children of families from all social classes. As a result, the growing demand led, especially in the 90s, to a greater differentiation of the educational offer. Between the end of the 1980s and the beginning of the 1990s the reforms guaranteed universities a greater level of autonomy, especially for the management of teaching and the financial resources made available. At the same time, parliamentary approval was no longer required for the establishment of new courses, while on the contrary, the requirement for inclusion in a university development plan was still in force. Many institutions have used this new autonomy to set up new offices in the more peripheral cities and to expand their educational offer. The growing differentiation of the university supply has contributed to widening the quality gap between higher education institutions (Bratti and Biancardi, 2018).

In 2001, following the Bologna process, the structure of the Italian university system turned into a two-tier system in line with the other European countries. Italian students, after obtaining the secondary school diploma, can choose to attend a three-year undergraduate course. If they complete it, they will obtain a first-level or bachelor's degree (*Laurea triennale*). Afterwards, students have two options: either enroll in a first-level master course or attend a further 2-year cycle of graduate courses that leads to obtaining the second-level degree (*Laurea magistrale*). Only for those who

attained their graduate degree, the Italian system offers either Ph.D. programs or a variety of specialization alternatives. The Bologna process further marked the transition to a mass education system. The sharp increase in the aggregate supply of university slots and programs has made it difficult for high school leavers to make their educational choices. Consequently, prospective students were increasingly interested in knowing the relative quality of institutions and university programs. For this reason, two of the main Italian newspapers (*Il Sole 24 Ore* and *La Repubblica*) began in 2001 to publish annual rankings of Italian universities and faculties.

In December 2010, a comprehensive reform (Law 240/2010, the so-called ‘Gelmini reform’) changed further the institutional and organizational assets of the Italian public institutions, guided by the principles of autonomy and accountability (Donina, et al., 2013). One of the major features of the Gelmini law is the profound reformation of the internal organizational structures. According to Previous legal guidelines, faculties, and departments are the internal organizational units of Italian academic institutions, with their competencies and duties, but without a specified size. With the 240/10 law a single internal academic structure is established, grouping faculties and (old)departments into the new departments that take on the duties and responsibilities of the previous structures. These new organizational units have a maximum of 12 ‘connection structures’ to coordinate teaching staff, and their activities and manage common services.

For this paper, an important characteristic of the Italian education system is its high degree of centralization. The Ministry of Education, University, and Research (MIUR) has full authority over the programs and funding of the education system, its regulation, as well as personnel recruitment. Consequently, any variation in the university supply has to be centrally authorized: this includes both the opening of new institutions and the contents of the university degrees and programs offered. The Regional School Authorities as peripheral branches of MIUR are responsible for implementing the regulations and policies transmitted by the national government. A high degree of centralization of the education system together with low horizontal differentiation led to the recognition of the “legal value” of the academic qualification, according to which graduates were considered to be at the same level of skills and knowledge regardless of the university in which they had obtained the qualification.

2.1 Hypotheses

Based on the theoretical section described above, we can formulate our hypotheses. International empirical studies consistently report a positive association between rankings and enrolments. University choices are the result of a long and complex process. Research on the final stage of the student educational decision-making process has focused on single institutions and their specific institutional characteristics (Nora, 2004). According to the result of these studies, general

academic reputation/general quality are institutional attributes that students mostly consider important when choosing what university to attend. However, students to make their choice, need information about institutional quality. Rankings meet the demand for information from high school students who are about to make their choice of where to study. This leads us to our first hypothesis:

H1. The higher the quality ranking, the higher the total number of enrolments.

Moreover, several international empirical studies demonstrate how top students are more likely to select themselves for high-quality institutions (Cook and Frank, 1993; Nurnberg, et al., 2012). Together with this, the literature on the rankings effects confirms how top students are more sensitive to rankings publications (Hazelkorn, 2012)

H2. The higher the ranking, the higher the enrolments of top students..

Last, our dataset includes four separate indicators of university quality, that are productivity, research, teaching, and internationalization (for detailed information see the next paragraph). Following the literature previously exposed and since these are disaggregated dimensions of institutional quality, we expect all indicators to have not a negative effect on total enrolments and enrolments of high achieving students. We do not formulate any precise hypothesis about the importance given by students to each of the indicators, since the literature, to our knowledge, does not suggest any expectations about what indicator students consider as more important than the other.

However, empirical studies have failed to consider separately the concepts of institutional quality and selectivity. This is not unreasonable as selectivity, at least in the US, is one of the dimensions encompassing institutional quality. For instance, The US News & World Report College Rankings employ students' selectivity to assess and rank colleges and universities: Factors such as acceptance rate, SAT/ACT scores of admitted students, and the proportion of admitted students who enroll are considered to assess the institution's selectivity. Additionally, it's important to note that while selectivity might influence an institution's reputation, it doesn't inherently determine the quality of education or the overall experience students receive at a university. Some highly selective institutions might excel in both selectivity and quality, but numerous excellent universities are less selective or have more inclusive admissions policies.

Due to its inherent nature, we expect selectivity to have a negative effect on overall enrolments. As the faculty's selectivity level increases, the number of enrollees tends to decrease. This occurs because selective requirements are designed to balance the trade-off between quantity and quality of students, thereby limiting access for some applicants. As the level of selectivity intensifies, it significantly

enhances the faculty's ability to refine and maintain a high standard of academic prowess, which consequently may reduce the total number of students admitted. Formalizing:

H3: The higher the selectivity level, the lower the number of enrollees

On the other hand, for top-performing students, the impact of selectivity can lead to a somewhat different set of expectations compared to general enrolments: because of their superior academic skills, they may be more competitive candidates, increasing their likelihood of securing admission to highly selective universities or programs. Hence, we hypothesize that:

H4: Institutional selectivity does not affect top students' enrolments.

Going back to quality rankings, we think that the above hypotheses may slightly change when controlling for selectivity. Institutions known for high-quality academic programs, esteemed faculty, strong research, and student support services often attract students irrespective of selectivity. However, institutional selectivity acts as a barrier irrespective of students' attraction to one specific faculty or degree program. When considering institutional selectivity in our analyses, we hypothesize the impact of quality rankings on overall enrolment could be attenuated by the degree of selectivity. In highly selective faculties, the effect of quality rankings might still exist, but its direct influence on enrolment might be tempered by the constraints imposed by selectivity. Conversely, it is plausible that top-performing students may experience fewer constraints imposed by selective requirements. As a result, they could have the freedom to choose an institution or degree program that best aligns with their preferences and academic aspirations. That means we hypothesize that quality rankings still affect top students' enrolment, irrespective of the level of selectivity.

3. Data, Method and Variables

The analysis is based on data from two main sources. The first one comes from the archives of the Ministry of Education, Universities, and Research (MIUR), which provides us with information about the number of students newly enrolled in the first year of any three-year degree course offered by public Italian universities for every year starting from 2003 to 2011. This period has been chosen due to both availability of data and methodological issues. Furthermore, our substantial interest in this particular timeframe stems from the shift from an undifferentiated system to one in which market logics, such as rankings, start to exert influence. The year 2003 represents the first year for which we can have available data from both our data sources. The ending period is the year 2011 since, out of the Italian law no.240 30/12/2010, from the a.y. 2012 faculties have been substituted by and grouped into new organizational structures, i.e. departments. That means, from the year 2012 on, the base unit

changes, undermining our unit of analysis, which should change accordingly. These archives also provide us with the number of newly enrolled students by upper secondary school diploma and final grade. From MIUR databases we also derive information about selectivity for each degree course in each Italian university from 2003 to 2011. Information has been extrapolated from the Scheda-SUA of each degree program.

The second data source comes from the statistical institute Censis. Censis in collaboration with the national newspaper La Repubblica from 2001 has annually released reports regarding university quality indicators. The report includes an annual quality ranking of HEIs by faculty (the so-called Censis-Repubblica University Guide). The Censis-Repubblica ranking is based on a composite index that includes several university quality dimensions, namely student performance, research and teacher quality, and international cooperation. These rankings are published both online and in a more detailed hardcopy version.

The position in the ranking of the individual faculties of state Italian universities is based on the analysis of 4 families of indicators: productivity, teaching, research, and international relations.

Tab1. Quality ranking indicators description

Productivity	Teaching	International Relations	Research
a) persistence rate between I and II years. b) credit regularity index. c) rate of regular enrolments to the three-year and single-cycle degree courses. d) regular enrolment rate for specialist and master's degree courses. e) regularity rate for graduates in three-year and single-cycle courses. f) regularity rate for graduates in specialized degree courses.	a) Faculty member ratio per credits (CFU) delivered. b) role teachers by enrolled. c) classroom seats per enrolled. e) researcher / full professor ratio. f) monitored teachings / total teachings.	a) mobility of exiting students. b) mobility of entrance students. c) host universities. d) international opportunities. e) double title or joint degree courses.	a) the average number of research units financed by the PRIN program in the three years 2006-2008 per role professor. b) average financing obtained from the research units financed by the PRIN program. c) projects submitted for co-financing within the PRIN per teacher program. d) success rate of participation in the PRIN program. e) average financing for international search by role teacher. f) research projects financed by the sixth and seventh programs of research and development by the role professor. g) average financing for FIRB research projects.

The final score is nothing but an arithmetic mean of the summary scores of the indicators. The evaluation system that determines the ranking of the state faculties will be described in greater detail below, further analyzing the methodology used for calculating both the individual indicators and the summary score of the evaluation families. It is built using five different classes of quantitative indicators: Productivity, teaching, international relations and research (described in tab.1).

To assess selectivity, we rely on information provided by MIUR for each degree program, indicating the type of access, categorized into three groups: 1) nationally restricted access, 2) locally restricted access, and 3) free access. To consolidate this selectivity information at the faculty level, we calculate the ratio of selective degree programs to the total number of degree programs within each faculty. This calculation yields a continuous variable representing the degree of selectivity across each faculty.

Finally, we include as a control variable an indicator of the number of degree courses offered within one faculty. This program supply variable helps us account for the establishment of new programs within a faculty. The variation in the number of degree programs may indeed have an effect on the number of enrollees.

3.1 Method and Variables

To assess the effects of degree program quality and selectivity on enrolments, we develop a panel data analysis, using university-faculty fixed effect regression models. The advantage of using fixed-effect models is that they control for time-invariant unobserved heterogeneity that may potentially influence the number of enrollees and enrolments of high-achieving students. Since fixed-effect models only estimate within effects, they are not affected by heterogeneity bias. In all our models we include both spatial and temporal fixed effects.

Using the merged dataset described above and covering a time period starting from 2003 to 2011, we regress our four outcome variables separately first on the mean score and then on the four university quality indicators that compose the quality score. Aside from the two specifications we present three distinct regression models. The first is our baseline model, which can be formalized as follows:

$$\text{Ln}(\text{enroll})_{it} = \alpha_{it} + \beta_1 X(\text{rank})_{it} + \tau_i + \mu_t + u_{it}$$

where the natural logarithm of enrolments of faculty i at time t (Ln enr) is a linear function of the mean score of the rankings X_{it} . τ and μ represent respectively temporal and spatial university-faculty fixed effects. Since we have transformed our outcomes variables into logarithms, the interpretation of the regression coefficients is in terms of the elasticity. In this form the interpretation of the coefficients is how a unit change in the independent variable affects the percentage impact on the dependent variable.

In this baseline model, we assume that the rankings published in a specific year (usually every year in July) have an immediate effect on enrolments (September) in the same year. However, as pointed out in the theoretical section, enrolments are the result of a long and complex process. Therefore, it is plausible to presume that the choice of where to study occurs before the rankings' publication of the same year. For this reason, in our second model, we substitute our indicators lagged dependent variables for $t-1$, that is we hypothesize that the rankings published in year A affect enrolments in the following year B.

We have four dependent variables at the faculty level, namely total number of first enrolments for each faculty in each Italian university institution, the total number of first enrollees that graduated from the academic track, the total number of newly enrolled high achieving students (students who graduated from upper secondary school with a final mark of 90 or more), and the number of first enrolments of high achieving students that graduated from the academic track.

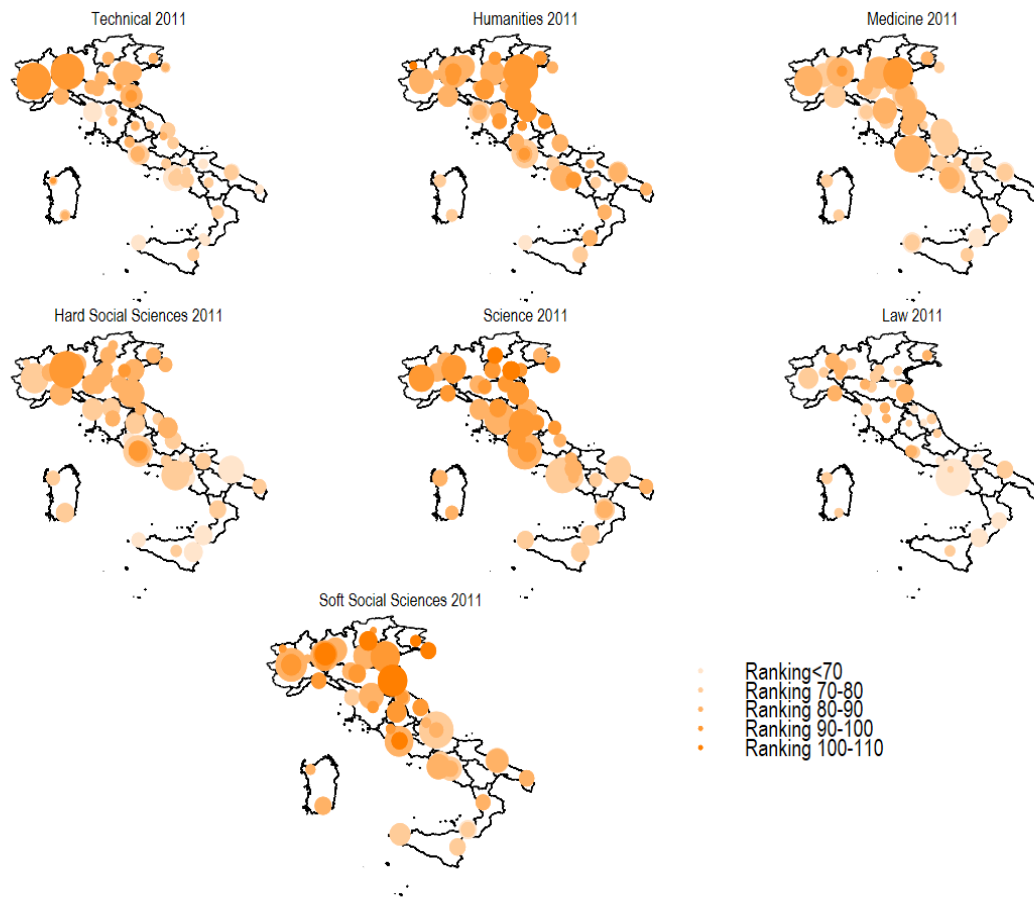
The independent variables have been computed for each faculty in each Italian university and comprehend the four institutional quality indicators described in the previous section and the quality score, which is simply the arithmetic mean resulting from the four indicators. These are all continuous variables that have been standardized. Finally, one last variable we use is the type of institution. Type of institution is a dummy variable that takes on value 0 when the institution is public and 1 for private institutions.

Our final analytical sample comprises 430 faculties distributed across 60 public universities monitored over the period from 2003 to 2011. For each university, we tracked the various faculties and associated them with indicators of ranking and selectivity. Some faculties are not included. However, this does not affect the representativeness of the data.

4. Descriptive Results

The descriptive evidence within this paper aims to examine the distribution of institutional quality on enrolments across different scientific areas. The figures included in this analysis consist of seven maps, each corresponding to a distinct scientific field. These maps effectively illustrate the distribution of enrolments and institutional quality rankings within each area. The representation employs dots to signify individual faculties, wherein larger dots indicate higher enrolment numbers. Additionally, the color intensity of these dots reflects the faculty's ranking placement, providing a visual representation of both enrolment magnitude and institutional quality.

Fig.1 Distribution of enrolments and quality ranking by scientific area.



Interestingly, a discernible pattern emerges from these maps, revealing a significant geographical disparity. Specifically, there appears to be a concentration of high-quality faculties in the northern regions of Italy. This spatial trend extends to the enrolment distribution, indicating that areas with greater institutional quality also attract higher enrolments. This observation suggests a correlation between the geographic distribution of high-quality educational institutions and the resulting enrolment figures, highlighting a potential influence of institutional quality on student choices and enrolment patterns.

5. Main Results

Here we present the results of our panel analysis for each of the dependent variables. Each table reports the results of our baseline model in columns (1), (2), (3) and (4); while in columns (5), (6), (7), and (8) we focus on fixed effects models including lagged independent variables (t-1). Each model consists of four specifications, the first includes only the quality score and the second

specification adds an indicator of selectivity. The third specification includes all the other four quality indicators, namely productivity, teaching, research, and international relations⁴. The fourth adds selectivity to the indicators.

Table 2. reports the results of university-faculty fixed effect regression models of overall new enrolments, including three specifications for each type of indicator, that is same-year and lagged indicators. We show that the Censis-Repubblica rankings affect new enrolments. Looking at the first column, the results of the fixed effect regressions show a positive statistically significant effect of the quality score on enrolments.

When we add selectivity, the effect of the quality score decreases, whereas selectivity exerts a not surprisingly negative effect on total student enrolments: showing a decrease by -60 enrollees for a one standard deviation (SD hereafter) increase in selectivity.

Tab. 2 Fixed-effect linear regression of the number of newly enrolled students: coefficients, robust standard errors, and level of statistical significance (***) $p < 0.01$, ** $p < 0.05$, * $p < 0.1$)

	Newly Enrolled							
	FE Models		FE Model with Indicators		FE Model t-1		FE Model with indicators t-1	
	1	2	1	2	1	2	1	2
Quality score	0.13*** (0.02)	0.12*** (0.02)			0.10*** (0.02)	0.10*** (0.02)		
Internationality			-0.03 (0.02)	-0.04 (0.02)			-0.06 (0.01)	-0.06 (0.01)
Teaching			0.06*** (0.01)	0.05*** (0.01)			0.05*** (0.01)	0.04** (0.01)
Research			0.08*** (0.01)	0.07*** (0.01)			0.07*** (0.01)	0.07*** (0.01)
Productivity			0.05 (0.01)	0.04 (0.01)			0.03* (0.01)	0.03* (0.01)
Selectivity		-0.11*** (0.01)		-0.11*** (0.01)		-0.07*** (0.01)		-0.07*** (0.01)
Program Supply	0.52*** (0.03)	0.52*** (0.03)	0.51*** (0.03)	0.51*** (0.03)	0.54*** (0.03)	0.54*** (0.03)	0.53*** (0.03)	0.52*** (0.03)
Constant	5.84*** (0.01)	5.85*** (0.01)	5.84*** (0.01)	5.85*** (0.01)	5.84*** (0.01)	5.84*** (0.01)	5.84*** (0.01)	5.84*** (0.01)
Obs.	2692	2692	2692	2692	2331	2331	2331	2331
TIME FE	YES	YES	YES	YES	YES	YES	YES	YES
SPATIAL FE	YES	YES	YES	YES	YES	YES	YES	YES

⁴ The various indicators produced by CENSIS are presented in the Appendix (Figures A1 and A2). All standardized indicators follow a normal distribution, except for international relations, which exhibits a left-skewed distribution. Figure A2 illustrates the correlations between each quality indicator and the quality ranking. All variables show positive correlations, ranging from a minimum of 0.25 to a maximum of 0.74.

Focusing on the single indicators, the third column reports a positive and significant effect of research and teaching, meaning that students seem to be more attracted by these two faculty attributes. Adding selectivity does not change the results.

Moving at fixed effect regressions with lagged indicators, we find similar results, however the effect is weaker. As shown in the last column, students seem to be attracted mostly by how well the faculty does in research, and teaching, also the year after the publication of the rankings.

Table 3 reports the results of the fixed effects model for our second outcome, that is new enrolments by students that obtained their diploma from an academic track in high school. Similarly, to tab.1, the baseline fixed-effect model indicates that there is a positive effect of the faculties' quality score on new enrolments from students that graduated from the academic track. Whereas, looking at the second specification, selectivity has no effect on enrolment for this student category. The third column shows similar results to tab.1: students seem to be more attracted by faculties with better research quality and teaching. When we use lagged independent indicators, the situation does not change: there is a positive, although weaker, effect of research on enrolments, and teaching is not statistically significant anymore.

Tab. 3. Fixed-effect linear regression of the number of newly enrolled students with *Maturità liceale*: coefficients, robust standard errors and level of statistical significance (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$)

Newly Enrolled with <i>Maturità Liceale</i>								
	FE Models		FE Model with Indicators		FE Model t-1		FE Model with indicators t-1	
	1	2	1	2	1	2	1	2
Quality score	0.11*** (0.02)	0.11*** (0.02)			0.09*** (0.02)	0.09*** (0.02)		
Internationality			-0.06 (0.02)	-0.06 (0.02)			-0.10*** (0.02)	-0.10*** (0.02)
Teaching			0.06*** (0.01)	0.06*** (0.01)			0.05*** (0.01)	0.05*** (0.01)
Research			0.08*** (0.01)	0.08*** (0.01)			0.08*** (0.02)	0.08*** (0.02)
Productivity			0.02 (0.02)	0.02 (0.02)			0.02 (0.02)	0.02 (0.02)
Selectivity		-0.02 (0.01)		-0.02 (0.01)		-0.00 (0.02)		-0.01 (0.02)
	0.54*** (0.03)	0.54*** (0.03)	0.53*** (0.03)	0.53*** (0.03)	0.55*** (0.04)	0.54*** (0.04)	0.53*** (0.04)	0.53*** (0.04)
Constant	5.15*** (0.01)	5.15*** (0.01)	5.15*** (0.01)	5.15*** (0.01)	5.17*** (0.01)	5.17*** (0.01)	5.17*** (0.01)	5.17*** (0.01)
Obs.	2692	2692	2692	2692	2331	2331	2331	2331
TIME FE	YES	YES	YES	YES	YES	YES	YES	YES
SPATIAL FE	YES	YES	YES	YES	YES	YES	YES	YES

The following tables (4) and (5) report the results on enrolments of high-achieving students. Table 4 shows fixed-effect models on students enrolled who graduated from any upper secondary school with a high mark (from 90 or more out of 100). Table 5 shows the effect of institutional quality indicators on enrolments of students who graduated from an academic track high school with a high mark. Moving to the results, in the first column of tab.4 we see that there is a positive effect of the quality score on enrolments of high-achieving students. Adding selectivity, the effect of the quality score is weaker, whereas selectivity turns now significant and still negative.

Tab. 4 Fixed-effect linear regression of the number of newly enrolled high-achieving students: coefficients, robust standard errors and level of statistical significance (***) $p < 0.01$, ** $p < 0.05$, * $p < 0.1$)

Best High School Graduates								
	FE Models		FE Model with Indicators		FE Model t-1		FE Model with indicators t-1	
	1	2	1	2	1	2	1	2
Quality score	0.14*** (0.02)	0.11*** (0.02)			0.14*** (0.03)	0.12*** (0.03)		
Internationality			-0.05 (0.02)	-0.06 (0.02)			-0.07 (0.03)	-0.07 (0.02)
Teaching			0.07*** (0.02)	0.07*** (0.02)			0.09*** (0.02)	0.08*** (0.02)
Research			0.08*** (0.02)	0.06*** (0.02)			0.05** (0.02)	0.05** (0.02)
Productivity			0.06** (0.02)	0.05* (0.02)			0.05* (0.02)	0.05* (0.02)
Selectivity		-0.22*** (0.02)		-0.22*** (0.02)		-0.17*** (0.02)		-0.17*** (0.02)
Program Supply	0.68*** (0.04)	0.68*** (0.04)	0.67*** (0.04)	0.67*** (0.04)	0.69*** (0.04)	0.69*** (0.04)	0.68*** (0.04)	0.68*** (0.04)
Constant	4.17*** (0.01)	4.19*** (0.01)	4.17*** (0.01)	4.19*** (0.01)	4.14*** (0.01)	4.14*** (0.01)	4.14*** (0.01)	4.14*** (0.01)
Obs.	2692	2692	2692	2692	2331	2331	2331	2331
TIME FE	YES	YES	YES	YES	YES	YES	YES	YES
SPATIAL FE	YES	YES	YES	YES	YES	YES	YES	YES

Looking at separate indicators in the third column, similarly to the first outcome, teaching has a positive effect on new enrolments of top high school graduates. We find a different situation when including lagged indicators at t-1. Selectivity still has a negative effect on enrolments. Among the single indicators, teaching seems to be the only institutional characteristic able to exert an effect on enrolment.

Finally, Table 5 reports the results for the fourth outcome. These results seem to be in line with the above-presented findings. The baseline specification demonstrates there is a positive effect of

rankings on enrolments of top students who graduated from a Lyceum. In the second specification, we note how selectivity still exerts a negative effect on top students' enrolments. The institutional characteristics that seem to be more appealing for prospective top students still are teaching and research, as it is also shown in the previous tables. The third column also shows a positive effect of the quality score, that is the rankings published the year before do influence the enrolments the following year. However, the negative effect, although weaker, of selectivity persists. Finally, lagged indicators still indicate a positive effect of teaching.

Table 5. Fixed-effect linear regression of the number of newly enrolled top students from Lyceum: coefficients, robust standard errors and level of statistical significance (***) $p < 0.01$, ** $p < 0.05$, * $p < 0.1$)

Best High School Graduates from Lyceums								
	FE Models		FE Model with Indicators		FE Model t-1		FE Model with indicators t-1	
	1	2	1	2	1	2	1	2
Quality score	0.13*** (0.03)	0.10*** (0.03)			0.11*** (0.03)	0.09*** (0.03)		
Internationality			-0.02 (0.02)	-0.02 (0.02)			-0.04 (0.03)	-0.04 (0.02)
Teaching			0.05** (0.02)	0.03* (0.02)			0.07*** (0.02)	0.05** (0.02)
Research			0.06*** (0.02)	0.05** (0.02)			0.04* (0.02)	0.04 (0.02)
Productivity			0.08 (0.02)	0.05 (0.02)			0.03 (0.02)	0.01 (0.02)
Selectivity		-0.14*** (0.02)		-0.14*** (0.02)		-0.11*** (0.02)		-0.11*** (0.02)
Program Supply	0.57*** (0.04)	0.57*** (0.04)	0.57*** (0.04)	0.64*** (0.03)	0.53*** (0.05)	0.52*** (0.04)	0.52*** (0.05)	0.61*** (0.03)
Constant	3.61*** (0.01)	3.62*** (0.01)	3.61*** (0.01)	3.51*** (0.05)	3.61*** (0.01)	3.62*** (0.01)	3.61*** (0.01)	3.51*** (0.05)
Obs.	2692	2692	2692	2692	2331	2331	2331	2331
TIME FE	YES	YES	YES	YES	YES	YES	YES	YES
SPATIAL FE	YES	YES	YES	YES	YES	YES	YES	YES

5.1 Spatial Models

As a robustness check, we include a spatial analysis, which aims to model the spatial dimension among universities, an element often overlooked in these types of analyses. Given the research question, a spatial analysis insists on identifying how universities react to each other in response to changes along the ranking published by CENSIS. Often, this type of reaction is seen as a strategic

behavior of a competitive nature triggered by signaling about the quality of the university. For this reason, we use the distance between universities as a proxy for perfect substitutes. From an identification point of view, we exploit variations in the CENSIS ranking over time given the distance between universities.

In this section, we are going to explore the potential spillover effects of Censis-La Repubblica rankings and institutional selectivity on enrolments. In doing so, we add a spatial lag of overall enrolments. The model we fit will include the term $\beta_2 W y_{ue}$, meaning that we will assume enrolments spill over from nearby faculties. Nearby or adjacent faculties are defined by a spatial weighting matrix W . The values of the matrix W are the geographical distances in kilometers between universities. Formalizing, we use the following equation to account for potential spillover effects.

$$\text{Ln}(enroll)_{it} = \alpha_{it} + \beta_1 X(rank)_{it} + \beta_2 W y + \tau_i + \mu_t + u_{it}$$

In this model, β_1 measures the effect of x_i on y_i , and $\beta_2 W y$ measures the effect of y_i from other areas $i \neq i$ on y_i .

In the following tab.5, we report estimates from three distinct models. We fit the first fixed-effect regression model with a spatial lag of the dependent variable, which means we allow outcomes in one area to be affected by outcomes in nearby areas. The second and third models include a spatial lag of the independent variables – quality score and institutional selectivity respectively, which means we allow outcomes in one faculty to be affected by covariates from nearby faculties.

The table reports average changes in enrolments for a 1-percentage-point increase in the quality score in the first column. In the second specification, we fit the model with a spatial lag of the independent variable that is institutional selectivity, and in the third, the spatial lag is on the quality score. The direct effect is the effect of the change within the university, ignoring spillover effects. The own-university direct effect is to increase enrolments by 0.13 percentage points. The indirect effect is the spillover effect.

The results of the spatial analyses (tab. 6) focus on the role of the quality score and selectivity. The direct effect refers to the impact on new enrolments when a university improves its ranking (Model 1), increases its selectivity (Model 2), or raises its average CENSIS score (Model 3). These results partially align with those found in the basic OLS models. The indirect effects assess the strict spatial impacts, i.e., from the perspective of a university, examining how variations in new enrolments are influenced by changes in the quality score and selectivity of neighbouring universities. It is observed that the variables of interest have no impact, thereby ruling out the possibility of enrolment 'predation' among universities. Conversely, as indicated by the positive coefficient for new enrolments, an

increase in enrolments at nearby universities demonstrates a positive spillover effect. This suggests potential geographic clustering trends in enrolments, though further analysis is required in this area.

Tab.6 SAR models with spatial lag for the dependent variable and the two independent variables, separately

		Spatial lag dependent variable	Spatial lag selectivity	Spatial lag mean score
		1	2	3
<i>Direct Effect</i>	Quality Score	0.14*** (0.03)	0.13*** (0.03)	0.13*** (0.03)
	Institutional Selectivity		-0.10*** (0.04)	-0.10*** (0.04)
<i>Indirect Effect</i>	Mean Score			0.08 (0.38)
	Selectivity		0.16 (0.15)	
	Newly Enrolled	1.47*** (0.07)	1.48*** (0.08)	1.44*** (0.10)
	Constant	0.40*** (0.01)	0.39*** (0.01)	0.39*** (0.01)
	Obs.	2692	2692	2692

The findings presented in tab.6 shed light on the direct effects of Censis ranking, and institutional selectivity on enrolments. Notably, the direct effect of the quality score on enrolments emerges as positive and statistically significant, a departure from the outcomes observed in previous fixed-effect regression models. This emphasizes the influence of Censis ranking on enrolments, suggesting a noteworthy impact on individual faculty enrolments.

Contrarily, and most importantly, the focus shifts to the second line of indicators, revealing a lack of significant effects for both mean score and institutional selectivity. These results suggest an absence of spillover effects—indicating that an increase in Censis ranking does not yield any discernible impact on the enrolments of nearby faculties. Similarly, institutional selectivity fails to demonstrate a significant influence on neighboring enrolments.

Crucially, these findings underscore the nuances of the Italian context's local university market dynamics. While there may be student flows, our models predominantly account for flows to nearby universities. For instance, while Milan might pose as a competitor to Turin, the dynamics do not mirror that of Rome as a direct competitor to Milan. This means that the observed models might not

account for student flows between distant locations but rather highlight the localized influence on enrolments within proximity.

These results imply the necessity for a nuanced understanding of local market dynamics when examining enrolment influences. The absence of spillover effects indicates a limited impact of rankings and selectivity on neighboring faculties within the Italian context's localized university market.

6. Concluding Remarks

The aim of this paper was twofold: first, we aimed to assess the effect of university quality rankings on enrolment decisions in Italy, namely on the total number of university enrolments and on enrolments of high achieving high school graduates and graduates from the academic track. Second, we wanted to understand the role of institutional selectivity in shaping both general enrolments and enrolment of top students. Using detailed rankings produced by Censis-La Repubblica merged with enrolment data from the Miur archive and selectivity information from the Scheda-SUA of every Italian degree program, we have conducted fixed effects regression models on first university enrolment of students over a period starting from the year 2003 to 2011.

Our paper contributes first to the strand of literature that investigates the role of university quality rankings produced by private intermediaries in shaping matriculation choices. Studies conducted in the US context have produced abundant evidence of a positive association between quality rankings and educational choices. In Italy, studies on enrolment choices have mostly focused on the demand side. The role of supply-side attributes in shaping individual HE choices has been investigated in terms of their effect on moving-to-study decisions. We seek to fill this research gap by providing a panel data analysis on the effect of rankings produced by private intermediaries, specifically the Censis-Repubblica ranking - one of the most popular rankings of Italian universities. Second, we provide a major novelty by distinguishing between two institutional characteristics that have been frequently considered intertwined in empirical research and theoretical discussions. Quality institutions have commonly been portrayed as selective, and conversely so. Separating these characteristics helps in analyzing and evaluating institutions more comprehensively, considering both the exclusivity of their selection processes and the excellence of their performance or output.

Our analysis shows that university quality rankings affect both the number and quality of students enrolled. This result is in line with our hypotheses: in all the outcomes considered in the analysis our fixed effect regression models provide a positive effect on the quality score.

On the other hand, institutional selectivity provides interesting insights. The findings regarding selectivity remain consistent across models, with one notable exception observed among graduates from the academic track. As anticipated, selectivity demonstrates a negative impact on overall enrolments and the enrolment of top-performing students: as selectivity rises, enrolments tend to decrease. However, what is particularly intriguing is its effect when focusing on students with better entry credentials. Selectivity does not exert any effect on the enrolment of students coming from the academic track. The higher the selectivity of a faculty, the greater its capability appears to be in

attracting students from the academic track. This is evident also considering the fourth outcome which exhibits a weaker effect than that registered on high achieving students.

The results on the effect of the single indicators need a more articulate discussion. Generally, it seems that students are more attracted by university quality attributes such as research and teaching, it is true especially when we look at the total number of first university enrolments and enrolments of top HS graduates. This is not surprising if we consider the results of a few studies that concentrate on the Italian context: Bratti and Verzillo (2019) examining the correlation between research quality and enrolments, find a significant impact of research quality. Similarly, Bratti and Biancardi (2018) found a positive effect of the initial Italian Research Evaluation Exercise (VTR 2001-2003) on enrolment decisions. They also highlight that these effects are more pronounced among high-achieving students, specifically those with superior high school final marks. It could be that these faculties have a strong reputation and higher prestige due to their research output, academic excellence, and contributions to various disciplines.

The observed results align with the emerging managerial culture that emphasizes performance and entrepreneurship and could provide a viable explanation within the Italian context and the analyzed period. Just after the Bologna process, Italy has been experiencing a shift towards a more performance-driven culture within various sectors, including academia. Universities are increasingly encouraged to adopt managerial practices that focus on measurable outcomes, research productivity, and academic excellence. This emphasis on performance aligns with the findings of your study, indicating that university quality rankings, often reflective of these performance metrics, influence student enrolment decisions.

Moreover, the increasing importance of entrepreneurship and innovation within the Italian economy might also play a role. Students may perceive universities with higher rankings as hubs for innovation, research opportunities, and entrepreneurial endeavors, thus attracting them to institutions associated with higher quality and selectivity. This managerial culture based on performance and entrepreneurship could be shaping students' perceptions, making them more inclined to choose universities that are reputed for their academic quality, research output, and potential for fostering entrepreneurial skills.

However, there are several limitations to these findings. One significant limitation is the absence of certain covariates in the analysis, which might have provided a more comprehensive understanding of the factors influencing enrolment decisions. Variables such as socioeconomic background, geographic location, or specific academic program offerings were not included due to data

constraints. Furthermore, the temporal scope of this study, focusing on data from 2003 to 2011, may not capture the latest trends and shifts in enrolment patterns. Therefore, future research should aim to employ more recent datasets and explore a broader range of covariates to better understand enrolment choices within the evolving landscape of Italian higher education.

References

- Allen, R. M. (2019). What Do Students Know about University Rankings? Testing Familiarity and Knowledge of Global and Domestic University League Tables in China. *Frontiers of Education in China*, 14(1), 59-89.
- Amsler, S. S., & Bolsmann, C. (2012). University ranking as social exclusion. *British journal of sociology of education*, 33(2), 283-301.
- Barone, C., Triventi, M. Assirelli, G. (2018). Explaining Social Inequalities in Access to University: A Test of Rational Choice Mechanisms in Italy, *European Sociological Review*, Volume 34, Issue 5, October 2018, Pages 554–569
- Biancardi, D and Bratti, M. (2019). The effect of introducing a Research Evaluation Exercise on student enrolment: Evidence from Italy. *Economics of Education Review* 69(2019):73–93
- Boulton, G. (2011). University rankings: Diversity, excellence and the European initiative. *Procedia-Social and Behavioral Sciences*, 13, 74-82.
- Bowden, R. (2000). Fantasy higher education: University and college league tables. *Quality in higher education*, 6(1), 41-60.
- Bowman, N. A., & Bastedo, M. N. (2011). Anchoring effects in world university rankings: Exploring biases in reputation scores. *Higher Education*, 61(4), 431-444.
- Bowman, N. A. and Bastedo, M. N (2009). Getting on the front page: Organizational reputation, status signals, and the impact of U.S. News and World Report on student decisions. *Research in Higher Education* , 50 (5), 415-436.
- Brand, J. E., & Halaby, C. N. (2006). Regression and matching estimates of the effects of elite college attendance on educational and career achievement. *Social Science Research*, 35, 749–770.
- Bratti, M., D. Checchi, and G. de Blasio (2008). Does the expansion of Higher Education Increase the equality of educational opportunities? Evidence from Italy. *LABOUR* 22(1): 53-88.
- Bratti, M. and Verzillo, S. (2019) The ‘gravity’ of quality: research quality and the attractiveness of universities in Italy, *Regional Studies*, 53:10, 1385-1396
- Brewer, D. J., Gates, A. and Goldman, M. (2001). *In Pursuit Of Prestige; Strategy and Competition in U.S. Higher Education*, New Brunswick and London: Transaction Publishers.
- Broecke, S. (2015). University rankings: Do they matter in the UK? *Education Economics* 23 (2), 137-161.

Cabrera, A.F. and La Nasa, S.M. (2000), Understanding the College-Choice Process. *New Directions for Institutional Research*, 2000: 5-22.

Ciriaci, D. (2013). Does University Quality Influence the Interregional Mobility of Students and Graduates? The Case of Italy. *Regional Studies* 48 (10), 1592-1608.

Cook, P., and Frank, R.H. (1993). Chapter in NBER book *Studies of Supply and Demand in Higher Education* (1993), Charles T. Clotfelter and Michael Rothschild, editors (p. 121 - 144)

David, M. (2016). Fabricated world-class: Global university league tables, status differentiation and myths of global competition. *British Journal of Sociology of Education*, 37(1), 169-189.

Dill, D. D., & Soo, M. (2005). Academic quality, league tables, and public policy: A cross-national analysis of university ranking systems. *Higher education*, 49(4), 495-533.

Dilnot, C. (2018). The relationship between A-level subject choice and league table score of university attended: the 'facilitating', the 'less suitable', and the counter-intuitive. *Oxford Review of Education*, 44(1), 118-137.

Donina, D., Meoli, M., and Paleari, S. (2015) 'Higher Education Reform in Italy: Tightening Regulation Instead of Steering at a Distance', *Higher Education Policy*, 28/2: 215-34.

Freidman, M. (1981). *The invisible hand in economics and politics*. Pasir Panjang, Singapore: Institute of Southeast Asian Studies.

Freidman, M. (1991). *Monetarist economics*. Cambridge, MA: Blackwell

Gibbons, S., E. Neumayer, and R. Perkins (2015). Student satisfaction, league tables and university applications: Evidence from Britain. *Economics of Education Review* 48:148-164.

Griffith, A. and K. Rask (2007). The influence of the U.S. News and World Report collegiate rankings on the matriculation decision of high-ability students: 1995-2004. *Economics of Education Review* 26 (2), 244-255.

Gunn, R., & Hill, S. (2008). The impact of league tables on university application rates. *Higher Education Quarterly*, 62(3), 273-296.

Hazelkorn, E. (2007). The impact of league tables and ranking systems on higher education decision-making. *Higher education management and policy*, 19(2), 1-24.

Hazelkorn, E. (2012). The Impact of Global Rankings on Higher Education Research and the Production of Knowledge. In B. Jongbloed and H. Vossensteyn (eds) *Access and Expansion Post-Massification: Opportunities and Barriers to Further Growth in Higher Education Participation*. London, Routledge.

- Hemsley-Brown, J., Lowrie, A., and Chapleo, C. (2010). What defines “successful” university brands?. *International Journal of Public Sector Management*.
- James, R., Baldwin, R., and McInnis, C. (1999). Which University? The Factors Influencing the Choices of Prospective Undergraduates, Department of Education, Training and Youth Affairs, Australia
- Kandiko, C. (2010). Neoliberalism in Higher Education: A Comparative Approach. *International Journal of Arts and Sciences*, 3(14):153-175
- Long, M. C. (2008). College quality and early adult outcomes. *Economics of Education Review*, 27, 588–602.
- Liu, X., Thomas, S., & Zhang, L. (2010). College quality, earnings, and job satisfaction: Evidence from recent college graduates. *Journal of Labor Research*, 31, 183–201.
- Luca, M. and S. Jonathan (2013). Salience in quality disclosure: Evidence from the U.S. News College Rankings. *Journal of Economics & Management Strategy* 22 (1), 58-77.
- Marginson, S. (2014). University rankings and social science. *European Journal of Education*, 49(1), 45-59.
- Matzdorf, F., & Greenwood, J. (2015). Student choice, league tables and university facilities.
- McManus-Howard, M. (2002). Student Use of Rankings in National Magazines in the College Decision-Making Process, EdD Thesis, University of Tennessee, Knoxville
- Monks, J. and R. G. Ehrenberg (1999). U.S. News and World Report's College Rankings: Why do they matter". *Change* 31 (6), 42-51.
- Nora, A. (2004). The role of habitus and cultural capital in choosing a college, transitioning from high school to higher education, and persisting in college among minority and nonminority students. *Journal of Hispanic higher education*, 3(2), 180-208.
- Nurnberg, P., Schapiro, M., and Zimmerman, D. (2012). Students choosing colleges: Understanding the matriculation decision at a highly selective private institution. *Economics of Education Review*, 31(1), 1–8.
- Pigini, C. and S. Staffolani (2016). Beyond participation: Do the cost and quality of higher education shape the enrolment composition? The case of Italy. *Higher Education* 71 (1), 119-142.
- Rauhvargers, A. (2011). *Global university rankings and their impact* (p. 85). Brussels: European University Association.
- Salmi, J., & Saroyan, A. (2007). League tables as policy instruments. *Higher education management and policy*, 19(2), 1-38.

- Shaver J. M. (2019). Interpreting Interactions in Linear Fixed-Effect Regression Models: When Fixed-Effect Estimates Are No Longer Within-Effects. *Strategy Science*, 4(1): 25-40
- Slaughter, S., and Leslie, L. L. (1997). *Academic capitalism: Politics, policies, and the entrepreneurial university*. Baltimore, MD: The Johns Hopkins University Press.
- Soh, K. C. (2011). Don't read university rankings like reading football league tables: Taking a close look at the indicators.
- Spies, R. (1978). *The Effects of Rising Costs on College Choice: A Study of the Application Decisions of High-Ability Students*. New York: College Entrance Examination Board.
- Telford, R. and Masson, R. (2005). The Congruence of Quality Values in Higher Education. *Quality Assurance in Education*, 13(2):107-119.
- Turner, D. (2005). Benchmarking in universities: league tables revisited. *Oxford Review of Education*, 31(3), 353-371.
- Usher, A., and Savino, M. (2006). *A World of Difference: A Global Survey of University League Tables*. Toronto, ON: Educational Policy Institute.
- Van Dyke, N. (2005). Twenty years of university report cards. *Higher Education in Europe*, 30(2), 103-125.
- Veloutsou, C., Paton, R. A., & Lewis, J. (2005). Consultation and reliability of information sources pertaining to university selection. *International Journal of Educational Management*.
- Veloutsou, C., Lewis, J. W., & Paton, R. A. (2004). University selection: information requirements and importance. *International Journal of Educational Management*.
- Zhang, L. (2008). The way to wealth and the way to leisure: The impact of college education on graduates' earnings and hours of work. *Research in Higher Education*, 49, 199–213.

Appendix

Fig.A1 Histograms for each standardized quality indicator

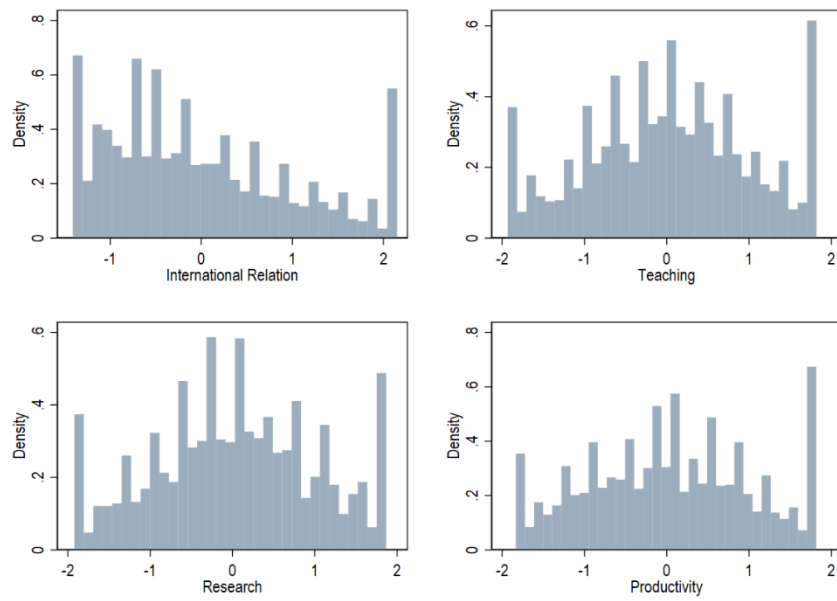
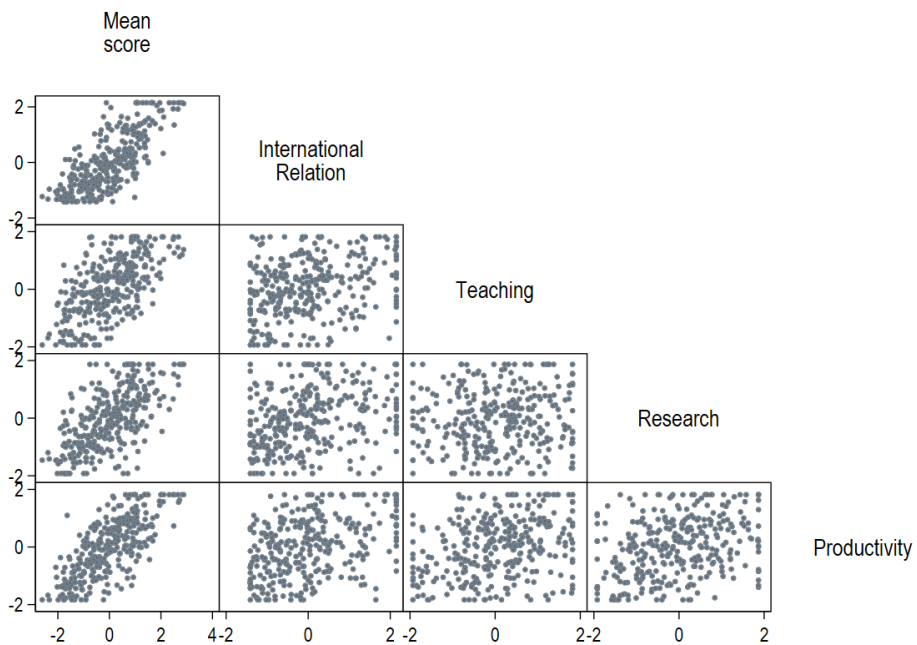


Fig.A2 Correlation matrix of the standardized quality score (mean score) and each standardized quality indicator:



Social Inequalities in Access to Selective Degree Programs: Are Admission Tests a Barrier for Low-SES Students?

Abstract

We examine social disparities in access to selective degree programs, specifically exploring the role of admission tests as potential barriers for students with a low socio-economic status (SES). While institutional selectivity is anticipated to improve student performance and degree completion, it also poses a threat to equality, particularly concerning social origin. In the empirical analysis, we rely on longitudinal data from the 'Family background, beliefs about education and participation in higher education' project, following a cohort of Italian high school leavers from various large cities through four distinct stages of educational decision-making—early preferences, application, admission, and actual enrolment in selective degree programs. The results reveal that while 67% of senior high school students express a preference for a selective degree, this proportion progressively erodes throughout the stages towards enrolment. We also find rather strong social gradients, especially in the application and admission stages, favoring high-SES students. A large part of the social differentials is accounted for by previous school achievement. Yet, a direct effect of social background is present among equally achieving students, and the social gaps are especially large among individuals with lower upper secondary final marks. By addressing the broader question of how selective admission policies contribute to educational inequality by social background, our research contributes to the debate about how such inequalities are reproduced through the interaction between institutional arrangements and family/individual decision-making.

Introduction

Selectivity in higher education is subject to a growing interest from scholars and policymakers (Hoxby, 2009). Institutional selectivity – i.e. the limitation of the number of places available to attend a given degree program or institution – is a tool to admit to a degree program only a limited set of able and motivated applicants and to offer them an educational experience that is well-tailored to their needs and potential. In this way, it is expected to improve university functioning, thereby leading to better student performance and higher rates of degree completion. In these terms, selecting students at the entrance could represent a possible solution to the widespread problems of student dropout and delayed graduations (Shamsuddin, 2016).

Notwithstanding, operating as a screening device, institutional selectivity is also considered as a potential threat to the equality of educational opportunities related to students' social backgrounds. Dealing with educational inequalities, a key question indeed is to what degree selective admission policies constitute a disincentive to university enrolment (in general and to the most lucrative degree programs) for students from families with lower socioeconomic resources, in this way enhancing inequality in higher education. This is a particularly salient issue because, given the great expansion of educational systems, the horizontal dimension of educational choices has become more important for the intergenerational reproduction of social inequalities (Lucas 2001; Shavit et al., 2007; Triventi 2013). Access to higher education must be considered not only in terms of *whether* pupils participate in higher education but also in *what* institution or degree program students choose (Gerber & Cheung, 2008). There is indeed growing stratification within higher education: some degree programs entail *numerus clausus* while others are open access, some institutions are much more selective than others (Stevens et al. 2008), and those usually guarantee better occupational outcomes for their graduates (Brand and Halaby 2006; Long 2008; Liu et al., 2010; Zhang 2008). In addition to that, selectivity may yield advantages also in the short term, influencing the student's academic achievement in their next future. For instance, selective degree programs may guarantee a better quality of the student body and in turn better peers may lead to higher academic performances and lower chances of dropout.

Nevertheless, little research has investigated the effects of higher education selectivity on educational choices. But most of all, very few studies have examined its role in reproducing social inequalities. Additionally, most of the studies on selectivity in higher education are focused on Anglophone countries (Jerrim, Chmielewski, and Parker, 2015) such as the United States (Gerber & Cheung, 2008) and the United Kingdom (O'Sullivan, et al., 2018), with only a few focused on European systems (e.g. Hällsten, 2010; Finger, 2022). The dominant approach in US studies is to analyze the average

ability of colleges' student intake as a measure of selectivity.⁵ While it is indubitably important, this approach conflates institutional selectivity with self-selection on the sides of students' applications, which might be linked also to university prestige and other desirable features of universities. In this work instead, we focus more directly on a specific form of institutional selectivity, namely whether degree programs impose a restriction on access and admit only students who pass an entry test.

More precisely, this paper aims to assess the role of admission tests in creating inequalities in access to university among a recent cohort of Italian high school leavers. In doing so, we ask if access to selective university degree programs is socially stratified in Italy, and at which stages of the enrolment process social inequalities are more effectively reproduced. Using unique data from the longitudinal survey of the project 'Family background, beliefs about education and participation in higher education' (Barone et al., 2017; Barone, Triventi & Assirelli, 2018), first fielded in 2013, we provide an important contribution to the understanding of unequal access to university degrees in terms of social background. By distinguishing between early preferences, application, admission, and actual enrolment steps, we adopt a longitudinal and dynamic perspective on how social background inequalities unfold along the process of transition to higher education (Perna, 2006). This allows us to better identify the most critical phases of the educational decision-making process, which could contribute to refining theoretical accounts of educational inequalities reproduction as well to inform policy-making more effectively in the higher education arena (Robinson & Roksa 2016). Moreover, most importantly, by separately dealing with each educational step, we can distinguish the impact of two distinct dimensions of selectivity: self-selection and institutional selection.

Compared to existing contributions, we additionally consider that the role of social origin might vary depending on individuals' previous academic performance: indeed, social classes do not respond in the same way to previous school achievement when making relevant educational choices (Holm, Hjorth-Trolle & Jæger, 2019; Bernardi & Triventi 2020; Herbaut 2021). In this vein, we introduce two complementary mechanisms – the compensatory advantage (CA) and the resource substitution theory (RST). The (CA) framework (Bernardi 2014) argues that students from socioeconomically advantaged families may compensate for the negative event of achieving poor grades by ignoring them and disproportionately choosing the best educational alternative. The RST, focusing on less advantaged and high-performing students, contends that prior academic performances have a stronger effect on the academic choices of students from disadvantaged backgrounds because these individual resources may substitute or compensate for an early disadvantage. In the second part of the article, we apply for the first time both frameworks to the study of educational selectivity in higher education,

⁵ The SAT is a standardized test whose score is widely used for college admissions in the United States

intending to understand if social background inequality varies systematically concerning students' academic performance in upper secondary education.

1. Theoretical Background

The role of socioeconomic background in university decision-making is a crucial and extensively studied aspect of educational choices (Terenzini, et al., 2001; Perna, 2006). There is, indeed, some evidence from the United States (Davies & Guppy, 1997; Lucas, 2001), Israel (Ayalon and Yogev, 2005; Shwed and Shavit, 2006) and Europe (Triventi, 2013) that pupils from disadvantaged socioeconomic backgrounds choose less prestigious and less selective fields or institutions. This discussion is underpinned by two prominent theoretical frameworks in sociology to understand social inequalities in educational decisions: rational action theory and cultural capital theory. According to Boudon (1974) as well as Breen and Goldthorpe (1997), risk aversion is the main driving force for any social class difference in educational choices. The basic assumption of RCT is that children and their families act rationally basing their educational choices on direct and indirect costs (C), on subjective and objective benefits of education (B), and their probability of success (P). The principle of choice is based, among several educational alternatives, on picking the one with the largest subjectively perceived utility ($U=(B*P)-C$) (Erickson & Jonsson, 1996): children would choose what guarantees higher benefits and higher probability of success and requires lower costs. The mechanism underlying rational educational choices includes sensitivity to loss aversion: the main purpose for each social class is to avoid downward mobility. Therefore, to maintain their social position, children from higher social classes feel compelled to attend higher education. At the same time, children from the lower social classes tend to enroll in less demanding and risky school paths, since the risk of downward mobility and the costs linked to this choice are lower and therefore sufficient to guarantee intergenerational stability in social position (Breen and Goldthorpe, 1997). Moreover, when lower-class families choose a more privileged school track or institution, this can result not only in a loss per se but also in additional costs when shifting to a less privileged one. This model implies that socioeconomically disadvantaged individuals are more risk-averse, and they tend to trade off high returns to minimize the risks. Conversely, individuals from advantaged backgrounds aim at having higher returns, and to access them, they take on higher risks. When delving into the horizontal dimensions of higher education, we may focus on the Effectively Maintained Inequalities theory (EMI) that compounds RCT: This theory posits that when education becomes widespread, advantaged groups seek better educational alternatives, ensuring their relative position. As posited by the RCT, obtaining and maintaining a high-rank position is a major concern for upper-class families: however, this is no longer sufficient as access to a given educational level increases. Consequently, it is

reasonable to assume that they would endeavor to sustain their children's advantages by strategically navigating the school system and leading to better educational choices. Hence, as more people pursue higher education, upper-class families opt for the best educational opportunities within it to maintain their social position. This resonates with the 'diversion hypothesis' (Brint and Karabel, 1989), suggesting that different higher education options steer lower-class students toward less prestigious institutions and courses.

Along with relative risk aversion, scholars have framed educational choices into a second major paradigm in social stratification research (Bourdieu, 1986; Bourdieu and Passeron, 1977). The cultural capital theory (CCT) is based on three assumptions. First, each social stratum in any given society has its own culture, expressed by shared values, lifestyle, and language. Second, there is the perception of a shared hierarchy between each culture and the implicit reception of the standards of the upper classes as the dominant cultural standards. Third, dominant cultural standards are taken for granted by educational institutions since those are continually conveyed by the teachers and textbooks, that reflect the higher-classes standard. Consequently, children of the upper classes have better performances because they are favored by the proximity between school and family cultural standards. More advantaged children find it easier to adapt and fulfill the educational requirements because of their familiarity with the culture conveyed by educational institutions.

As suggested by van de Werfhorst et al. (2003), cultural and economic resources of the student's family of origin together could help us understand why students develop different educational preferences and hence evaluate the risks and benefits associated with those educational alternatives.

1.1 The Choice of Selective Degree Programs

Selectivity in higher education is the result of two types of selection: students' self-selection and institutional selection. The former involves qualified students making decisions about whether to pursue their optimal educational path based on their individual preferences, abilities, and available resources. On the other hand, institutional selection pertains to the explicit mechanisms employed by an institution or degree program to choose among their pool of applicants. In this paper, we can distinguish these two dimensions, thus hereinafter trying to discuss the possible underlying mechanisms separately for the type of selection.

Focusing on self-selection, we may extrapolate some useful elements from the RCT taken together with EMI Theory. Selective degree programs may be riskier as students could perceive them as more difficult. Moreover, admission tests have costs: students face direct and indirect costs when they try university admission tests. Direct costs refer to the fact that the application to each test the students want to take has a cost. Usually, costs a small amount of money: however, students often have to bear

travel costs as well to take the test in presence. These costs taken together may prevent students from trying one or more admission tests if they do not feel confident enough to pass them successfully. Furthermore, drawing both from the social closure theory (Weber, 1978) and social and cultural reproduction theory (Bourdieu & Passeron, 1977), we can derive explanations of the effect of institutional selection: selective institutions adopt admission policies that match the cultural capital of their desired prospective students, thus reproducing and maintaining class advantages (O'Sullivan et al., 2019). Admission tests may relate to topics from the higher class's cultural standards. For instance, university entry tests in Italy often include – beyond specific technical or subject-specific parts – a section on general or cultural knowledge, which is likely to be affected more by the family's cultural capital and lifestyle than strictly what was covered by the education curricula. Moreover, in several cases, the test is supplemented by high school final marks as a criterion for admission. It has been shown that school grades assigned by teachers are upwardly biased for children from higher socioeconomic and cultural backgrounds, both in Italy (Argentin & Triventi 2015) and elsewhere (Geven et al. 2021).

Therefore, we hypothesize that *students from advantaged backgrounds are more likely to choose selective degree programs than their disadvantaged counterparts* (H1).

Elaborating further on these theories, we develop two different hypotheses for the effect of the two dimensions of selectivity on the stages of the educational process. Considering the students' self-selection, we expect the *role of social origin to be stronger at the application stage than at the preference stage* (H2a). This is because the mechanisms related to the perceived difficulty and costs of university studies may be more salient when the student effectively chooses his or her potential future educational career. Indeed, the application stage entails a series of choices and considerations about the expected costs, the perceived difficulty of university studies, and the probability of success. During this process of choice, the student may be supported and influenced by the family of origin more than during the preference stage.

Considering separately the admission and enrolment stages, as they reflect a second dimension of selectivity, namely institutional selection, we develop a third hypothesis. We expect the *role of social origin to be stronger at the admission stage than at the enrolment stage* (H2b). The cultural standards reflected in the admission tests may increase the chances for socioeconomically advantaged students to successfully pass them and finally gain admission, whereas the probability of enrolling depends on the chances of admission. Furthermore, students from privileged backgrounds may invest more in test-specific preparation than disadvantaged student. For example, Buchman et al. (2010) find that disparities in family background, particularly in terms of family income, significantly influence students' engagement in SAT preparation. These supplementary educational activities have significant

implications for test performance. Students from more privileged backgrounds are notably more inclined to participate in private courses. Participation in these courses increases sat scores and in turn, enhances the probability of gaining admission to the US most prestigious colleges and universities.

1.2 The Heterogeneity of the Effects of Social Background

The effect of social origin may vary depending on previous school performance. Two complementary notions may help us to interpret the heterogeneity of the effects of social background concerning academic performance: the compensatory advantage mechanism (Bernardi, 2014) and the resource substitution theory (Ross and Mirowski, 2011)

The core insight of the compensatory advantage mechanism is that the life paths of individuals of the higher classes depend to a lesser extent than the most disadvantaged classes on previous negative events: unfavorable conditions tend to persist or grow over time for people from disadvantaged families, whereas more advantaged families are less likely to be undermined by them.

Although it may be employed in a variety of settings, the compensatory advantage framework has been widely applied to educational outcomes, for instance, to understand the risk of retention (Bernardi 2014), educational transitions (Bernardi & Triventi, 2020; Eiskala, Erola and Kilpi-Jakonen 2021), or dropout in higher education (Herbaut, 2021).

In this work, for the first time, we apply the CA framework to enrolment patterns in selective university degree courses, thereby connecting it to educational inequalities within the horizontal stratification of higher education. We inspect whether students from socioeconomically advantaged families compensate for the negative event of achieving a low final grade in upper secondary education by ignoring it, choosing to apply, and enrolling in selective degree programs. More advantaged students may invest more family resources to compensate for their previous suboptimal academic achievement. While the lower classes might invest less resources and may also receive less encouragement to make ambitious choices.

The relative risk aversion (RRA) theory, together with the Effectively Maintained Inequality theory provides an explanation to make sense of the expected heterogeneity in the different social classes' reactions to feedback from the educational institutions. One might expect that a negative academic outcome – such as a school failure or bad marks – negatively influences the following educational path: this is because it is perceived as an indicator of potential future failure in education. Consequently, low-performing students are less likely to pursue future education or choose the best educational option. However, the EMI theory (Lucas 2009) suggests that the perceived probability of success is not consequential for upper-class students' educational choices. High SES students make

the next educational transition and choose the most advantageous educational alternative, irrespective of their performances, since it is fundamental to avoid the risk of downward mobility. More advantaged families, thus, are in the position to employ their superior socioeconomic and cultural resources to guarantee educational advantages and provide superior opportunities for their children. These arguments taken together may explain why students from disadvantaged families might not compensate for prior negative performance, whereas upper-class students may instead ignore past negative outcomes: the risks of downward mobility among disadvantaged families are smaller because their starting positions are already low.

So far evidence for such a compensatory advantage on educational outcomes mainly comes from research regarding the decision to make the transition to higher education; less is known about its role in the choice of the best educational alternative, and in particular in choosing and accessing selective university programs.

Integrating further the compensatory advantage mechanism, we could also see this phenomenon the other way around through the lenses of the resource substitution theory (Ross and Mirowsky, 2011), which states that favorable conditions play a larger role for low-SES students. Education is more important to disadvantaged people (Ross and Mirowsky, 2006, 2011): Those with few alternative resources are more dependent on education for future educational choices than those with more resources because resources can substitute for one another to improve their educational careers. Resource substitution theory predicts that education interacts with disadvantaged social origins, such that education or better prior performances have a larger effect on future education for individuals who grew up in families with poorly educated parents than it does for the more advantaged.

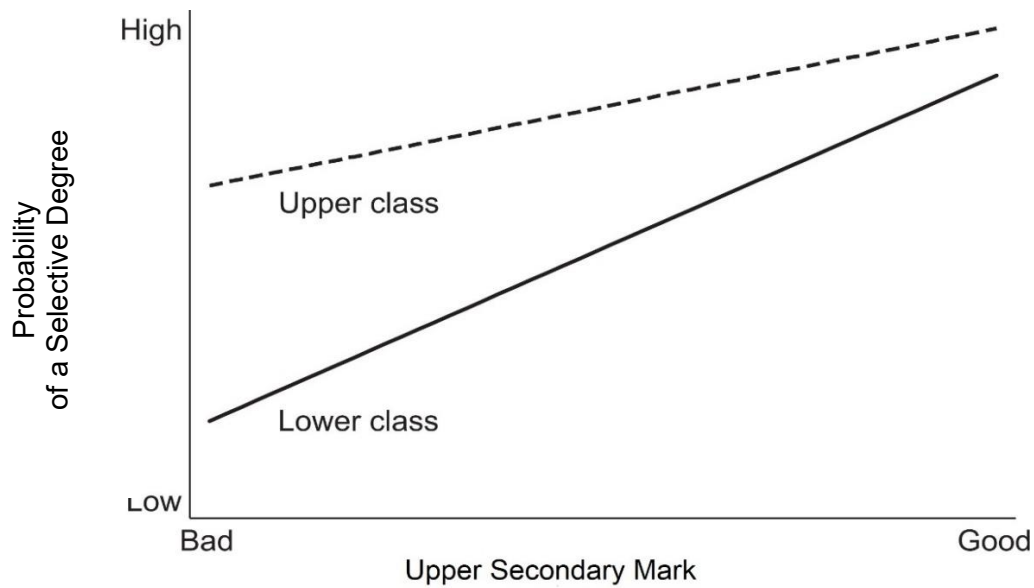
There may be several other possible underlying mechanisms in the choice of a selective degree program. For instance, socioeconomically advantaged students may be more confident about their academic skills and knowledge: social-psychological research suggests how social background influences the attitudes and beliefs that individuals have about themselves and their cognitive skills (Belmi et al., 2020). Being overconfident may increase educational ambitions and motivations, thus increasing the probability of success. Drawing from Moore and Schatz (2017), there may be three different ways in which students can exhibit overconfidence in educational choices. First, *overestimation*, that is more self-confident students tend to evaluate themselves better than they are. This could be the case for a student who believes his/her academic skills are adequate to try an admission test and enroll in a more selective degree. Furthermore, students may display *overplacement*, as they may think that they are better than other students who take the test, as such they may rank in a higher position and access the degree program they applied to. Third, a student

who demonstrates *overprecision* may be the one who is sure to have scored well on the admission test and is confident enough to enroll in a more selective degree.

Furthermore, upper-class families may compensate for an early negative school outcome by activating economic and noneconomic resources to guarantee their children access to the desired educational alternative. These families could, for instance, provide emotional support as well as practical help by spending time together in study activities: higher background parents because of their educational level and occupational position may have specific knowledge of the subjects covered in the admission tests. Moreover, advantaged students may have the chance to benefit from more information provided by their family of origin and their peers: since the contents of the questions are unknown, higher backgrounds students may take advantage of their connections to obtain more specific information about the subjects and kind of questions administered in previous editions. Also, since information about the effective selectivity of the admission tests is not publicly available, students could get an idea from their peers of their chances to pass the test. Finally, these families may also pay for private lessons and specific admission test preparation courses that focus on the academic skills students need to pass the entry exam.

We thus hypothesize that *social origin differences in access to selective degree programs are larger at the lower end of the past performance distribution, whereas the differences reduce as school performance increases* (H3). If our data show patterns compatible with the compensatory advantage mechanism and RST, results would be similar to those portrayed in Figure 1, where among the low achievers more advantaged students have higher probabilities of choosing and accessing a selective degree than their more disadvantaged counterparts, whereas social strata differentials are significantly lower among top students.

Figure 1. Theoretical expectations of the CA mechanism and RST in the choice of a selective degree



Furthermore, we hypothesize that *patterns compatible with a compensatory advantage mechanism and RST are more marked during the application than the preference stage* (H4a). As stated before, the application stage is a more concrete act during the educational decision-making process than expressing a preference, which may reflect and be an expression of an inconsiderate or intimate will. As such, considerations about future studies may more easily go around students' academic potential, leaving more room for parental emotional support and overconfidence. Finally, considering the second dimension of selectivity, namely institutional selection, we speculate that *such a pattern is stronger at the admission than at the enrolment stage* (H4b). Indeed, mechanisms such as private lessons specifically built in preparation for admission tests may be more salient during the former stage than the latter.

2. Higher Education in the Italian Context

The Italian context is particularly interesting for our research aim for two sets of reasons. The first one regards the organization of the Italian educational system itself. Upper secondary education in Italy is differentiated into school tracks. Until grade 9 all students follow the same school path and around age 14, they are expected to choose among different curricula, which are commonly classified into three broad tracks: the academic, the technical, and the vocational track. The academic

track is widely considered to be the gateway to the university. Nevertheless, all students from any track who complete a final state exam are allowed to enter tertiary education. Still, differences between school tracks in the transition rates to university are significant.

Besides this, access to university may be further regulated by different procedures and criteria depending on the field of study and the institutions themselves. In particular, admission may be regulated at national and local levels: degree programs whose access is regulated at the national level are those for which the admission tests are held on the same day throughout Italy and the dates of the tests, the number of places available, the methods and contents of the tests, evaluation criteria, are established directly by the Ministry of Education; those courses include medicine and surgery, veterinary medicine, dentistry, architecture, health professions and educational sciences⁶.

On the other hand, access to most degrees is regulated at the local level. Institutions in agreement with departments may autonomously introduce admission exams to select students and give them access to single-degree programs. In this case, dates and criteria relating to any admission test vary for each degree course. Furthermore, admission tests at the local level are not chained to any specific field of study: this means that the same degree course may provide for admission tests in one university while guaranteeing free access in another.

Second, in Italy, although a slight decrease in the last decades, social inequalities in access to higher education are still conspicuous: irrespective of previous performance and type of diploma, children of the upper classes are more likely to enter university than their less advantaged counterpart (Ballarino et al., 2009; Barone, et al., 2010; Barone, et al., 2018a). Furthermore, social class differentials are entangled in the horizontal stratification of the educational system as well. Italian research has long established the link between school tracking and social selection (Panichella and Triventi, 2014; Guetto and Vergolini, 2016; Barone, et al., 2018b; Lievore and Triventi, 2021). Also, in recent years, the association has strengthened, with students from higher social backgrounds becoming increasingly more likely to attend the academic track (Panichella and Triventi, 2014). In this vein, it is important to point out that in Italy students and their families are free to choose and enter the preferred school track, regardless of previous school performance and teachers' recommendations. That is the family of origin becomes more influential, since parents may use their economic and cultural resources to push their children towards the best educational alternative. Finally, social background differentials are evident not only in the transition to university, but social segregation exists also in the choice of educational alternatives: pupils from advantaged social backgrounds tend to choose more prestigious fields in tertiary education (Triventi, 2013; Triventi, Vergolini and Zanini, 2017)

⁶ According to Law n.264, 2 August 1999

3. Data, Variables, and Method

In the empirical analyses, we focus on four key educational outcomes in the Italian context that entail the choice of a selective tertiary degree: the expression of a preference, the application, the admission to their first-ranked degree course, and the actual enrolment to the first-choice degree program. Selectivity is defined by the presence of an admission test. A selective degree program provides for an admission test, regardless of the ratio between the number of applications and the number of students who effectively enter a given degree program. Although an admission test may not be effectively selective, as the number of applicants may be lower than the available slots, we believe that the presence of an admission test may be perceived as daunting by students, since they lack information about the number of participants.

Data

We use unique data from the longitudinal survey of the project ‘Family background, beliefs about education and participation in higher education’, first fielded in October 2013. The survey was based on a stratified random sample, defined by province and school track, of 62 Italian schools located in four Italian provinces -- Milan, Bologna, Vicenza, and Salerno. The entire sample counts of 9,159 high school students, interviewed in four waves covering a timespan from October 2013 to November 2015. Wave 0 collected information on the student’s family of origin and domestic environment, educational paths, and future educational and occupational aspirations. In the following months, the same students were interviewed in three other waves. In particular, the outcomes for this analysis come from the second wave that took place in November 2014 (4 months after upper secondary graduation), where actual university choices were recorded. It is important to note that the vast majority (around 85%) of high school leavers who decide to enroll in university, do it immediately after the end of upper secondary education (Barone et al., 2018b).

An experimental design was integrated into the longitudinal survey: The experiment aimed to assess whether information barriers regarding tertiary education affect students’ university decisions. Thus, in the second wave, half of the schools of the sample were provided with information about the costs, economic benefits, and dropout risks associated with higher education.

Albeit the data does not come from a probabilistic sample of the whole country, it does indeed cover various distinct areas of the countries, thereby allowing a representation of various contexts characterized by heterogeneous socioeconomic conditions. Furthermore, since there is no availability of data that allows us to answer our research question, we aim to identify patterns and mechanisms that encourage or discourage students from different social backgrounds to choose and access a selective degree program, rather than provide population estimates.

Fig.2 Survey timeline and relevant information collected within each wave

Wave 0 October 2013	Wave 1 May 2014	Wave 2 November 2014	Wave 3 November 2015
<ul style="list-style-type: none"> •Students' social backgrounds •Cultural, economic and social resources of the family •Performance and satisfaction with one's school experience •Intentions to continue studies after graduation •Beliefs about university studies(costs, employability, possibility of success •Network of friends at school 	<ul style="list-style-type: none"> •Intentions to continue studies after graduation (university enrolment and choice of degree course) •Beliefs about the costs of university studies •Beliefs about school to work transition •Beliefs about the probability of success in university studies 	<ul style="list-style-type: none"> •University enrolment and choice of degree course •Entry into the labor market 	<ul style="list-style-type: none"> •University studies progress <ul style="list-style-type: none"> •course changes •dropout •acquired credits •grade point average •Experience in the labor market <ul style="list-style-type: none"> •interruption or change of previous job •entry into the labor market •job search

Variables

In the empirical analyses, we focus on four relevant educational outcomes in the university choice process. The first outcome refers to the preferences for a selective degree expressed by the students one month before taking the final high-school exam: the variable is categorical and takes on value 3 if the students express a preference for a selective degree, 2 for a non-selective degree and 1 if the student does not express a preference at all. The second outcome is the application to a selective degree, to a non-selective degree, or no application to any tertiary degree. For the third and fourth outcomes, we focus on first-choice admission and enrolment. As for admission we consider whether the student was admitted to a first choice degree, was not admitted to his/her first choice, was admitted to any non-selective degree, or no university at all. Similarly, enrolment is a categorical variable that takes on value 4 if the student effectively enrolled to his/her first choice selective degree, 3 if enrolled to any selective degree, 2 if enrolled to a non-selective degree, and 1 if not enrolled at all.

Tab.1 Variable description

Variable	Variable Description
Outcomes	
<i>First Preference</i>	1) No Preference 2) Non-selective 3) Selective
<i>Application</i>	1) No University 2) Non-selective 3) Selective
<i>Admission to First Choice</i>	1) No University 2) Non-selective 3) No pass first choice 4) Pass first choice
<i>Enrolment to First Choice</i>	1) No University 2) Non-selective 3) Selective 4) First choice selective
Independent	
Social Background	
<i>Social class</i>	1) I+II “Service class”; 2) IIIa “Higher grade Routine non-manual employees”; 3) IV “Petty bourgeoisie”; 4) IIIb “Lower grade routine non-manual employees”; 5) V+VI “Skilled manual workers”; 6) VII “Unskilled manual workers”.
<i>Parental Education</i>	1) “Lower Secondary or lower”; 2) “Upper Secondary”; 3) “Higher Education”
<i>Ability</i>	
<i>Upper Secondary Final Grade</i>	Range 60 - 100
Socio-demographic Controls	
<i>Gender</i>	0 = Male; 1 = Female
<i>Province of Residence</i>	1) Bologna; 2) Milano; 3) Vicenza; 4) Salerno
<i>Citizenship</i>	0 = Italian; 1 = Foreign
<i>Tracking</i>	
<i>Type of Diploma</i>	1) Academic; 2) Technical; 3) Vocational
<i>Lower Secondary marks</i>	1) Pass; 2) Good; 3) Very Good; 4) Excellent
<i>Field of Study of Preference</i>	1) Medicine; 2) Law; 3) Health; 4) Engineering; 5) Pharmacy; 6) Economics and Statistics; 7) Architecture; 8) Education; 9) STEM; 10) Geography; 11) Political and Social Sciences; 12) Humanities 13) No pref.
<i>Rct Treatment</i>	0 = Control; 1 = Treated

Our main independent variable is social background for which we use both the parental highest level of education and social class (both defined using the dominance criterion) as indicators. For social class, we rely on a simplified version of the Erikson–Goldthorpe schema with six categories (see Tab.1; Tab. A1 for descriptive statistics). Final marks in upper secondary education are used as an indicator of academic performance: a continuous variable whose value ranges from a minimum of 60 to 100. Finally, we add to our models several controls. The first set of controls includes students’ socio-demographic characteristics, which may influence the choice of educational alternatives: gender, province of residence, and citizenship. A second set of controls refers to previous school choices and academic preferences. Therefore, we include in our model the type of diploma obtained, lower secondary marks, and the field of study of preference.

Last, given the experimental aim of the longitudinal study we are using (see data section) we include in our analyses a dummy variable indicating whether the student was part of the treatment or control group. This control allows us to make use of the whole sample of students.

Method

The empirical analysis is organized into two steps. First, to test H1 and H2 we analyze the relationship between social background and the choice of a selective degree program, applying binomial logistic regression models and presenting results in terms both of average partial effects (APE) and marginal odds ratios (MOR). APE and MOR behave identically; however, MOR retain the odds ratio interpretation, and, among their advantages, they are unaffected by rescaling or noncollapsibility bias, and allow for comparability across different populations or studies (Karlson and Jann, 2023). In both cases, we show conditional and unconditional estimates. Unconditional estimates rely on the whole analytical sample irrespective of the outcome, while conditional estimates condition the analytical sample to the students who made successfully the previous educational transition (Mare, 1981). The first ones are more easily comparable across stages, but in each step, the estimated inequality should be conceived as the cumulative outcome of what happens at a given stage and the previous stages as well. The second ones instead isolate social inequalities in a specific transition, but instead does not take into account the fact possible heterogeneous selection process to which high- and low-SES students are subject, which can impact the unobserved heterogeneity across the two categories (Cameron and Heckman, 1998).

The second step examines if the choice of a selective degree is compatible with a compensatory advantage mechanism. To do this, we apply binomial logistic regression models, where our outcome of interest is a function of social background, previous academic performance (upper secondary final mark), and their interaction. We then computed the predicted probabilities for the interaction between social background and previous academic performance, using predictive margins. In our final models, we only focus on social background as expressed by parental education. At this step, we add a second model specification, where models are additionally adjusted for the field of study of preference and school track.

These models can be formalized as follows:

$$P(\text{SEL}) = \beta_0 + \beta_1(\text{PEDU}) + \beta_2(\text{Marks}) + \beta_3 \text{ Parental education} \times \text{Marks} + \beta_4 \mathbf{Z} + \varepsilon$$

where $P(\text{SEL})$ is respectively the probability for expressing a preference, applying, being admitted, and effectively enrolling in a selective university degree program. The variable PEDU refers to parental education. Marks refers to the upper secondary final mark students received. β_0 , β_1 , β_2 , and

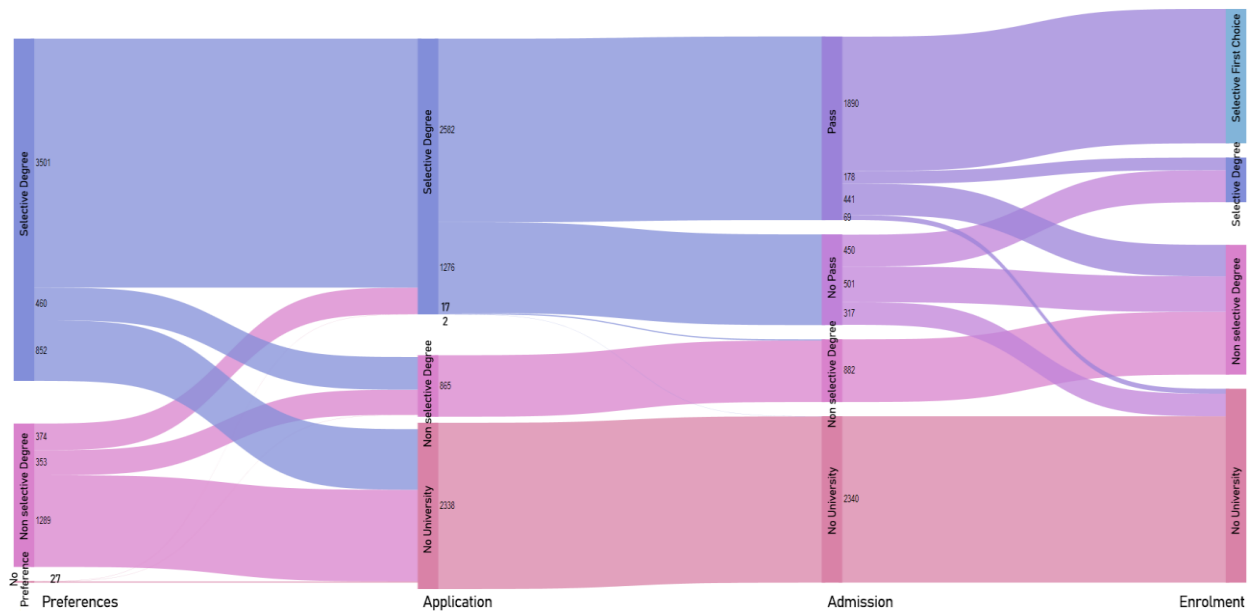
β_3 are parameters to be estimated, β_4 is a vector of regression coefficients associated with control variables (Z), while ε is the error term.

4. The Pathways Toward a Selective University Degree Program

As a first step in our analysis, we were interested in understanding if and how students' choice of a selective degree program changes throughout the path to the last phase of the educational decision-making process - enrolment. The Sankey diagram (fig.2) is a very useful tool that allows us to show the flow of students moving from one educational choice to another. Starting from the preferences expressed for the type of degree program the student would rather attend, we consider three other important educational steps: application, admission, and enrolment.

Looking at the first educational step, most senior high school students express a preference for a selective degree course (67%). What is interesting and well portrayed by the Sankey diagram, is that this proportion is gradually reduced when moving to the next educational steps. Indeed, 55% applied to such courses, 36% were admitted to the 1st choice selective course, and finally, only 28% enrolled in the 1st choice selective course.

Fig. 3 – Sankey diagram representing the flows across alternatives in the path towards access to a selective university degree course.

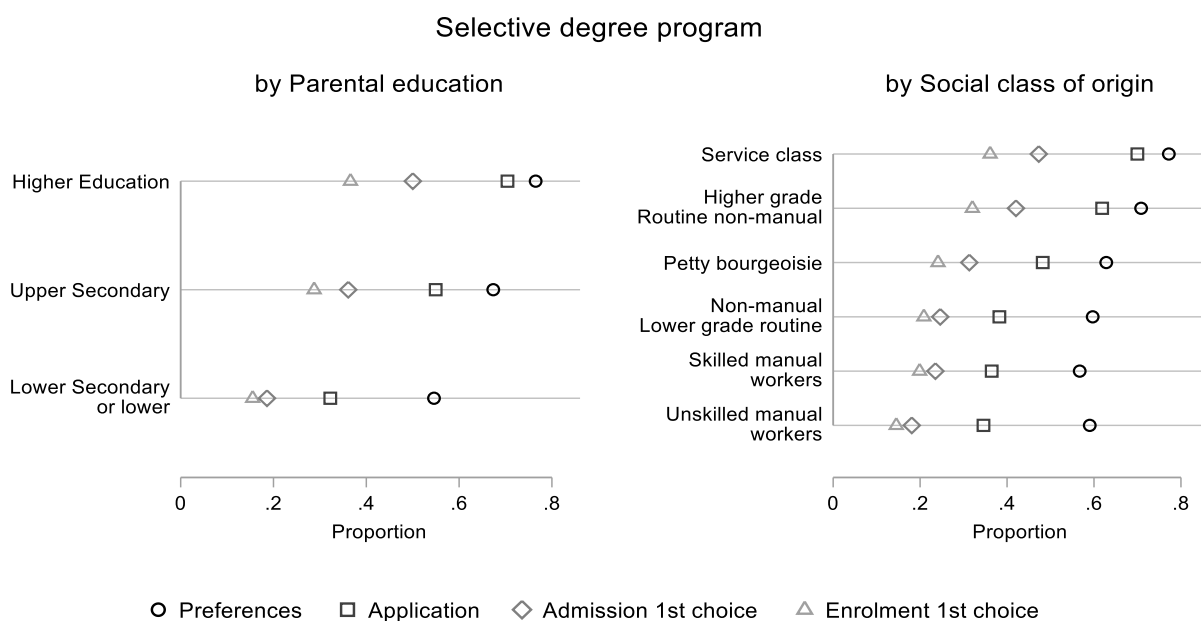


From these results it seems that selective admission requirements represent a barrier to educational intentions: at the stage of expressing a preference for a degree program, students seem to opt for a

selective course. However, at the time of sending applications, some students change their minds and even do not apply at all. That is, there seems to be a mismatch between aspirations and behavior.

Focusing on class differentials, fig.3 shows how selectivity plays a role in recreating social inequality: indeed, the choice of a selective degree program is stratified by both parental education and social class of origin. The proportion of students coming from more advantaged social backgrounds who choose a selective degree program is higher than the proportion of their more disadvantaged counterparts. This pattern appears in all four stages, from preference expressed at the end of the last high school year to actual enrolment. While absolute differences by social background are similar across the four stages, in relative terms social background differentials increase: when comparing risk ratios, students with tertiary-educated parents are 1.4 times more likely to express a preference for a selective degree program compared to those with lower secondary educated parents, while they are 2.3 times more likely to end up enrolled in such programs.

Fig.4 – Proportion of individuals who expressed a preference, applied, were admitted, and enrolled in a selective university degree program by parental education (left) and social class of origin (right).



A second pattern becomes clear when looking first at preferences and applications taken together, and then admission and enrolment. The gap between preferences and application is greater when the social background is lower, and it becomes smaller for students coming from more advantaged families. On the contrary, the gap between admission and enrolment increases when social background gets higher.

This is evident both for parental education and social class of origin. For more advantaged students preferences seem to follow the effective application to a degree program. Thus, seemingly confirming a self-confidence hypothesis. While students from lower socioeconomic backgrounds are less likely to apply to the degree courses they expressed a preference for. Fig.2 shows how students who in principle would express a preference for selective degrees, then change their mind by the time of the application process: fig.3 shows how this pattern is more marked among less privileged students.

5. Social Inequalities in Accessing Selective Degree Programs

As a first step in our analysis, we look at the association between social background - dealing both with social class and parental education separately - and the probability of expressing a preference, applying, being admitted, and enrolling in a selective degree program. Results from logistic regression models are presented in tab.2, where we report the unconditional and conditional average partial effects of both parental education and social class. Generally, students from higher social backgrounds have higher chances to choose and access a selective degree program than their less advantaged counterparts. This is particularly true considering parental education: students with university-educated parents are more likely to choose a selective degree, and this gap is stronger at the application and admission stage.

Social class yields similar results when considering extreme EGP categories: however social class is more strongly related to preference and application. Application is the stage at which social background exerts a stronger influence even when our estimates are conditional upon a selective degree choice at the previous stage. Among those students who expressed a preference for a selective degree, parental education is positively related to the chances of applying for a selective degree. This gap is still present at the admission stage, but it disappears when looking at the chances of enrolment upon admission.

Conditional estimates show partially different yet interesting results. Social background differences remain evident on applications: among the students who express a preference for a selective degree, those from advantaged backgrounds are more likely to apply to a selective degree. Moving to admissions, the effect is weaker and disappears for social class. However, it still holds for parental education. Interestingly, even among the self-selected group of students who applied to a selective degree program, those who are more likely to gain admission are those with well-educated parents. These results possibly shed light on the importance of cultural resources for this particular stage. The enrolment stage does not show any significant difference between social strata: among students who gain admission to their first-choice selective degree, there is no difference in terms of social background when enrolling in selective degrees.

Tab.2 Unconditional and Conditional APEs

	APE Unconditional				APE Conditional		
	Preference	Application	Admission	Enrolment	Application	Admission	Enrolment
Parental Education							
<i>Upper Secondary</i>	0.065*** (.0173)	0.141*** (.0181)	0.123*** (.0168)	0.100*** (.0157)	0.122*** (.0222)	0.067* (.0292)	-0.013 (.0330)
<i>University</i>	0.112*** (.0213)	0.224*** (.0225)	0.206*** (.0212)	0.133*** (.0198)	0.175*** (.0262)	0.121** (.0328)	-0.059 (.0377)
EGP Parents							
<i>Higher Grade Routine non-manual</i>	-0.051** (.0179)	-0.032 (.0192)	0.001 (.0182)	-0.008 (.0175)	-0.020 (.0198)	-1.029 (.0230)	-0.021 (.0247)
<i>Petty Bourgeoisie</i>	-0.082*** (.0223)	-0.103*** (.0239)	-0.044 (.0229)	-0.052* (.0220)	-0.064* (.0256)	-1.031 (.0303)	-0.060 (.0361)
<i>Lower Grade Routine non-manual</i>	-0.100*** (.0249)	-0.151*** (.0268)	-0.060* (.0260)	-0.045 (.0251)	-0.122*** (.0299)	-1.070 (.0350)	0.010 (.0414)
<i>Manual</i>	-0.132*** (.0250)	-0.180*** (.0266)	-0.089** (.0255)	-0.074* (.0243)	-0.145*** (.0302)	-1.048 (.0358)	-0.011 (.0427)

Note: models adjusted for gender, migration background, lower secondary marks, school province, and randomization

In the appendix, we also report the sheaf coefficients⁷ that summarize the direct effect of social background and the total effect of marks on the choice of a selective degree across four educational steps (see Fig. A1). Besides being coherent with APE results, sheaf coefficients show how is not to be neglected the role of previous academic performance: results from binomial logistic regressions show how an upper secondary mark is more strongly associated with the choice of a selective degree than social background. Following the same pattern as parental education, the total effect of marks is stronger in the phases of application and admission. Social class of origin, parental education, and previous academic performance all matter for all the stages of the choice of a selective degree program. The upper secondary final mark is more strongly associated with the application process to a selective degree program than social background. The effect of social class of origin and parental education is weaker but still apparent, with a slightly larger contribution of the latter. Looking at the effect on the various steps of the educational path, the total effect of marks along the application process follows an inverted U-shaped pattern, being stronger in the phases of application and admission. We find a similar, but less marked, pattern for parental education, while social class of origin matters more in the application stage.

5.2 Heterogeneous Effects

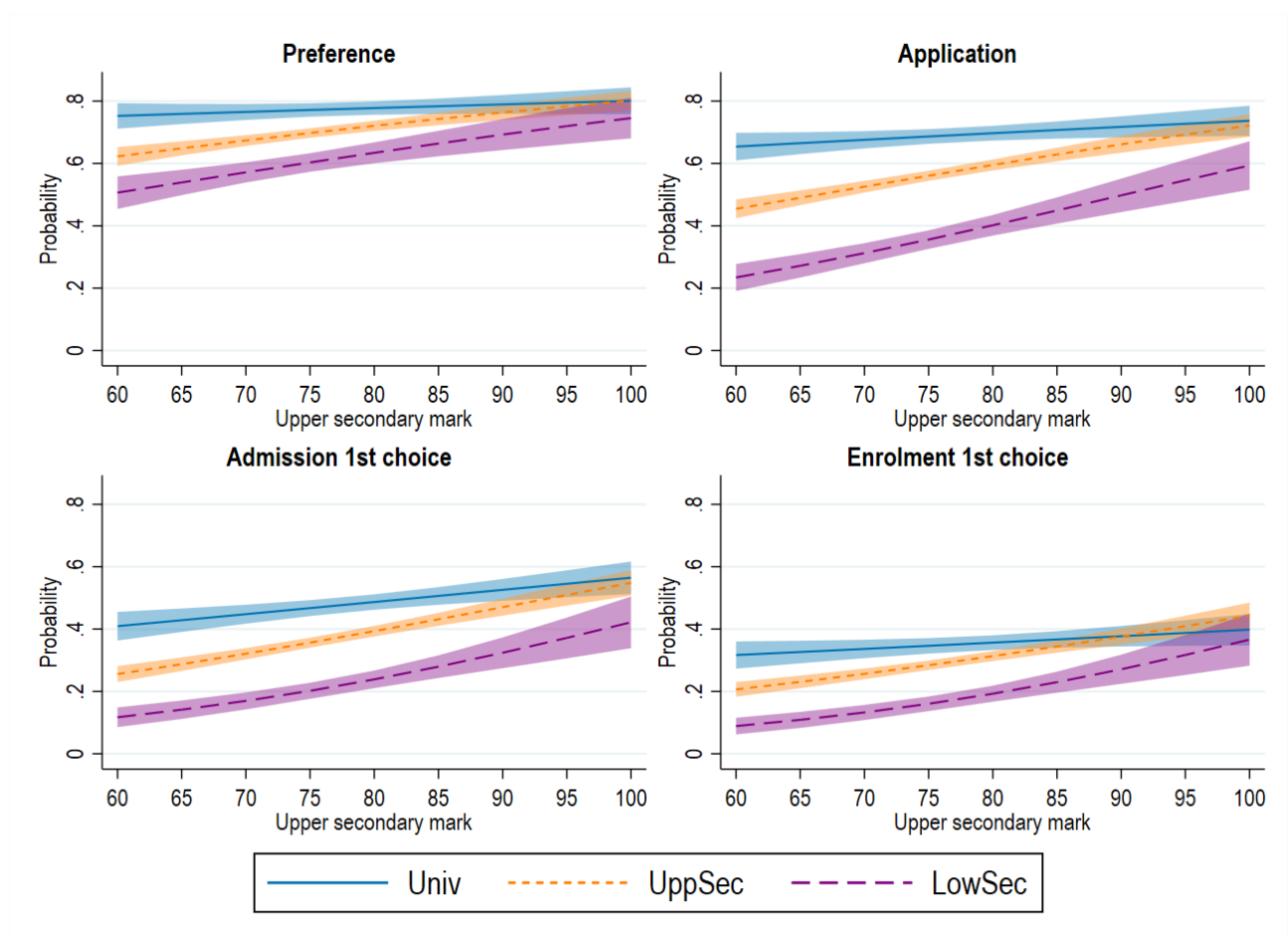
Finally, to understand if the CA mechanism may play a role, we interact with previous academic performance and social background, for which we here only consider parental education. Adjusted

⁷ It is a post-estimation method that, by the recovery of the ‘effect’ of a latent variable as a weighted sum of the observed variables, allows us to summarize the association between the regressors and the outcomes under a unique parameter (Sheaf 1972; Buis 2010).

models for gender, migration background, lower secondary mark, and school province yield interesting results at each stage pertaining to the choice of a selective degree program. Fig.4 shows the predicted probabilities of choosing a selective degree according to upper secondary final mark and parental education (fig. A3 in Appendix shows predicted probabilities for social class of origin). At each stage, there is evidence of the CA mechanism being in place: when previous performance is low, social background differentials are greater, with children of highly educated individuals being more likely to choose a selective degree than pupils with low-educated parents. These differences decrease as previous performance increase until they almost disappear among students with very high upper secondary marks. Particularly salient is the steepness of the lines: for students whose parents hold a tertiary degree the line is flat, meaning that those students have the same probability to choose a selective degree irrespective of their final high school mark. Whereas the line is much steeper among students with low educated parents: among them past negative outcomes are more consequential for their future educational choices.

Fig. 5. Predicted probabilities of selective degree programs according to high school final mark and parental education.

Note: models adjusted for gender, migration background, lower secondary marks, school province, and randomization



Results are in line with our hypotheses: patterns compatible with a compensatory advantage mechanism are clear at all stages of the degree choice process. Furthermore, this pattern is more marked at the application and admission stages. This holds also when we include more controls to our model (see Fig.A2 in appendix): although less evident, differences between social strata still exist in all our outcomes.

6. Concluding Remarks

This paper provides evidence of the effect of higher education selectivity on social inequalities in access to tertiary degree programs. Focusing on the educational choices of a cohort of Italian high school leavers, our aim was twofold: first, we wanted to assess if the choice and access to selective degree programs is stratified by social background. Second, we questioned the role of the compensatory advantage mechanism in shaping educational choices. The main novelty has been the introduction of selectivity into the stream of studies on university choices, as there is lack of empirical research investigating the consequences of higher education selectivity on educational choices, and how these effects differ according to social background. Furthermore, instead of focusing only on the final stage of the educational decision-making process, we consider the different steps embodying the decisional path to a selective degree program – the expression of a preference, application, admission, and actual enrolment. In doing so, we can assess the effect of both dimensions of higher education selectivity, which are self-selection and institutional selection. Finally, we have provided new evidence on a specific type of compensatory advantage (CA) mechanism in educational transitions and attainment, applying it to the selectivity of higher education.

Empirical results suggest how the choice and access to selective degree programs are strongly stratified by social background, both parental education and social class matter in all four stages of the educational path. Students from advantaged social backgrounds are more likely to express a preference for and choose selective degrees than their disadvantaged counterparts, thus confirming our first hypothesis (H1). That is the presence of an admission test may dissuade lower backgrounds students from accessing specific degree programs. This is true both for social class of origin and parental education at all stages, with a larger contribution of the latter. Differences are to be found in the pattern across the stages: class of origin matters more in the application stage, whereas parental education has a major influence both in the application and admission stages. Considering the two dimensions to which the four stages adhere, as hypothesized, both self-selection and institutional selection have a role in shaping social inequalities in access to higher education: concerning self-

selection, the social background effect is stronger when students decide where to apply than the preference stage (H2a). As suggested, this may be since the family of origin is more involved when effective choices are to be made and considerations about the costs and the probability of success in university studies have to be dealt with. The effect on the application stage holds even when conditioning on the performance expressed. Institutional selection matters as well: there is an effect of social background both on the admission and the enrolment stage, with a stronger influence on the former, thus supporting our hypothesis (H2b). However, when our esteems are conditioned on the former stage, enrolment is not significant anymore, meaning that those who are admitted tend to enroll in a degree course with a similar selectivity level; whereas admission is only significant when considering parental education.

In the second part of the paper, we have shown empirically how the CA mechanism matters in the choice of a selective degree program: social background differentials in the probability of expressing a preference, applying to, being admitted, and finally enrolling in a selective degree are greater among students with low previous academic performance, whereas they are much less evident among the high achieving students. That is differences in the choice of a selective degree course between students from lower and higher social backgrounds are visible among students who achieve lower marks and tend to disappear among high-achieving students, as hypothesized in H3. Students from higher social backgrounds show a greater advantage among low achieving students compared to students from lower backgrounds at all the stages of the educational path and tend to choose more selective degrees irrespective of previous performance. Indeed, low-background students appear to be rather responsive to their previous academic performances, such that poor academic performance is a strong predictor of choosing a selective degree. While higher background students are less affected by their previous school results: their probability of choosing a selective degree is fairly the same among low and high achievers. When we consider the two different dimensions of selectivity, we can see how patterns compatible with a compensatory advantage mechanism are more marked in one stage than the other within the same dimension, thus confirming our hypotheses. The application shows a much clearer pattern than preferences (H4a). Within institutional selection, a more marked pattern is to be seen at the admission stage than enrolment(H4b). However, the line for students with university-educated parents is steeper than among the enrollees: Admission depends indeed upon academic skills.

In sum, this paper provides novel evidence on the effect of selectivity in higher education. The implementation of selective criteria in university admission is justified and encouraged by a meritocratic system, that emphasizes the role of academic performances to gain admission and access

to higher education in line with neoliberal trends in higher education. However, this strategy may represent indeed a further barrier for low-income students, thus preventing them from accessing the desired degree program and potentially exacerbating already existent inequalities. Selectivity may be an important tool to regulate the quantity quality trade-off of students, and because of a lack of resources and available places, it may not be feasible not to implement this strategy. Nevertheless, admission tests do not fulfill this request since potentially skilled low-income students are self-excluded and left aside. Thanks to the focus on different stages of the educational path, we were able to identify the effect of the two dimensions of selectivity, thus allowing us to recognize the potential mechanisms at play. From these results we may derive two main policy implications: if admission tests are to be considered as an irreplaceable strategy, schools and universities may organize preparatory courses that may train students to handle this type of tests. Furthermore, as differences are evident even at the admission stage, presumably the most “merit-based” phase, and even controlling for previous academic skills, it may be the case that admission tests favor some students more than others, for example through questions that reflect high social background cultural standards: one solution for this could be to provide tests whose topics stick to the schools' programs.

References

- Ambler, J. S. and Neathery, J. (1999). Education policy and equality: some evidence from Europe. *Social Science Quarterly*, 80, 437–456.
- Argentin, G., & Triventi, M. (2015). The North-South Divide in School Grading Standards: New Evidence from National Assessments of the Italian Student Population. *Italian Journal of Sociology of Education*, 2015, 157-185.
- Arum, R., Roksa, J., and Budig, M. J. (2008). The romance of college attendance: Higher education stratification and mate selection. *Research in Social Stratification and Mobility*, 26, 107–121.
- Ayalon, Hanna, and Abraham Yogev. (2005). Field of Study and Students' Stratification in an Expanded System of Higher Education: The Case of Israel. *European Sociological Review* 21:227–41.
- Ballarino, G., Bernardi F., Requena, Schadee H. (2009) Persistent inequalities? Expansion of education and class inequality in Italy and Spain. - In: EUROPEAN SOCIOLOGICAL REVIEW. 25(1)123-138.
- Barone, C., Luijkx, R., Schizzerotto, A. (2010) Elogio dei grandi numeri: il lento declino delle disuguaglianze nelle opportunità di istruzione in Italia, in "Polis, Ricerche e studi su società e politica" 1:5-34
- Barone, C., Schizzerotto, A., Abbiati, G., & Argentin, G. (2017). Information barriers, social inequality, and plans for higher education: Evidence from a field experiment. *European Sociological Review*, 33(1), 84-96.
- Barone, C., Triventi, M., & Assirelli, G. (2018a). Explaining social inequalities in access to university: a test of rational choice mechanisms in Italy. *European Sociological Review*, 34(5), 554-569.
- Barone, C., Assirelli, G., Abbiati, G., Argentin, G., De Luca, D. (2018b). Social origins, relative risk aversion and track choice: A field experiment on the role of information biases. *Acta Sociologica*, 61(4), 441-459.
- Belmi, Peter, Neale, Margaret A., Reiff, David, & Ulfe, Rosemary The social advantage of miscalibrated individuals: The relationship between social class and overconfidence and its implications for class-based inequality. *Journal of Personality and Social Psychology*, Vol 118(2), Feb 2020, 254-282
- Bernardi, F. (2014). Compensatory Advantage as a Mechanism of Educational Inequality: A Regression Discontinuity Based on Month of Birth. *Sociology of Education*, 87(2), 74-88
- Bernardi, F., & Triventi, M. (2020). Compensatory advantage in educational transitions: trivial or substantial? A simulated scenario analysis. *Acta sociológica*, 63(1), 40-62.
- Brand, J. E., & Halaby, C. N. (2006). Regression and matching estimates of the effects of elite college attendance on educational and career achievement. *Social Science Research*, 35, 749–770.

- Breen, R., & John H. Goldthorpe. (1997). Explaining Educational Differentials: Towards a Formal Rational Action Theory. *Rationality and Society* 9:275–305.
- Breen, R. and Goldthorpe, J.H. (1999). Class inequality and meritocracy: a critique of Saunders and an alternative analysis. *The British Journal of Sociology*, 50: 1-27
- Brint, S., & Karabel, J. (1989). The Community College and Democratic Ideals. *Community College Review*, 17(2), 9-19
- Boudon, R. (1974). *Education, Opportunity, and Social Inequality: Changing Prospects in Western Society*. New York: Wiley
- Bourdieu P. e Passeron J.C. (1964), *Les Héritiers*, Les éditions de Minuit, Paris (transl. it. 1971 I delfini. *Gli studenti e la cultura*, Guaraldi, Bologna-Firenze)
- Bourdieu P. (1996). *The State Nobility*. Stanford, CA: Stanford University Press.
- Buchmann, C. Condrón, D., Roscigno, V. (2010). Shadow Education, American Style: Test Preparation, the SAT and College Enrolment. *Social Forces*, 89(2): 435–461.
- Davies, S., & Guppy, N. (1997). Fields of Study, College Selectivity, and Student Inequalities in Higher Education. *Social Forces*, 75(4), 1417-1438. doi:10.2307/2580677
- Deer, C. (2005). Higher education access and expansion: the French experience. *Higher Education Quarterly*, 59, 230–241.
- Delaney, J. and Devereux, P. (2020). How Gender and Prior Disadvantage Predict Performance in College. *The Economic and Social Review*, *Economic and Social Studies*, 51(2): 189-239.
- Duru-Bellat, M., Kieffer, A. and Reimer, D. (2008). Patterns of social inequalities in access to higher education in France and Germany. *International Journal of Comparative Sociology*, 49, 347–368.
- Erikson, R., & Jonsson, J. O. (1996). *Can education be equalized? : the Swedish case in comparative perspective*. Westview Press.
- Finger, C. (2022). (Mis) Matched College Aspirations and Expectations: The Role of Social Background and Admission Barriers. *European Sociological Review*, 38(3), 472-492.
- Gerber, T. P., & Cheung, S. Y. (2008). Horizontal stratification in postsecondary education: Forms, explanations, and implications. *Annual Review of Sociology*, 34(1), 299-318.
- Geven S, Wiborg ØN, Fish RE, van de Werfhorst HG. How teachers form educational expectations for students: A comparative factorial survey experiment in three institutional contexts. *Soc Sci Res*. 2021 Nov;100:102599.
- Givord, P. and Goux, D. (2007). France: mass and class – persisting inequalities in postsecondary education in France. In Shavit, Y., Arum, R. and Gamoran, A. (Eds.), *Stratification in Higher Education*. Stanford: Stanford University Press, pp. 221–375.
- Guetto, R., Vergolini, L. (2017) Educational expansion without equalization: a reappraisal of the ‘Effectively Maintained Inequality’ hypothesis in children’s choice of the upper secondary track, *European Societies*, 19:1, 1-27

- Hällsten, M. (2010). The structure of educational decision making and consequences for inequality: A Swedish test case. *American Journal of Sociology*, 116(3), 806-54.
- Heiskala, L., Erola, J., Kilpi-Jakonen, (2021). Compensatory and Multiplicative Advantages: Social Origin, School Performance, and Stratified Higher Education Enrolment in Finland, *European Sociological Review*, 37(2): 171–185
- Herbaut, E. (2021). Overcoming failure in higher education: Social inequalities and compensatory advantage in dropout patterns. *Acta Sociologica*, 64(4), 383-402.
- Holm, A., Hjorth-Trolle, A., & Jæger, M. M. (2019). Signals, educational decision-making, and inequality. *European Sociological Review*, 35(4), 447-460.
- Hoxby, C., (2009). The Changing Selectivity of American Colleges. *Journal of Economic Perspectives*, American Economic Association, vol. 23(4), pages 95-118
- Jerrim, J., Chmielewski, A. K., & Parker, P. (2015). Socioeconomic inequality in access to high-status colleges: A cross-country comparison. *Research in Social Stratification and Mobility*, 42, 20-32.
- Lievore, I., Triventi, M. (2022). Social background and school track choice: An analysis informed by the rational choice framework. *Acta Sociologica*, 65(2), 111-129.
- Liu, X., Thomas, S., & Zhang, L. (2010). College quality, earnings, and job satisfaction: Evidence from recent college graduates. *Journal of Labor Research*, 31, 183–201.
- Long, M. C. (2008). College quality and early adult outcomes. *Economics of Education Review*, 27, 588–602.
- Lucas, S. (2001). Effectively Maintained Inequality: Education Transitions, Track Mobility, and Social Background Effects. *American Journal of Sociology* 106: 1642–90.
- O’Sullivan, K., Byrne, D., Robson, J., & Winters, N. (2019). Who Goes to College via Access Routes? A Comparative Study of Widening Participation Admission in Selective Universities in Ireland and England. *Social Inclusion*, 7(1), 38-51.
- Panichella, N., Triventi, M. (2014) Social Inequalities in the Choice of Secondary School, *European Societies*, 16:5, 666-693
- Perna, L. W. (2006). Studying college access and choice: A proposed conceptual model. In *Higher Education*: (pp. 99-157). Springer, Dordrecht.
- Reimer, David, and Reinhard Pollak. (2005). The Impact of Social Origin on the Transition to Tertiary Education in West Germany, 1983 and 1999. Working Paper. Mannheimer Zentrum für Europäische Sozialforschung, Mannheim.
- Robinson, K. J., & Roksa, J. (2016). Counselors, information, and high school college-going culture: Inequalities in the college application process. *Research in Higher Education*, 57(7), 845-868.
- Ross CE, Mirowsky J. Sex differences in the effect of education on depression: resource multiplication or resource substitution? *Soc Sci Med*. 2006 Sep;63(5):1400-13.
- Ross CE, Mirowsky J. (2011) The interaction of personal and parental education on health. *Soc Sci Med*. ;72(4):591-9.

- Shamsuddin, S. (2016). Berkeley or bust? Estimating the causal effect of college selectivity on bachelor's degree completion. *Research in Higher Education*, 57(7), 795-822
- Shavit, Y. et al. (2007). *Stratification in higher education: A comparative study*. Stanford University Press.
- Shwed, Uri, and Yossi Shavit. (2006). Occupational and Economic Attainments of College and University Graduates in Israel. *European Sociological Review* 22:431– 42.
- Stevens, M. L., Armstrong, E. A., & Arum, R. (2008). Sieve, incubator, temple, hub: Empirical and theoretical advances in the sociology of higher education. *Annual Review of Sociology*, 34, 127–151.
- Terenzini, AF Cabrera, EM Bernal Swimming against the Tide: The Poor in American Higher Education. Research Report No. 2001-1. College Entrance Examination Board
- Triventi, M. (2013) The role of higher education stratification in the reproduction of social inequality in the labor market. *Research in Social Stratification and Mobility* 32: 45–63.
- Triventi, M., Vergolini, L. and Zanini, N. (2017). Do individuals with high social background graduate from more rewarding fields of study? Changing patterns before and after the 'Bologna process'. *Research in Social Stratification and Mobility* 51, 28-40
- van de Werfhorst, Herman G., Nan Dirk de Graaf, and Gerbert Kraaykamp.(2001). Intergenerational Resemblance in Field of Study in the Netherlands. *European Sociological Review* 17:275–93.
- van de Werfhorst, H. G., Alice Sullivan, and Sin Yi Cheung. (2003). Social Class, Ability and Choice of Subject in Secondary and Tertiary Education in Britain. *British Educational Research Journal* 29:41–62.
- Weber, M. (1978). *Economy and society: An outline of interpretive sociology*. Edited by Guenther Roth and Claus Wittich. Berkeley: Univ. of California Press
- Zhang, L. (2008). The way to wealth and the way to leisure: The impact of college education on graduates' earnings and hours of work. *Research in Higher Education*, 49, 199–213

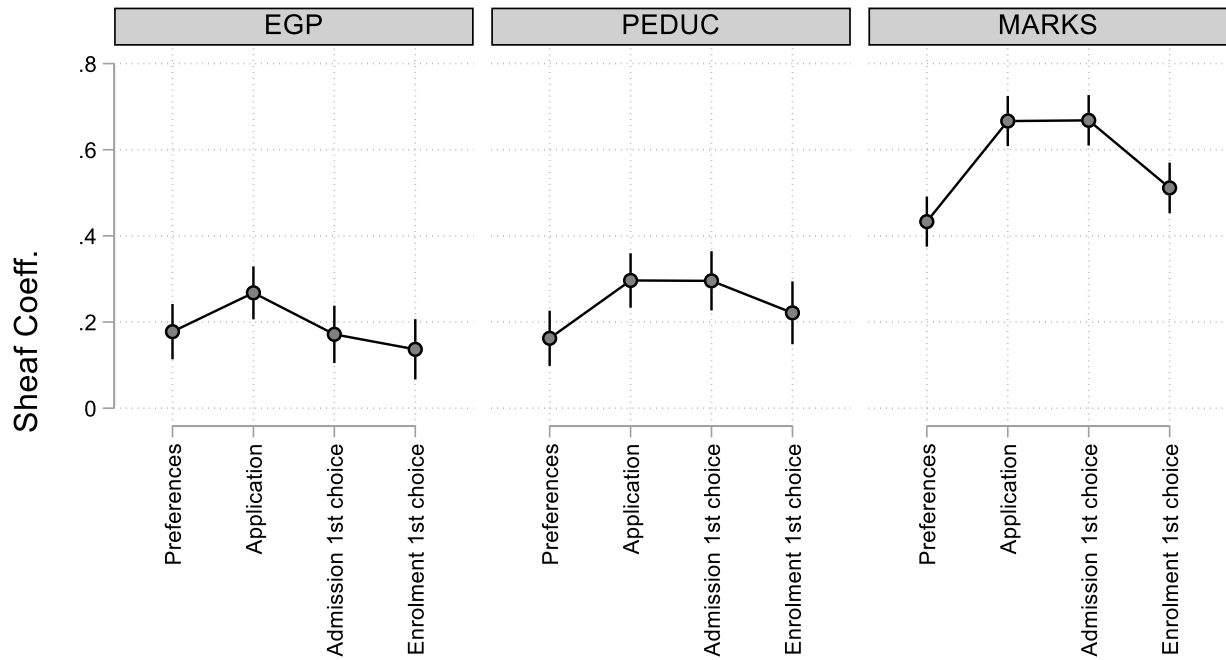
Appendix

Tab. A1 Descriptive statistics for our variables of interest (N. 7553)

Variable	Descriptive Statistics	
Outcomes		% / Mean
<i>First Preference</i>	No Preference	0.36
	Non-selective	32.2
	Selective	67.3
<i>Application</i>	No University	33.1
	Non-selective	12.2
	Selective	54.7
<i>Admission to First Choice</i>	No University	33.0
	Non-selective	12.4
	No pass first choice	18.1
	Pass first choice	36.4
<i>Enrolment to First Choice</i>	No University	38.5
	Non-selective	25.8
	Selective	7.3
	First choice selective	28.3
Independent		
Social Background		
<i>Social class</i>	Service class	13.4
	Higher-grade routine non-manual employees	44.7
	Petty bourgeoisie	17.1
	Lower grade routine non-manual employees	11.0
	Skilled manual workers	10.7
	Unskilled manual workers	3.0
<i>Parental Education</i>	Lower Secondary or lower	19.2
	Upper Secondary	56.1
	Higher Education	24.6
Ability		
<i>Upper Secondary Final Grade</i>	Range 60 - 100	76.1
Socio-demographic Controls		
Gender	Male	48.1
	Female	51.9
Province of Residence	Bologna	13.2
	Milano	43.7
	Vicenza	16.8
	Salerno	26.4
Citizenship	Italian	93.4
	Foreign	6.6
Tracking		
<i>Type of Diploma</i>	Academic	50.2
	Technical	31.3
	Vocational	18.4
Lower Secondary marks	Pass	13.6

	Good	29.1
	Very Good	40.4
	Excellent	16.7
Field of Study of Preference	Medicine	7.0
	Law	5.8
	Health	8.6
	Engineering	15.6
	Pharmacy	2.1
	Economics and Statistics	14.2
	Architecture	5.6
	Education	11.2
	STEM	3.5
	Geography	6.5
	Political and Social Sciences	5.2
	Humanities	14.3
	No preference	0.3
Rct Treatment	Control	52.4
	Treated	47.5

Fig. A1- Sheaf coefficient summarizing the 'direct effect' of social class of origin (EGP) and parental education (PEDU), and the 'total effect' of academic performance (MARKS) on the various stages of the path to a selective degree course



Tab.. A2 Unconditional and Conditional MORs

	MOR Unconditional				MOR Conditional		
	Preference	Application	Admission	Enrolment	Application	Admission	Enrolment
Parental Education							
<i>Upper Secondary</i>	1.340***	1.767***	1.786***	1.724***	1.730***	1.319*	0.923
<i>University</i>	1.696***	2.505***	2.521***	2.003***	2.298***	1.689***	0.729
EGP Parents							
<i>Higher Grade Routine non-manual</i>	0.766**	0.873	1.005	0.964	0.897	1.133	0.896
<i>Petty Bourgeoisie</i>	0.663***	0.654***	0.829	0.775*	0.716*	1.145	0.737
<i>Lower Grade Routine non-manual</i>	0.610***	0.539***	0.772*	0.803	0.551***	1.363	1.053
<i>Skilled manual</i>	0.515***	0.478***	0.695**	0.725*	0.508***	1.235	1.002
<i>Unskilled manual</i>	0.597**	0.487***	0.585**	0.542**	0.459***	0.895	0.682

Fig. A2 Predicted probabilities of selective degree program according to high school final mark and parental education.

Note: models adjusted for gender, migration background, lower secondary marks, school province, randomization, field of study and school track

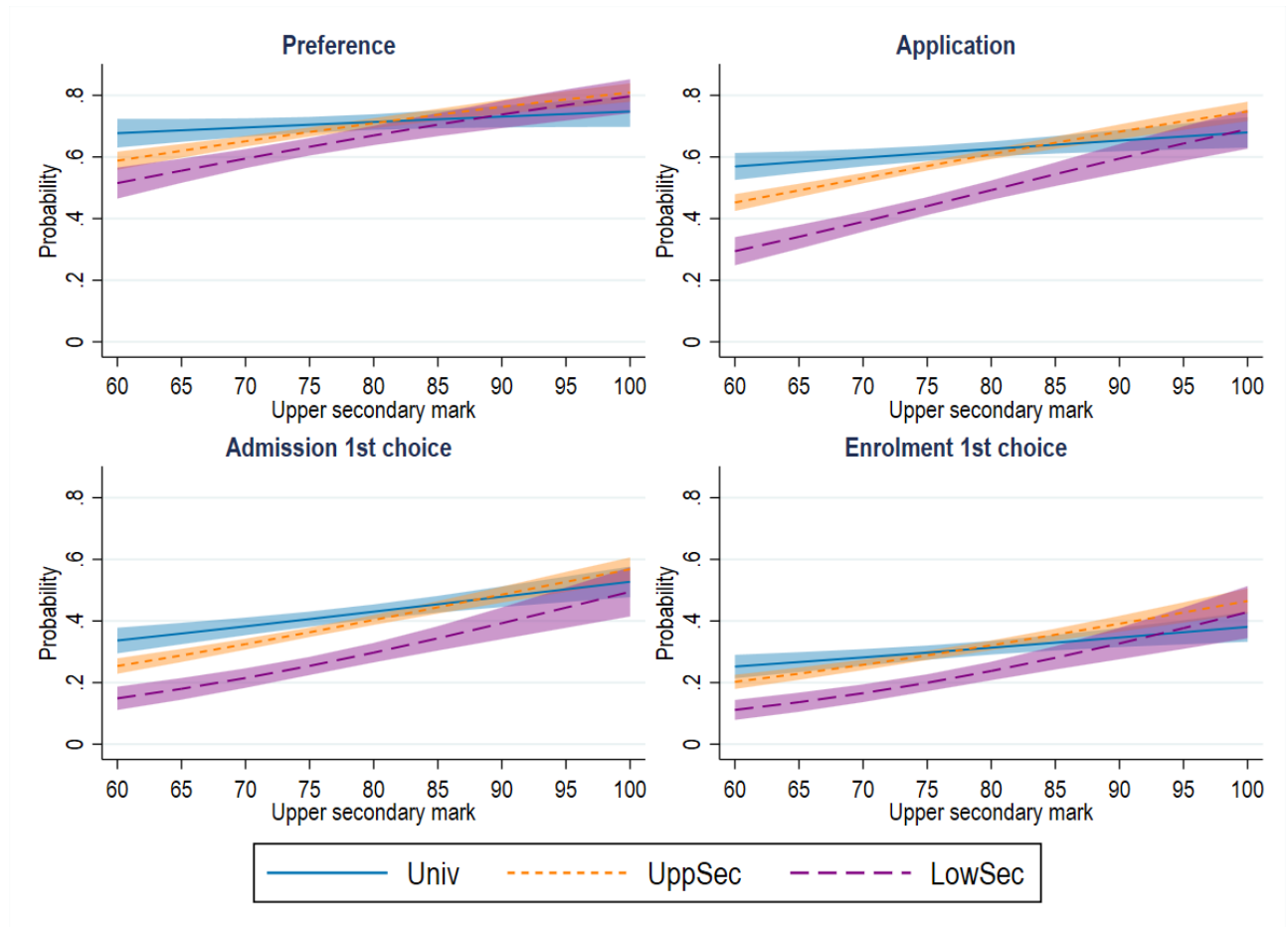
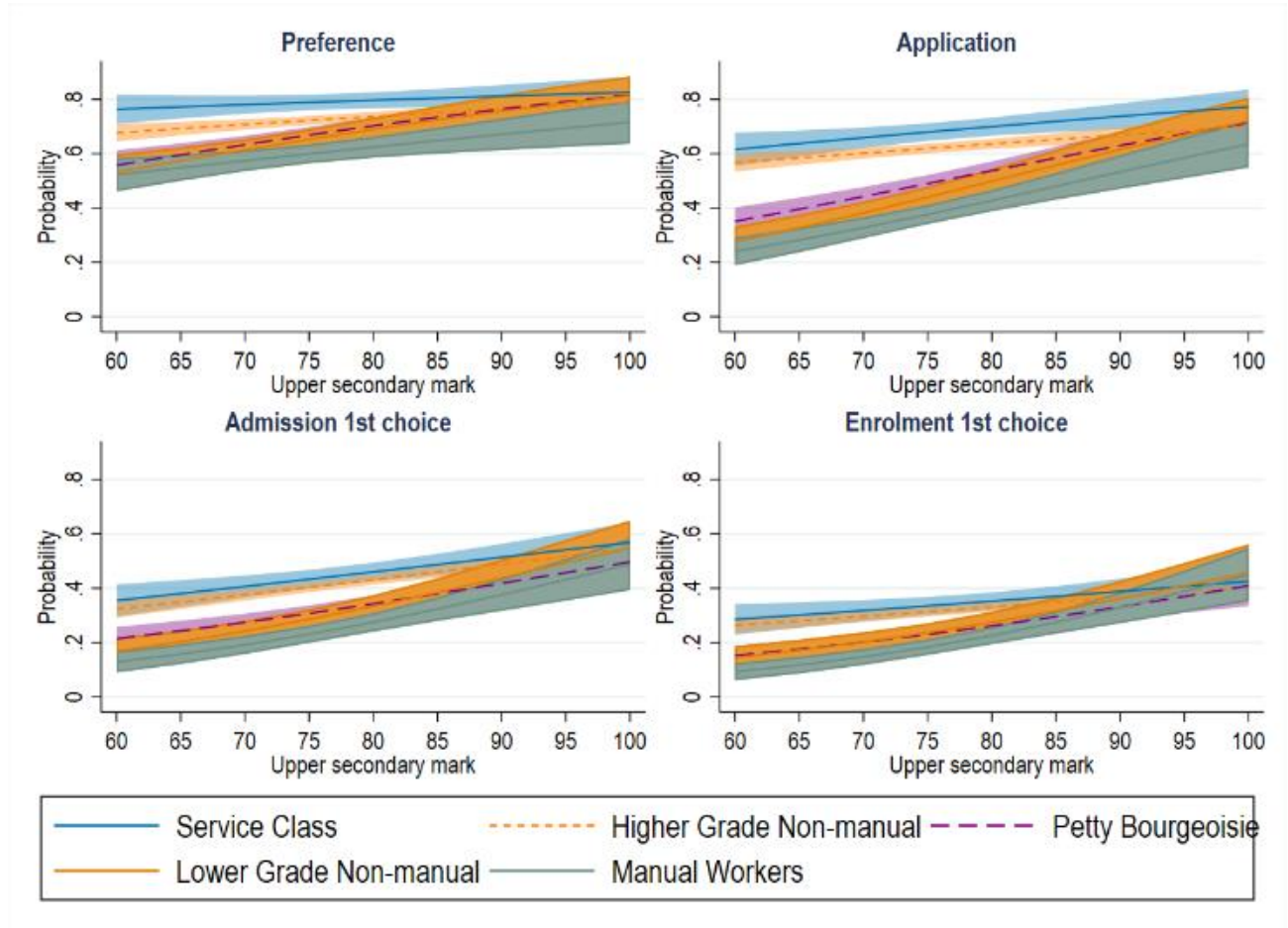


Fig. A3 Predicted probabilities of selective degree program according to high school final mark and parental social class.

Note: models adjusted for gender, migration background, lower secondary marks, school province, randomization, field of study, and school track



Does Attending a Selective Degree Program Improve Student Progression?

Evidence from a Self-Revelation Model

Abstract:

In past and recent years policymakers and observers in many developed countries have focused on widening university participation. However, increasing enrolment rates do not necessarily translate to improved degree completion chances. Thus, regulating the quantity-quality tradeoff of students has become imperative. One proposed solution involves the implementation of selective admission policies to guarantee that incoming students meet a minimum quality standard. However, the empirical evidence regarding the effects of these policies on students' academic performance and progression yields mixed results.

This paper aims to fill this gap by assessing the effect of admission tests on students' academic progression. We use longitudinal data from the 'Family Background, Education Beliefs, and Higher Education Participation' project in Italy, providing us with a rich covariates dataset. To account for the potential selection bias, we employ a self-revelation model and propensity score matching techniques. Our findings highlight a clear link between institutional selectivity and improved student academic progression. We make a novel contribution to this strand of literature: first, we move away from correlational studies and attempt to establish a causal relationship between selectivity and students' outcomes. Second, although our sample is not representative of the entire country, we focus on a broader context instead of a single institution.

Introduction

The global expansion of higher education has led to a marked surge in public investment in educational institutions, prompting growing concerns about the cost-effectiveness of tertiary education systems (Gray et al., 1995; Yorke, 1998). The successful completion of students' studies holds primary importance, as prolonged graduation timelines not only escalate public expenditure in tertiary education but also impose increased costs on students, their families, and taxpayers (Yorke, 1998; Bound et al., 2010): The longer it takes for students to graduate, the more money is spent on tertiary education, thereby expanding the financial burden. In the context of a knowledge-driven economy, the augmentation of skilled labor stands as a pivotal driver for overall economic advancement. Consequently, the graduation of students and the subsequent expansion of a skilled workforce have emerged as focal points in political agendas (Trow, 2007; Bailey, 2007).

Among the various policy instruments at the disposal of governments and universities, the provision of selective access to degree programs is a crucial and widespread factor, that can influence students' degree attainment, timely completion, and academic performance. Various underlying mechanisms are usually invoked to justify the introduction of admission tests. Selective institutions and degree programs can put in place a more organized and well-structured learning environment, since they avoid overcrowding, rely on more effective planning, and can provide an adequate set of resources to students. The favorable student-teacher ratio enhances the quality of interactions between students and faculty members, thereby improving student learning outcomes (Lundberg and Schreiner, 2004; Mayhew et al., 2016). Additionally, providing a selective entry test at admission is a way to engage in 'cream skimming', that is selecting from a larger pool of candidates who are more academically competent and motivated. When students engage with more capable peers, they are more likely to experience intellectual stimulation, fostering a conducive learning environment. Additionally, the presence of highly skilled students may compel faculty members to raise their expectations and standards, which might result in enhanced student progression (Pascarella, et al., 2005).

Nevertheless, the body of empirical research concerning selectivity and students' educational outcomes presents conflicting results. Some studies suggest a positive correlation between selectivity and completion rates, indicating that institutions with a higher degree of selectivity tend to facilitate student graduation more effectively (Orr, et al., 2017); whereas others find a non-significant or even negative effect.

This inconsistency can partly be attributed to variations in data and methodology (Heil, et al., 2014): Some studies concentrate on single prestigious institutions, while others encompass a broader

spectrum of universities. Additionally, especially in the US, while some studies focus on specific demographic groups (e.g. Black students) (Bowen and Bock, 1998), others attempt to estimate effects across all sociodemographic groups (Long, 2008). Variations in analytical approaches are also evident: while some studies use quasi-experimental strategies to estimate the causal effects of selectivity (Carrieri, et al., 2014), many offer a correlational approach that does not address selection biases adequately (Bowen et al., 2009). Furthermore, both the conceptualization of selectivity and students' outcomes change across studies, making it difficult to compare results. Some use the quality of the student body as a proxy of selectivity (Bowen and Bok, 1998), while others exploit admission requirements (Francesconi, et al., 2011). Some studies focus on academic performance, while others on completion (Zhang, 2005).

All in all, empirical evidence addressing specifically the impact of selective admission policies on students' academic progression remains scarce. This study aims to fill this void by assessing the effect of higher education institutional selectivity on students' academic progression in their first year of college. To achieve this objective, we harness unique data sourced from a longitudinal survey initiated under the 'Family Background, Education Beliefs, and Higher Education Participation' project, starting in October 2013 (Barone et al., 2017; Barone, Triventi and Assirelli, 2018). Albeit the sample employed in this study does not encompass the entirety of Italy, it covers various distinct geographical areas which represent well the heterogeneity in the sociodemographic and educational landscape within the country. Additionally, the longitudinal nature and the uniquely detailed set of information at the student level provided by such data sources allow us to provide credible evidence on the causal effect of attending a selective degree program on academic progression for recent cohorts of high school leavers.

In particular, to address our research question, we employ a self-revelation model (Dale and Krueger, 2002) integrated with a propensity score matching approach (Rubin, 1974) based on a rich set of individual and contextual covariates. Matching allows us to compare the academic progression of students attending a selective degree program with those of otherwise equal students who attend a similar but non-selective course. By forming 'statistical twins' based on a large set of relevant covariates, this approach is useful to account for the selection of the treatment based on observed characteristics (Rosenbaum and Rubin, 1983). To account for additional potential unobserved factors, this method is augmented by a "self-revelation" strategy, according to which individuals reveal their unobserved ability and motivation through their college application behavior. By exploiting unique information on the number and kind of applications by high school leavers, we are in the position to

gather relevant proxies of individual features such as ambition and academic potential, not fully measured by the observed covariates.

In this way, we attempt to answer the question of whether being enrolled in a selective degree program increases a student's progression once selection bias is aptly accounted for. It is crucial to carefully address the potential selection bias because otherwise, we would not be able to discern whether the higher academic progression observed in selective degree courses is primarily attributable to the highly qualified student body or if the institution's selectivity itself contributes significantly to the enhanced benefits experienced by students attending these programs, irrespective of their initial academic skills and motivation. Failing to address this bias hinders our ability to disentangle and accurately ascertain whether institutional selectivity or the caliber of students primarily drives the potential superior academic outcomes witnessed in these degree programs.

This paper is organized as follows: The first section provides a theoretical background and a discussion of potential underlying mechanisms. Then, the next section illustrates the state of the art of the studies aimed at assessing the effect of selectivity on students' academic outcomes. Additionally, we discuss confounding factors and selection bias in evaluating selectivity effects. In the fourth section, we present the data and the identification strategy, while section five showcases the main results on academic progression. Finally, the last section summarizes the main findings and lessons learned.

1. Theoretical Background and Hypotheses

Even if the implementation of admission tests to access university has sparked a significant public debate in Italy, only a limited number of studies have delved into this issue (Francesconi et al., 2011; Carrieri et al., 2014), and none of them have integrated it into a comprehensive theoretical framework.

The literature on higher education has extensively explored various theoretical models aimed at understanding the factors influencing students' educational outcomes. These models delve into the interplay of individual and institutional attributes in affecting students' academic careers. For instance, Tinto's interactionist approach, developed in 1987, is one of the most influential in this regard. This approach builds upon Spady (1970) and introduces the Student Integration Model (Tinto, 1975), which has undergone continual refinement by Tinto and other scholars. Notably, this framework extends beyond psychological and social determinants of students' outcomes, to incorporate an organizational and contextual perspective, emphasizing the pivotal role of reciprocal interactions between individuals and their educational environments. Central to Tinto's theory is the

notion that experiences fostering students' social and intellectual integration within university communities enhance their commitment and reduce the risk of dropout.

Pascarella (1985), drawing inspiration from Tinto's work, formulated the Student-Faculty Informal Contact Model, positing that informal interactions between students and faculty members, particularly in the initial year, correlate positively with student retention. Notably, Pascarella, in his Student-Faculty Informal Contact Model, considered explicitly the role of institutional factors in affecting college students' trajectories and outcomes. It contends that the structural and organizational attributes of colleges and universities may have a limited direct impact on students' emotional and personal development. This, however, does not diminish their overall significance in the college experience or their potential influence on student development. The effects of structural factors on student development may be subtle and indirect, primarily mediated through activities and interactions with individuals and entities more closely tied to the student's college experience. Nevertheless, notwithstanding their indirect role, these structural characteristics do exhibit ultimately notable effects on various measures of students' academic integration and socialization.

In summary, these theoretical models suggest that institutional structural and organizational attributes may exert minimal direct effects on students' academic careers. Nevertheless, these attributes can impact immediate aspects of a student's life, such as their level of academic integration or engagement within the institution's social system. These factors, in turn, can have significant direct consequences on student development (Pascarella, 1985).

Although these theoretical models highlight the role of organizational factors in shaping students' outcomes, it is less clear what mechanisms may lie under the potential relationship between selectivity and academic performance. I will in turn review the relevant ones, dividing them into three categories – student-related factors, faculty-related factors, and institutional-related factors.

Student-related factors

Attending a selective degree program might affect students' academic outcomes by influencing their attitudes, motivation, and behavior (socio-psychological factors), as well as the quality of their interaction with their peers (peer effects).

Students attending a selective degree program are likely to achieve better academic performance due to heightened motivation resulting from their success in passing the admission test. Success can impact motivation in various ways. Firstly, passing an admission test can serve as a positive reinforcement. Experiencing success can be highly motivating, instilling a belief in one's abilities and driving individuals to establish and pursue new goals. Success provides positive feedback, further

fueling the motivation to persist in diligent efforts. This aligns with the principles of operant conditioning (Altman and Linton, 1971), where those who attain success are more inclined to engage in behaviors that contribute to their success, reinforcing their motivation to continue these behaviors. Additionally, success has the potential to bolster self-confidence. Belief in one's capabilities fosters a willingness to embrace new challenges and pursue goals with enthusiasm, making self-confidence a potent motivator. According to self-determination theory (Deci and Ryan, 2004), people are more motivated when they feel competent and capable of reaching their objectives. Success reinforces this sense of competence, subsequently boosting motivation (Guay, 2022).

Moreover, success can enhance self-efficacy, which refers to a person's belief in their ability to accomplish tasks and achieve goals (Bandura, 1977; Schunk, 1989). Higher self-efficacy is linked to increased motivation to tackle new challenges and persevere in the face of obstacles. Furthermore, students who achieve success through admission test passage may set loftier goals, thereby motivating themselves to aim higher and pursue more ambitious objectives. Success creates a sense of momentum, propelling individuals to strive for even greater accomplishments.

Lastly, success can amplify intrinsic motivation, which originates from personal satisfaction and enjoyment. When individuals find fulfillment and joy in their achievements, they are more likely to remain motivated to engage in similar activities or pursue analogous goals.

In summary, success in passing an admission test may have a profound impact on student's motivation, affecting their academic progression through various mechanisms, including positive reinforcement, increased self-confidence, enhanced self-efficacy, and the inspiration to set and achieve higher goals, all while enriching intrinsic motivation through personal fulfillment and enjoyment.

Students in selective programs are surrounded by peers who are highly motivated and academically accomplished. This can create a competitive yet supportive environment where students push each other to excel and perform at their best. As Pascarella et al. (2006) suggest, students' interactions with one another represent a major dimension of the educational impact of an institution on any one student. Consequently, the more skilled the peers are, the greater the likelihood of the students being intellectually stimulated in their interactions with them. Attending a selective institution presumably guarantees pupils better peers and social networks. Peer effect refers to the influence of a reference group on individuals' behavior or outcomes. Peer effect occurs when student B influences student's A educational outcomes. There could be a direct peer effect: student B affects A's educational outcome without changing student A's or anyone else's behavior. This might be the case in which student B answers the teacher's questions well so that A learns from B. Also, the peer effect might be indirect in the sense that A wants to emulate B. Moreover, B might also influence the teachers' behavior, for

example, motivating them and stimulating discussions from which A benefits (Epple, et al., 2003). A student surrounded by able and motivated peers benefits from higher quality in-class discussions, help in understanding the class attended and the material assigned (ibidem).

Faculty related factors

This second order of factors moves from the students' emotional and relational experience to the external influence of their faculty members and additional learning opportunities.

Selective programs select students based on their academic skills, and, for this reason, these programs are commonly thought to have on average better-skilled enrollees and a more homogeneous student body in terms of abilities and motivation. Therefore, these courses may often set higher academic standards that may encourage students to strive for excellence: Students may be more motivated to meet these standards, which can positively impact their academic performance (Darling-Hammond, 1999; Hout and Elliott, 2011; Hanushek and Woessman, 2015).

Moreover, teachers may have high expectations for student progression, both academically and behaviorally. Expectations can motivate students to work harder, meet deadlines, and take their studies more seriously, contributing to on-time degree completion (Strauss and Johnson, 2006).

Also, academically skilled students may provide faculty members to increase their academic expectations and demands from students and, thereby, even further enhance the impact of an institution on its student body (Pascarella et al., 2006). There is both experimental and correlational evidence that effective teaching – particularly, teacher clarity and teacher organization - has positive effects on students' performances, intended as both knowledge acquisition and more general soft skills (Pascarella et al., 1996; Wood and Murray, 1999). Teachers with more skilled students dedicate more time and effort to the design of and preparation for their lessons and courses, establish and communicate precise learning goals, and employ effective feedback practices (Schneider and Preckel, 2017) However, there is also evidence that effective teaching at the undergraduate level may positively influence students' degree completion; this influence is independent of background characteristics, tested ability, grades, and social involvement (Pascarella et al., 2006).

Selective programs may provide more comprehensive mentoring and advising programs to guide students through their academic journey. This personalized support can help students make informed decisions, stay on track, and complete their degrees on time.

Environmental factors

This last category groups factors referring to the various influences within a learning setting that can impact students' academic progression, learning experiences, and overall educational outcomes that encompass both physical and socio-cultural aspects of the educational environment.

Among the objectives of institutional selection is the regulation of the quantity-quality trade-off of students, resulting in an appropriate number of students across degree programs with an adequate level of academic preparation. Smaller class sizes may allow for more personalized attention from professors but also adequate and well-maintained facilities, such as libraries, laboratories, and a major availability and accessibility to technologies, computers, and internet access. This can lead to increased engagement, improved understanding of course materials, and better academic performance (Bedard and Kuhn, 2008; Kokkelenberg, Dillon, and Christy, 2006). Moreover, with fewer students in a class, instructors can employ more interactive teaching methods. This can promote greater engagement among students, fostering critical thinking, deeper comprehension, and a more active learning experience (Bonwell and Eison 1991). University courses with a selective admission test are also able to create a relatively homogeneous student body – both in terms of ability and sociodemographic characteristics – that may enhance students' academic and social integration, leading to better performances.

2. Previous studies on selectivity in higher education and students' academic outcomes

The empirical evidence regarding the effects of implementing selective admission schemes on student academic outcomes predominantly originates from the US context. Results from these studies are mixed and potentially suffer from self-selection bias since most of them adopt a correlational approach. Following this line, Bridgeman et al. (2004) demonstrate how there are significant variations in the percentage of students who achieve success, based on their SAT score levels. This trend persists even after considering the high school curriculum and high school grades. (Park and Kerr, 1990;; Titus, 2006; Kim, 2007; Noble et al., 2005; Gansemer-Topf and Schuh, 2006). On the other hand, some studies have shown a negative or non-significant association: once high school grades have been taken into account, the institutional selectivity appears ineffective (Crouse and Trusheim, 1988; Perkhounkova et al., 2006; Geiser and Santelices, 2007).

Moving from correlational research, in the US Heil et al., (2014) employing multilevel models and propensity score matching methods to mitigate selection bias, the researchers discovered that selectivity does not exert an independent effect on graduation. Instead, they identify relatively minor positive impacts on graduation associated with enrolment in colleges with higher tuition costs.

Moreover, their findings indicate no evidence suggesting that students who do not attend highly selective colleges experience diminished prospects of graduation, holding all other factors constant. Similarly, Alon and Tienda (2005), Long (2008), and Melguizo (2008) incorporated statistical adjustments to address selection bias and observed a positive effect of selectivity on students' attainment. However, Melguizo (2008) highlighted that the effect of selectivity diminished after accounting for the selection bias. Additionally, Zhang (2005) assessed positive associations between selectivity within undergraduate courses and subsequent attainment of graduate education.

In Italy, Francesconi et al. (2011) use a quasi-experimental design to account for self-selection into selective degree courses. Employing a difference in difference approach they take advantage of an admission policy change in a leading private university in Northern Italy. The study shows how selectivity might not result in improved student results, such as an increased probability of degree completion, achieving top grades, and meeting the prescribed minimum duration for their study curriculum. Conversely, Carrieri et al. (2014), using a similar approach in a large public university located in Southern Italy, have examined whether the introduction of a selective admission test affects students' academic performances and progression. They found that the introduction of a selective entry test leads to a reduction in the dropout rates by 14%. Furthermore, they show how still enrolled students benefit from the policy change, since the analyses display an improvement of the grade point average at the end of the first year, by almost 0.78 points among those students who have a grade point average different from zero.

3. A discussion of selection bias in studying the effects of higher education selectivity

In studying the impact of attending a degree program with a selective entry test on academic progression among first-year university students, selection bias is a natural concern that arises since the process of selecting students for the program is not random. In a scenario where admission to the program is based on a selective entry test, students who are accepted into the program may differ systematically from those who are not accepted. This difference in characteristics could influence academic progression independently of the program itself, making it challenging to attribute observed outcomes solely to the program. For instance, students who perform well on the entry test may have certain qualities or skills that contribute to their academic success, regardless of the program's impact. Additionally, degree programs and institutions that adopt entry tests might systematically differ from others in various features, which could independently also affect students' academic progression. To address this issue, it's essential to account for pre-existing differences between students and degree programs by employing rigorous research methods that try to minimize the selection bias issues derived from both observed and unobserved characteristics. In this section, we aim to discuss the

main sources potentially confounding the estimation of the impact of attending a selective degree program in Italy, and in the next one, we explain how we deal with each of them.

These factors can be grouped into two broad families: individual and contextual/institutional factors. Among individual factors, the most important ones are 1) students' sociodemographic characteristics, 2) their academic competence (and academic potential), and 3) their ambition, motivation, and aspirations. Among the most important contextual factors we identified 4) the institutional quality and 5) the field of study as crucial features to be taken into account.

1) *Students' sociodemographic characteristics*. Social background is a major individual characteristic that significantly influences academic progression from an international perspective (e.g. Rodríguez-Hernández, Cascallar, and Kyndt 2020). Also in Italy, students from socioeconomically advantaged backgrounds have been found to have lower dropout risks (Argentin and Triventi 2010; Belloc, Maruotti, and Petrella, 2011; Aina 2013) and a higher probability of completing their studies on time (Triventi and Trivellato 2008; Aina, Baici, and Casalone 2013). Even among equally talented students, those from disadvantaged backgrounds may face greater obstacles in their educational path, due to limited access to educational resources, increased stressors, major economic constraints, and the need to work during their academic journey (Stinebrickner and Stinebrickner, 2003; Triventi, 2014; Scott-Clayton and Minaya, 2016).

2) *Students' academic competencies*. Another important individual-level characteristic associated with university achievement is the student's high school progression. A large body of literature identifies high school performance as the best predictor of academic success (DeBerard, et al., 2004; Geiser and Santelices 2007; Clinedinst, et al., 2011; Vulperhorst, et al., 2018; Galla, et al., 2019). Furthermore, the predictive validity of high school performance may differ according to different high school diplomas (Fu, 2012; Vulperhorst, et al., 2018). In turn, high-performing high school students tend to self-select (Dale and Krueger, 2002) and enroll in more selective degrees, as shown in the previous chapter of this dissertation.

3) *Students' ambition, motivation, and aspirations*. A student's ambition, motivation, and aspirations can contribute significantly to academic achievement (Robbins et al., 2004; Wigfield et al., 2016; Brian P.An, 2016; Steinmayr, et al., 2019). Furthermore, students by setting specific goals increase their motivation enhancing academic performance (Martin and Elliot, 2016). Academic ambition and motivation seem to be an important determinant net of prior achievement: Jerrim et al., 2020, find that academically ambitious and driven students achieve higher grades than their peers, even controlling for prior academic attainment and school attended. More motivated students tend also to choose more selective and prestigious fields of study (Skatova and Ferguson, 2014).

4) *Institutional quality*. At the institutional level, university quality remains a crucial determinant impacting student performance. Extensive literature underscores the pivotal role of higher-quality universities in fostering enhanced academic outcomes (Pascarella and Terenzini, 1991). Moreover, well-reputed institutions tend to attract and retain top-tier faculty members renowned for their expertise, pedagogical excellence, and provision of effective mentorship, consequently influencing the academic trajectory of students. Recent research emphasizes the substantive impact of teacher quality on students' academic achievements. (Card and Krueger, 1992, 1998; Hoxby, 2002; Hoxby and Leigh, 2004; Jacob and Lefgren, 2005; De Paola, 2009). Additionally, institutions' financial resources have emerged as an important aspect to be taken into account when understanding student educational outcomes (Ryan, 2004; Gansemer-Topf and Schuh 2006; Webber and Ehrenberg, 2009; Pike et al., 2006). High-quality institutions often possess major economic resources, and this translates into well-equipped libraries, laboratories, and advanced technology infrastructure, thereby substantially enriching the overall learning experience (Smart, et al., 2002; Stone et al., 2011). Moreover, universities with robust financial backing can extend various forms of financial aid, including scholarships and grants, significantly alleviating financial burdens on students. This alleviation, in turn, enables students to devote greater focus and dedication to their studies, ultimately enhancing their academic performance (Dynarski 2003; Goldin and Katz 2008; Bowen, et al., 2009; Goldrick-Rab, et al., 2009; Deming and Dynarski, 2010; Goldrick-Rab, et al., 2016). Therefore, if such higher-quality institutions are also more likely to introduce admission tests, given their potential impact on students' careers, they represent another possible confounding factor.

5) *Field of study*. According to ANVUR (2018), the drop-out rates vary significantly among different fields. Generally, there is an evident gap between scientific and humanistic degrees. For instance, in the year 2015/16 approximately 20% of law students did not progress to their second year, followed by earth science and agricultural studies, 17% and 16% respectively. In contrast, the drop-out reaches its lowest point at 7% for Medicine. Vergolini and Vlach (2023) examined differences in the drop-out rate during the Great Recession according to the field of study. They found that every field experienced an increase in the drop-out rate. Highly remunerative fields, such as Engineering and Architecture exhibit larger dropout rates increase.

4. Research hypotheses

Drawing on this literature, we may elaborate alternative hypotheses.

First, we hypothesize a positive association between selectivity and students' progression. Therefore, even though accounting for the selection bias and confounding factors may reduce its effect, selectivity enhances students' progression. Aligning with this expectation, the previously exposed literature suggests a connection, whose underlying mechanisms have been discussed above. We believe that the positive association may be due to the homogeneity of the student body which may enhance students' integration, leading to better performances and progression. As highlighted in the previous chapters of this thesis, we speculate that the student body, having already been selected, is relatively homogeneous, and there is less variation within students' academic and ascriptive characteristics. Furthermore, admitted applicants may experience heightened motivation upon receiving admission, reaffirming their suitability for the degree program and thus enhancing their performances and chances of progression.

Alternatively, the '*no effect*' hypothesis asserts that attending a selective degree course makes no systematic difference to students' progression. Following this line of thinking, there could be no effect because more skilled and motivated students self-select into selective degrees, thus increasing the academic outcomes of these degree enrollees. Furthermore, the empirical evidence of a relationship between selectivity and better educational outcomes in Italy is mixed. These studies may not yield significant results within the Italian institutional context, which, to a considerable extent, continues to feature a substantial number of high-quality institutions and degree programs that do not prioritize academic selectivity in their undergraduate admissions (Carrieri, et al., 2014). The main evidence supporting this hypothesis derives from the fact that some degree programs that provide for an admission test may rely on a limited pool of applicants, which in some cases may even not exceed the number of potential enrollees. Hence, the student body in those degrees may not be homogeneous, preventing them from feeling integrated into the system.

4.1 How to deal with unobserved heterogeneity: the Self-Revelation model

Including a large number of relevant variables in statistical models could be a way to account for selection bias, but there is always the risk that unobserved factors such as students' ability, motivation, and aspirations still can bias the estimates (Angrist and Pischke, 2007). To deal with this problem, Dale and Krueger (2002) proposed what they called a 'self-revelation model', which has been used later in other studies (e.g. Borgen, 2014). The authors elaborate on Barnow, Goldberger, and Cain (1981) who suggest that achieving unbiasedness in estimation is feasible when the factors determining the assignment rule are identifiable, quantifiable, and incorporated into the regression equation. They

extend the concept of ‘selection on the observables’ to ‘selection on the observables and unobservables’, arguing that information about unobservable variables can be inferred from the outcomes of independent admission decisions made by the schools to which a student applied. This extension aims to account for selection bias by leveraging information from the outcomes of separate screening processes.

Based on this premise, the Self-revelation approach contends that leveraging the pattern of college applications submitted by students can help mitigate some, though not all, of the confounding factors arising from unobserved endowments and aspirations. In their self-revelation model, they posit that students "disclose" their endowments, motivation, and ambition through their university applications. Students with significant abilities and ambitions are more inclined to apply and be admitted to prestigious universities. Consequently, Dale and Krueger (2002) propose the use of students' college admission and application information as a means to gauge their unobserved endowments and aspirations. The fundamental assumption underlying this approach is that students applying to top-tier universities possess greater unobserved endowments and aspirations compared to those applying to lower-quality institutions. This is reasonable in the United States, but also in Italy, since the probability of applying to selective degree programs is positively associated also with socio-economic advantage and final marks in upper secondary education, as shown in the previous empirical chapter of this Ph.D. thesis. For this reason, we will build some variables inspired by this approach to capture possible additional unobserved students' characteristics and make the identification of the effect of attending a selective degree program more credible.

5. Data and Variables

The data used in the analysis is derived from a longitudinal survey undertaken as part of the 'Family Background, Beliefs about Education, and Participation in Higher Education' project, which was initiated in October 2013. The data collection involved a stratified random sample of 62 Italian schools spread across four provinces—Milan, Bologna, Vicenza, and Salerno—representing diverse regions in Italy. Stratification was based on province and school track. The initial data collection occurred during the first wave, followed by three subsequent surveys conducted in the months that followed.

It's crucial to highlight that individuals not enrolled in university during the third wave (November 2014) and those with missing values in pertinent variables were excluded from subsequent analyses. Our study incorporates information from all waves: socio-demographic characteristics were derived from the first wave in October 2013; educational intentions were sourced from the second wave in May 2014; actual university choices, including application and enrolment details with or without

admission tests, were recorded in the third wave, November 2014. Finally, the fourth wave in October 2015 provided insight into students' academic progress during their first year of enrolment.

Supplementing our dataset, we integrated additional data from La Repubblica – CENSIS Ranking published in the year 2015. The final score is the average of the scores obtained by each university in the 5 evaluated dimensions on a scale ranging from 66 (minimum value) to 110 (maximum value). The indicators used for the evaluation of universities are as follows: (1) Services: number of meals provided/enrolled students; number of accommodations and grants/enrolled residents from outside the region; (2) Scholarships and contributions: expenditure of universities and institutions for student support interventions /total enrolled students; (3) Facilities: classroom seats/enrolled students; seats in libraries/enrolled students; seats in scientific laboratories/enrolled students; (4) Communication and digital services: score resulting from the analysis of the characteristics and functionalities of university websites, their respective official social media profiles, and the efficiency of response provided by these channels; (5) Internationalization: foreign students/enrolled total; students who have spent a period abroad for study or internship/enrolled students net of new enrolments; foreign students who have spent a study period at the university/total enrolled students; expenditure of universities and institutions for student international mobility /total enrolled students net of new enrolments.

Our dependent variable is academic progression, measured as the number of academic credits gained during the first year of enrolment. It is expressed using the European Credit Transfer and Accumulation System (ECTS), which is a standard for comparing and understanding academic credits across different European countries and higher education institutions. ECTS is widely used in the European Higher Education Area (EHEA) to facilitate the recognition and transfer of credits between universities and promote student mobility. ECTS is based on the workload students need to achieve the intended learning outcomes of a program. One ECTS credit is generally equivalent to 25-30 hours of student work, including lectures, seminars, independent study, exams, and other forms of assessment. ECTS credits are allocated to courses based on the estimated student workload required to achieve the learning outcomes. A full year of study at a university typically corresponds to 60 ECTS credits, while a semester is around 30 credits. The variable is continuous and ranges from 0 to 100.

Our main independent variable is a dummy variable, assuming a value of 0 if the student enrolls in a non-selective degree program and 1 if admission to the course mandates passing an admission test. The respondents themselves provide this information.

Further, control variables—both basic and main—were included, aligning with the theoretical framework.

The students' socio-economic background is expressed by both parental level of education and social class of origin. Parental education is a categorical variable with three categories (lower secondary or lower, upper secondary, and higher education). The categorization of the social class follows the EGP schema with 5 categories: the service class, higher grade routine non-manual workers, petty bourgeoisie, lower grade non-manual workers, and skilled and unskilled manual workers.

To assess students' competencies, we consider several variables associated with their high school experiences and performances. These variables include the upper secondary final mark, a continuous variable ranging from 60 to 100; the lower secondary final mark, a categorical variable with four categories (Pass, Good, Very Good, Excellent); high school retention, a categorical variable with a value of 0 if the student has never experienced school failure, 1 if the student experienced retention once, and 2 if retention was experienced twice or more. Finally, we include the school track, a categorical variable with three categories (academic track, technical track, and vocational track).

Aligned with the theoretical framework, we then add motivation-related variables. The students expected probability of success⁸, which is a continuous variable that has been constructed by computing the means of the answers that referred to the first three selected fields of study. The perceived difficulty of university studies is a continuous variable whose values refer to the student agreement on a scale from 1 (not at all) to 10 (very much) on the statement "University studies are difficult". The student's tendency toward academic studies is again a continuous variable built on the student's answer to the question "On a scale from 1 to 10, how much are you inclined towards studying?". All the above variables have been standardized so that they have a mean of 0 and a standard deviation of 1. Finally, the type of job the student desires, is measured by a dummy variable taking on value 0 if the desired job requires a university degree, and 1 if it does not. Furthermore, we include two additional variables related to the students' economic support. The first reflects the working status of the student: the dummy variable assumes a value of 0 if the student is currently working or worked during the first enrolment year and assumes a value of 1 otherwise. The second refers to the scholarship status, which has three categories: the student is a scholarship holder, the student applied for a scholarship but was not awarded one, and the student did not apply.

Going to the institutional factors, the field of study is a categorical variable with 6 categories: Science, Medical Studies, Technical, Social Sciences, Law, and Humanities. To control for the quality of the

⁸ Students were asked "If you enrolled at university, what chance of completing each of your preferred fields do you think you would have? Please give a number between 0 (no chance at all) and 100 (sure to achieve the degree)". Students could choose a maximum of three fields.

institution the student is enrolled in we use the Censis-La Repubblica ranking: a continuous variable that ranges from 70 to a max of 102.2.

The self-revelation variables assess the quality of the universities to which students submitted applications and gained admission. Our underlying assumption is that students who apply to and are admitted to high-quality institutions typically possess higher levels of academic endowment and ambition in contrast to those who target lower-quality institutions (Dale and Krueger, 2002). To create the self-revelation variables, we utilize the previously mentioned quality rankings: for each student, we document the quality ratings of the universities they applied to and were accepted by. Given that individuals may apply to and gain admission to multiple institutions, we calculate the average quality metrics across all their college applications and admissions. As a result, we obtain two variables that gauge the quality of the institutions to which students applied and were accepted.

Additionally, basic control variables influencing our dependent variable were considered: gender, age (and age squared), school province, and randomization.

6. Method

The primary objective of our analysis is to examine the impact of being enrolled in a selective degree program on academic progression. Our overall strategy to tackle confounding is to integrate different approaches elaborated in the literature on the identification and estimation of causal effects with observational data within a counterfactual framework (Rubin, 1974, 1978, 1980, 1986). Specifically, we propose the integration of propensity score matching with the self-revelation approach developed by Dale and Krueger (2002). Our empirical strategy is based, first, on the selection of data sources that are rich in information on those students' characteristics that might be correlated with the probability of attending a selective degree program and influence academic progression, as we have reviewed in the previous sections. As described above, they include a variety of variables capturing sociodemographic characteristics, previous school career, and achievement, as well as several observed proxies of ambition, motivation, and self-confidence. We adjust for these variables by relying on the propensity score matching approach (Rubin, 1974).

This method allowed us to contrast the academic achievements of students enrolled in selective degree programs (the 'treatment' group) with those of comparable peers enrolled in non-selective programs (the 'control' group). Employing this method, we created pairs of individuals with similar observed traits, differing only in their participation in selective degree programs, to mitigate any self-

selection biases based on observed covariates (Rosenbaum & Rubin, 1983, 1984). Initially, we gauged the similarity between individuals by calculating the propensity score, which reflects the probability of enrolling in a selective degree program based on various observable factors (ibidem). The propensity score was estimated as the probability of being enrolled in a selective degree course, modeled as a function of relevant covariates.⁹ In a second step, matching was performed to ensure comparability between the treatment and control group, by balancing the distribution of covariates using the matching algorithm Nearest Neighbour Matching (NNM).

The propensity score, denoted as $e(X)$, is estimated using a logistic regression model:

$$e(X) = Pr(D=1|X)$$

The logistic regression model estimates the probability of being enrolled in a selective course ($D=1$) based on the covariates (X). The covariates X include relevant variables such as that could potentially influence both the treatment assignment and the dependent variable (number of credits).

After conducting matching and ensuring covariate balance, we were able to estimate the Average Treatment Effect (ATE). This measures the average difference in outcomes between students who are enrolled in a selective degree program and those who are not. The ATE is calculated by comparing the average outcome of a group that received the treatment to the average outcome of a control group that did not receive the treatment. It aims to measure the causal effect of the treatment by isolating the impact of the treatment from other factors that could influence the outcome. We use two specifications of our model, basic and full. The former includes socio-demographic variables and basic controls; whereas the latter adds all variables presented in tab1. We chose the ATE as causal estimand aligning with our research question since we are interested in the difference in outcomes between students enrolled in selective and students enrolled in non-selective degree programs.

The primary advantage of Propensity Score Matching (PSM) lies in its adherence to the 'common support' condition, ensuring that only comparable individuals across treatment and control groups are included in the analysis. This condition is crucial as it prevents the issue of comparing non-comparable persons, which commonly occurs in linear regression. By employing PSM and adhering to this condition, the analysis guarantees that suitable control cases are considered, thus providing a more accurate assessment of the treatment effect on academic progression while minimizing bias in the results, assuming that the standard conditional independence assumption (CIA) or full selection on observables hold.

⁹ The distribution of the propensity score among the treated and control groups is presented in Figure A1.

As a sensitivity analysis, we estimated a treatment effect model based on inverse probability weighting (IPW) to validate our main findings. This strategy involved assigning weights to each observation based on the inverse of the probability associated with the observed exposure or treatment status. While propensity score matching primarily focuses on creating comparable groups by matching individuals with similar propensity scores, ensuring balance in observed covariates, IPW assigns weights to observations based on treatment probabilities, emphasizing fewer common instances, and creating a representative weighted dataset. In other words, propensity score matching directly matches similar individuals, while IPW reweights the entire dataset based on treatment probabilities.

The main analysis, by estimating the ATE, assumes that there is homogeneity across students in the way they respond to attending a selective degree program. However, students might be affected differently by being exposed to this ‘treatment’, with some being more and others less affected by the contextual and social features of the academic environment provided by the selective courses. To tackle this aspect, there are various approaches aimed at identifying and estimating so-called heterogeneous treatment effects. One approach is to estimate separate models across socio-demographic groups or other key features of students and courses. Albeit interesting, this approach suffers from the fact that the number of factors to consider is high and there is little theoretical guidance on which could be the most important moderator of the impact of enrolling in selective degree programs. A second, more parsimonious approach, consists in estimating heterogeneous treatment effects based on a synthetic characteristic that distinguishes students: their estimated propensity to enroll in degree programs with an entry test, i.e. the propensity score. Following Brand and Xie (2010), based on a subset of covariates, we can divide the sample into subpopulations with similar predicted propensity scores to enroll in selective degree programs. We then assess whether heterogeneity in the propensity to enroll in selective courses is associated with heterogeneity in the impact of actually attending such programs on academic progression. Specifically, we ask if the estimated effect of selectivity is positively or negatively associated with the estimated propensity to enroll in selective degrees. Substantially, this means asking whether attending selective degree programs is more beneficial for those students who have characteristics that make them more likely to enroll in these courses (positive selection) or, conversely, if attending such programs would lead to better outcomes, especially for those students who are less likely to enroll (negative selection).

From a statistical point of view, we rely on the Matching-Smoothing Method (MS) (Xie, Brand, and Jann, 2012). The analysis begins by estimating the propensity score, representing the likelihood of receiving treatment based on covariates using the logit method. Balanced propensity score strata are

then constructed (Becker and Ichino, 2002). Subsequently, we match treated and controls: for each observation, we compute a counterfactual outcome which is based on the matched observations. The differences between observed and potential outcomes are plotted in relation to the propensity score. A local polynomial regression (Fan and Gijbels, 1996) is applied to obtain a pattern of treatment effect heterogeneity across the propensity score.

7. Descriptive statistics

As a first step in our analyses, we assessed whether and how students of selective and non-selective degree programs show some differences or similarities. The following table (1) presents descriptive statistics on our variables according to degree program. Starting from basic socio-demographic characteristics what we first observe is a slight difference in the gender composition of the two types of degree programs: women are more represented in selective degree programs than non-selective whereas there is a higher proportion of male students in non-selective degrees than in the selective ones.

Looking at the other sociodemographic characteristics we note that selective degree programs attract relatively more native students compared to those with a migration background, and younger students compared to older ones, who are instead overrepresented in non-selective programs.

As expected, students from a privileged socioeconomic background are overrepresented in selective courses: the incidence of individuals with tertiary-educated parents, for instance, is 34% versus 21% in nonselective courses. At the same time, less advantaged students are overrepresented in non-selective degrees.

Moving to the student's previous academic careers, we note in general that selective degree courses have a student body with more desirable characteristics in terms of academic potential: Such programs, indeed, attract relatively more students from the academic tracks, without retention experiences, and with high grades in lower and upper secondary education.

When it comes to university characteristics, there are some expected differences in the distribution of fields across degree types. Technical, science, and medical degrees are more represented within selective degrees, while humanities and law have a higher number of non-selective degrees than selective ones. Not surprisingly, although the difference is not as remarkable as expected, the share of lower-quality institutions is larger among non-selective degrees; while the two types of degrees are substantially equal within average-performing institutions, top institutions are more represented within selective degrees. The self-revelation variables exhibit similar results.

Tab.1 Distribution of variables related to students' socio-demographic characteristics, high school career, and university studies path by type of degree program (column %)

	Non-selective	Selective		Non-selective	Selective
<i>Gender</i>			<i>Age</i>		
Male	48.3	45.1	19	73.5	87.9
Female	51.6	54.9	20	18.6	9.6
			21 or more	7.9	2.5
<i>Citizenship</i>			<i>Currently working</i>		
Italian	93.6	96.1	Yes	56.1	29.8
Non-Italian	6.41	3.8	No	43.8	70.1
<i>School Province</i>			<i>Scholarship</i>		
BO	13.7	11.6	Recipient	5.6	7.7
MI	47.7	37.3	Applicant not Recipient	7.3	7.5
SA	21.8	31.3	Not applicant	87.0	84.7
VI	16.6	19.6			
<i>Parents' Education</i>			<i>Quality Ranking</i>		
Lower Secondary or Lower	22.4	9.7	70 – 80	19.1	10.7
Upper Secondary	56.4	56.6	81 – 90	60.1	62.8
Higher Education	21.1	33.6	91 - Max	20.7	26.5
<i>EGP Parents</i>			<i>Quality of admissions</i>		
Service Class	10.8	18.0	70 – 80	18.1	11.3
Higher Grade Non-manual	43.5	53.0	81 – 90	59.6	62.6
Petty Bourgeoisie	18.0	13.3	91 - Max	22.2	26.0
Lower Grade Non-manual	12.3	7.3			
Skilled & Unskilled Manual	15.3	8.4			
<i>School Track</i>			<i>Quality of tests taken</i>		
Lyceum	40.6	74.2	70 – 80	15.8	11.0
Technical	37.4	21.7	81 – 90	60.3	63.4
Vocational	21.8	4.0	91 - Max	23.8	25.1
<i>Lower Secondary Final</i>			<i>Probability of Success (1-5)</i>		
<i>Mark</i>			1	2.6	0.2
Pass	16.4	4.5	2	4.7	1.4
Good	32.8	19.7	3	19.5	9.2
Very Good	38.2	48.5	4	44.4	45.5
Excellent	12.5	27.1	5	28.6	43.7
<i>School Repetition</i>			<i>Difficulty University Studies</i>		
Never	75.1	89.0	Disagree	5.4	6.0
Once	18.1	8.4	Neither agree or disagree	34.1	37.1
Twice or more	6.2	1.6	Agree	60.4	57.0
<i>High School Final Mark</i>			<i>Inclined for University</i>		
60 - 70	45.1	24.7	Not at all	2.8	0.7
71 - 80	29.0	30.9	A little	7.0	2.4
81 – 90	17.1	23.8	Neither inclined or not	27.5	16.0
91 - 100	8.8	20.5	Quite inclined	52.2	60.4
			Very inclined	10.3	20.4
<i>Field of Study</i>			<i>Desired Job</i>		
Science	12.3	16.7	Degree Required	48.4	62.2
Medical	7.8	11.1	Degree NOT Required	51.5	37.7
Technical	19.5	22.5			
Social Sciences	21.9	30.7			
Law	12.4	4.7			
Humanities	25.9	14.1			
Total	100	100		100	100
N	4556	2515		4556	2515

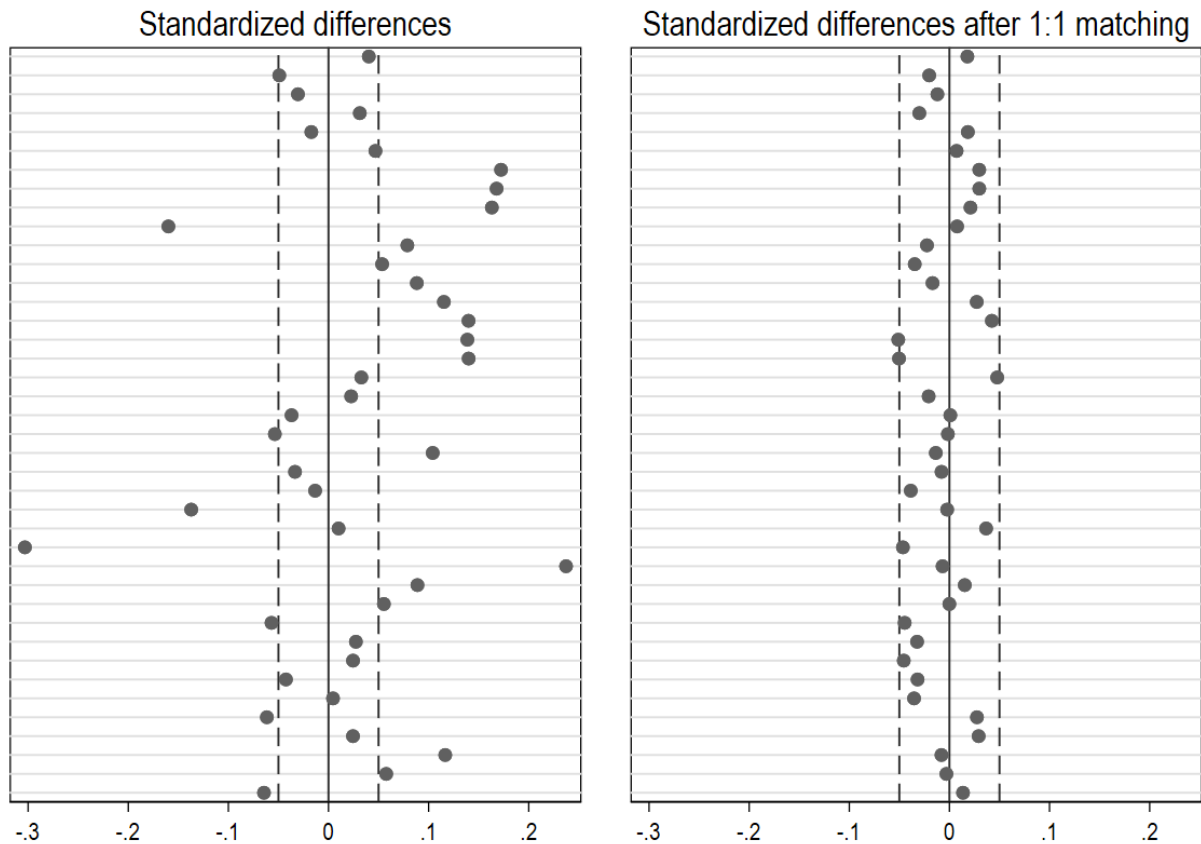
Going to the economic support variables, selective and non-selective degrees have very similar shares of scholarship holders, with non-selective degrees exhibiting a slightly higher percentage of grant recipients. Differences are much more evident when considering the share of students who work during their studies: selective degree programs have a significantly larger fraction of working students than non-selective.

Finally, motivation-related variables provide interesting insights. Generally, selective degrees attract more motivated students than non-selective courses. Large differences are clear in all these variables: selective programs attract students who are more confident about their chances of success, are more inclined towards university studies, and aspire to pursue a career that requires a university degree.

In Table A1, we report the average partial effects from the predicted model used to estimate the propensity score. This allows us to see which predictors are statistically significant in predicting enrolment in selective degree programs once all the other factors are simultaneously taken into account and to check on which factors the treatment and the control group are more unbalanced, before the implementation of the PSM procedure. Rubin (2008) recommends checking for covariate balance before looking at results for the estimated treatment effect. The extracted average partial effects from binomial logistic regression (Tab.A1) generally do not align with the descriptive statistics provided above: the multivariate context does not exhibit coefficients to be as significant as expected. However, we are dealing with strongly selected students who have already decided to make the transition to university. We have interesting positive coefficients for the field of study and the quality ranking: they indicate that these fields were more likely to be offered in selective degrees than scientific disciplines. Furthermore, the positive coefficient for the quality ranking confirms the association between institutional quality and selectivity.

In Fig.1 we show how the covariates become more balanced after the PSM procedure is applied. To be balanced, covariates should have a similar distribution between the treated and untreated groups. We can assess for covariate balance by looking at the standardized mean differences between group means across our covariates. Standardized differences are independent of the unit of measurement, meaning that we are allowed to compare variables that have different units of measurement.

Fig.1 Standardized differences between unmatched and matched data.



In fig.2 we report both the standardized mean differences for raw and matched data, that is before and after our propensity score matching. To be perfectly balanced, standardized differences should be close to zero. The balance check above indicates that generally considering standardized differences covariates in the matched data are closer to zero than the raw data. This indicates that our matched data are well balanced and we can proceed with the estimation of the treatment effect.

8. Main Results

In this section, we assess whether attending a selective degree program leads to substantially better educational outcomes than enrolment in a non-selective degree. In tab.3 we report the estimates of the ATE from both propensity score matching analysis and inverse probability weighting, showing both methods results using two different specifications – basic and full as described in the methodological section. All estimations from the propensity score matching analysis were calculated in the ‘common support’ area (Fig. A1 in Appendix), as such we discarded 26 cases because of a lack of a suitable statistical match.

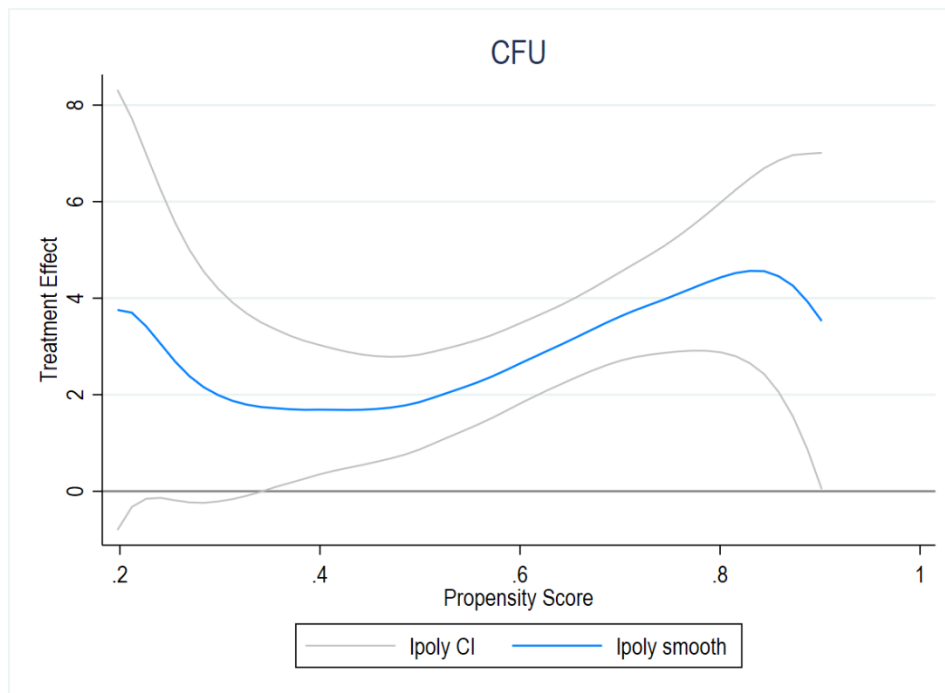
Tab.3 Results from the propensity score matching and IPW analysis: ATE of enrolling in a selective degree on the CFU obtained. Coefficients, robust standard errors, and level of statistical significance (***) $p < 0.01$, ** $p < 0.05$, * $p < 0.1$)

Dependent Variable	Specification	Method	ATE	S.E	t-stat	N
CFU	Basic	PSM	3.3904***	.9253	3.66	2769
	Full	PSM	2.7318***	.9340	2.92	2769
	Basic	IPW	3.1415***	.7586	4.38	2795
	Full	IPW	2.5933***	.7559	3.43	2795

Overall, the results from both propensity score matching and inverse probability weighting show how being enrolled in a selective degree program positively affects academic progression, expressed in terms of academic credits gained in the first year. This is true for both the specifications - basic and full. Although clearly showing a reduction in the strength of effects, our full specification, which encompasses the relevant factors associated with academic progression available in our data, indicates that selective degree programs are beneficial in terms of students' progression.

Finally, we estimate the heterogeneous treatment effects through the matching-smoothing method (MS), which uncovers the heterogeneity pattern as a non-parametric function of the propensity score (Xie, Brand, Jann). In Fig. 2 we show the estimated results for the treatment group with the nearest neighbor matching with our full specification model. The curve for the treatment effect can be interpreted as a non-parametric regression for the individually matched differences. The y-axis depicts differences in the expected CFU earned.

Fig.2 Heterogeneous treatment effects through the matching-smoothing method (MS).



Substantially, we observe a progressively larger progression-increasing effect of selectivity as students' propensity for selective degree programs increases. While students who attended selective degrees have higher progression chances than similar students who attended non-selective degrees, the selectivity effect is smaller for students least likely to attend selective degrees and increases as we consider students with characteristics that are more predictive of selective degree enrolment.

9. Concluding Remarks

This empirical chapter aimed to fill a critical gap in understanding the influence of institutional selectivity on students' academic progression within higher education.

The role of institutional selectivity in influencing students' degree attainment, timely completion, and academic achievements has garnered considerable attention. Theoretical constructs postulate various mechanisms underlying this phenomenon, including the impact of peer interactions, faculty-student engagement, and the overall academic environment within selective institutions. However, empirical evidence regarding the association between selectivity and educational outcomes remains inconclusive, with studies yielding conflicting results due to variations in data, methodologies, and demographic focuses.

We sought to address these inconsistencies by specifically assessing the impact of institutional selectivity on students' academic progression. Using data from a longitudinal survey started under the 'Family Background, Education Beliefs, and Higher Education Participation' project, our analysis aimed to uncover the causal impact of being enrolled in a selective degree program on academic progression, namely the number of CFU obtained during the first year of enrolment. To mitigate potential selection bias, we employed a self-revelation model, enabling control over confounding variables. Additionally, propensity score matching techniques were utilized to directly address selection bias, crucial in determining whether enhanced academic progression in selective degree programs is attributed to the caliber and attributes of the students enrolled or the institution's selectivity itself.

Our findings underscored a clear relationship between institutional selectivity and academic progression among Italian students. Notably, enrolment in selective degree programs exhibited a positive impact on the number of CFUs obtained in the first academic year, even after accounting for potential selection bias. This suggests that institutional selectivity plays a significant role in shaping students' academic outcomes, independent of initial academic skills and motivation. Our results thus confirm the main hypothesis of this study: admission tests enhance the student's chances of

progression. We theoretically attribute this result to the fact that the selection of enrollees creates a homogeneous student body. This, in turn, makes the students feel more integrated into the academic and social system, resulting in enhanced academic outcomes. Furthermore, being selected can lead to a motivational boost. Achieving success in an admission test can significantly influence a student's motivation, shaping their academic journey through several channels. These include reinforcing positive behavior, boosting self-assurance, improving belief in one's capabilities, and fostering the drive to set and reach ambitious objectives. Additionally, it enhances intrinsic motivation by fostering personal fulfillment and enjoyment in the learning process.

We believe these results contribute significantly to educational research. We provide empirical evidence of the relevance that entrance exams can have in terms of academic progression from a broader spectrum of educational institutions throughout Italy and by offering causal estimates derived from a robust methodology. Numerous factors are implicated in forecasting academic outcomes, and despite the incorporation of pertinent control variables in this analysis, the impact of institutional selectivity persists. Thus, a difference between selective and non selective of 3 CFU is deemed noteworthy in this context.

In substantive terms, a more cautious approach is warranted. The CFU required for the first year of study stands at 60. Relative to this, a discrepancy of merely 3 appears insignificantly small. However, when extrapolated across successive academic years, such marginal variances could culminate in the accumulation of credits equivalent to an entire examination. Consequently, this may augment the probability of delayed graduation for students exempt from the entrance examination. Nevertheless, from a policy standpoint, I do not deem this effect to be of significant magnitude.

In conclusion, this study emphasizes the substantial influence of institutional selectivity on students' academic progression, underscoring its relevance in shaping educational outcomes and highlighting its potential to curb the chances of dropout. The insights gleaned from this research offer valuable implications for policymakers and educational stakeholders, highlighting the importance of considering institutional selectivity as a determinant of student success within higher education. Further studies and investigations are warranted to deepen our understanding of the relationship between institutional selectivity and student academic outcomes. The main limitation of our study is that it relies on survey data that do not come from a probabilistic sample of the entire Italy, as such this study does not provide population estimates. However, we were able to delve into the causal relationship between selectivity and students' academic outcomes by considering a wider range of institutions and degrees, thereby contributing novelty to this strand of literature. Unfortunately, given

the lack of data, it seems not feasible to take a step forward, by providing results that could be generalized to the whole country and considering other outcomes, such as performances and dropouts.

References

- Aina, C. (2013). Parental background and university dropout in Italy. *Higher Education*, 65, 437-456.
- Aina, C., Baici, E., & Casalone, G. (2011). Time to degree: students' abilities, university characteristics or something else? Evidence from Italy. *Education Economics*, 19(3), 311-325.
- Alon, S., and Tienda, M. (2005). Assessing the “mismatch” hypothesis: Differences in college graduation rates by institutional selectivity. *Sociology of Education*, 78(4), 294.
- Alon, S., and Tienda, M. (2007). Diversity, opportunity, and the shifting meritocracy in higher education. *American Sociological Review*, 72, 487–511.
- Altman, K. I., and T. E. Linton. (1971) "Operant conditioning in the classroom setting: A review of the research." *The Journal of Educational Research* 64.6: 277-286.
- Angrist and Pischke. (2007). *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton University Press
- ANVUR. (2018). *Rapporto sullo stato del sistema universitario e della ricerca 2017*. Agenzia Nazionale di Valutazione del Sistema Universitario e della Ricerca
- Argentin G. - Triventi M. (2011), "Social Inequality in Higher Education and Labour Market in a Period of Institutional Reforms: Italy, 1992-2007", *Higher Education*, vol.61, pp. 309-323.
- Bailey (Ed.). (2007). *The language demands of school: Putting academic English to the test*. New Haven, CT: Yale University Press. 256 pp
- Barone, C., Schizzerotto, A., Abbiati, G., & Argentin, G. (2017). Information barriers, social inequality, and plans for higher education: Evidence from a field experiment. *European Sociological Review*, 33(1), 84-96.
- Barone, C., Triventi, M., & Assirelli, G. (2018a). Explaining social inequalities in access to university: a test of rational choice mechanisms in Italy. *European Sociological Review*, 34(5), 554-569.
- Barone, C., Assirelli, G., Abbiati, G., Argentin, G., De Luca, D. (2018b). Social origins, relative risk aversion and track choice: A field experiment on the role of information biases. *Acta Sociologica*, 61(4), 441-459.
- Barnow, B. Cain G., Goldberg A (1981). Selection on Observables. *Evaluation Studies*.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84(2), 191–215.
- Barnow, B., Cain, G., & Goldberg, A. (1981). Selection on observables. *Evaluation Studies*.
- Becker, S., Ichino, A. (2002), Estimation of average treatment effects based on propensity scores, *Stata Journal*, 2(4): 358-377

- Belloc, F., Maruotti, A., & Petrella, L. (2011). How individual characteristics affect university students drop-out: a semiparametric mixed-effects model for an Italian case study. *Journal of applied Statistics*, 38(10), 2225-2239.
- Bedard, Kelly & Kuhn, Peter, 2008. "Where class size really matters: Class size and student ratings of instructor effectiveness," *Economics of Education Review*, Elsevier, vol. 27(3), pages 253-265
- Bonwell, C. C., & Eison, J. A. (1991). *Active Learning: Creating Excitement in the Classroom*. ASHE-ERIC Higher Education Report, Washington DC: School of Education and Human Development, George Washington University.
- Borgen, N. (2014). College quality and hourly wages: Evidence from the self-revelation model, sibling models and instrumental variables. *Social Science Research*, 48: 121-134
- Bound, J., and Turner, S. (2007). Cohort crowding: How resources affect collegiate attainment. *Journal of public Economics*, 91(5-6), 877-899.
- Bound, J, Lovenheim, M.F., Turner, S. (2010). Why Have College Completion Rates Declined? An Analysis of Changing Student Preparation and Collegiate Resources. *American Economic Journal: Applied Economics*, 2 (3): 129-57.
- Bowen, W., & Bok, D. (1998). *The shape of the river: Long term consequences of considering race in college and University Admissions*
- Bowen, W. G., Chingos, M. M., & McPherson, M. S. (2009). *Crossing the finish line: Completing college at America's public universities*. Princeton, NJ: Princeton University Press.
- Brand, J. E., & Xie, Y. (2010). Who Benefits Most from College?: Evidence for Negative Selection in Heterogeneous Economic Returns to Higher Education. *American Sociological Review*, 75(2), 273-302
- Brian P. An (2016) The Role of Academic Motivation and Engagement on the Relationship between Dual Enrolment and Academic Performance, *The Journal of Higher Education*, 86:1, 98-126
- Bridgeman, B., Pollack, J., and Burton, N. (2004). Understanding what SAT reasoning test scores add to high school grades: a straightforward approach. (College Board Research Report No. 2004-4). New York: College Entrance Examination Board.
- Card, D., Krueger, A. (1992), Does School Quality Matter? Returns to Education and the Characteristics of Public Schools in the United States, *Journal of Political Economy*, 100(1): 1-4
- Card, D., Krueger, A. B. (1998). School Resources and Student Outcomes. *The ANNALS of the American Academy of Political and Social Science*, 559(1), 39-53
- Carrieri, V., D'Amato, M. Zotti, R. (2014), On the causal effects of selective admission policies on students' performances: evidence from a quasi-experiment in a large Italian university, *Oxford Economic Papers*, 67(4):1034-1056

- Clinedinst, M.E., Hurley, S.F., and Hawkins, D.A. (2011). 2011 State of College Admission. Alexandria, VA: National Association for College Admissions Counseling.
- Contini, D., Cugnata, F., & Scagni, A. (2018). Social selection in higher education. Enrolment, dropout and timely degree attainment in Italy. *Higher Education*, 75(5), 785-808.
- Crouse, J., & Trusheim, D. (1988). The case against the SAT. The University of Chicago Press.
- Dale, S., Krueger, A. B. (2002). Estimating the Payoff to Attending a More Selective College: An Application of Selection on Observables and Unobservables. *The Quarterly Journal of Economics*, 117(4), 1491–1527.
- Darling-Hammond, L. (1999) Teacher Quality and Student Achievement. A Review of State Policy Evidence. *Education Policy Analysis Archives*, 8, 1-44.
- DeBerard, M. Scott, et al. (2004). Predictors of academic achievement and retention among college freshmen: a longitudinal study. *College Student Journal*, 38(1): 66
- Deming, D., Dynarski, S. (2010). College Aid. In *Targeting Investments in Children: Fighting Poverty When Resources Are Limited*. Edited by Phillip B. Levine, and David J. Zimmerman (eds). University of Chicago Press.
- De Paola, M. (2009), Does Teacher Quality Affect Student Performance? Evidence from an Italian University. *Bulletin of Economic Research*, 61: 353-377
- Dynarski, S. M. (2003). Does Aid Matter? Measuring the Effect of Student Aid on College Attendance and Completion. *American Economic Review*, 93(1), 279–288.
- Epple, D., Romano, R., & Sieg, H. (2003). Peer Effects, Financial Aid and Selection of Students into Colleges and Universities: An Empirical Analysis. *Journal of Applied Econometrics*, 18(5), 501–525.
- Fan, J. and Gijbels, I. (1996) *Local Polynomial Modelling and Its Applications*. Chapman and Hall, London.
- Francesconi, M., Aina, C., and Cappellari, L. (2011). Student performance may not improve when universities are choosier. *Evaluation & Research in Education*, 24 (4), 231-242.
- Fu, Y. (2012). The Effectiveness of Traditional Admissions Criteria in Predicting College and Graduate Success for American and International Students. PhD diss., University of Arizona.
- Galla, B. M., Shulman, E. P., Plummer, B. D., Gardner, M., Hutt, S. J., Goyer, J. P., D’Mello, S. K., Finn, A. S., & Duckworth, A. L. (2019). Why High School Grades Are Better Predictors of On-Time College Graduation Than Are Admissions Test Scores: The Roles of Self-Regulation and Cognitive Ability. *American Educational Research Journal*, 56(6), 2077-2115
- Gansemmer-Topf, A. M., & Schuh, J. H. (2006). Institutional Selectivity and Institutional Expenditures: Examining Organizational Factors That Contribute to Retention and Graduation. *Research in Higher Education*, 47(6), 613–642.
- Geiser, S., and M. V. Santelices. 2007. Validity of High-school Grades in Predicting Student Success beyond the Freshman Year: High-school Record Vs. Standardized Test as Indicators

of Four-year College Outcomes. Center for Studies in Higher Education Research & Occasional Paper Series: CSHE. 6.07

Goldin, C., Katz, L. F. (2008). Transitions: Career and Family Life Cycles of the Educational Elite. *American Economic Review*, 98(2), 363–369

Goldrick-Rab, S., and Pfeffer, F. T. (2009). Beyond Access: Explaining Socioeconomic Differences in College Transfer. *Sociology of Education*, 82(2), 101–125.

Goldrick-Rab, S. (2016). *Paying the Price. College Costs, Financial Aid, and Betrayal of the American Dream.* University Chicago Press.

Gray, J., Jesson, D., Goldstein, H., Hedger, K., & Rasbash, J. (1995). A multi-level analysis of school improvement: changes in schools' performance over time. *School effectiveness and school improvement*, 6(2), 97-114.

Guay, F. Sociocultural Contexts and Relationships as the Cornerstones of Students' Motivation: Commentary on the Special Issue on the "Other Half of the Story". *Educ Psychol Rev* 34, 2043–2060 (2022)

Galla, B. M., Shulman, E. P., Plummer, B. D., Gardner, M., Hutt, S. J., Goyer, J. P., D'Mello, S. K., Finn, A. S., & Duckworth, A. L. (2019). Why High School Grades Are Better Predictors of On-Time College Graduation Than Are Admissions Test Scores: The Roles of Self-Regulation and Cognitive Ability. *American Educational Research Journal*, 56(6), 2077-2115

Hanushek, E.A., and Woessmann, L. (2012). Do better schools lead to more growth? Cognitive skills, economic outcomes, and causation. *Journal of Economic Growth*, 17 (4), 267-321.

Heil, S., Reisel, L., & Attewell, P. (2014). College selectivity and degree completion. *American Educational Research Journal*, 51(5), 913-935.

Hout, M. & Elliott, S.W. & Education, Division & Council, National. (2011). Incentives and test-based accountability in education. 10.17226/12521.

Hoxby, C. (2002). *School Choice and School Productivity (or Could School Choice be a Tide that Lifts All Boats?)*. NBER Working Papers 8873, National Bureau of Economic Research, Inc.

Hoxby, C. M., Leigh, A. (2004). Pulled Away or Pushed out? Explaining the Decline of Teacher Aptitude in the United States. *The American Economic Review*, 94(2), 236–240.

Jacob, B., Lefgren, L. (2005). *Principals as Agents: Subjective Performance Measurement in Education*, NBER Working Papers 11463, National Bureau of Economic Research, Inc.

Jerrim, J., Chmielewski, A. K & Parker, P. (2015). Socioeconomic inequality in access to high-status colleges: A cross-country comparison. *Research in Social Stratification and Mobility*, 42 20-32.

Kim, D. B. (2007). The effect of loans on students' degree attainment: Differences by student and institutional characteristics. *Harvard Educational Review*, 77(1)

- Kokkelenberg, E. C., M. Dillon, and S. M. Christy (2008). The effects of class size on student grades at a public university. *Economics of Education Review* 27, 221–233.
- Light, A. & Strayer, W. (2000). Determinants of college completion: School quality or student ability? *The Journal of Human Resources*, 39(3), 299-332.
- Liu, X., Thomas, S., & Zhang, L. (2010). College quality, earnings, and job satisfaction: Evidence from recent college graduates. *Journal of Labor Research*, 31, 183–201.
- Long, B.T. (2004). How have college decisions changed over time? An application of the conditional logistic choice model. *Journal of econometrics*, 121 (1-2), 271-296
- Long M.C. (2008). College quality and early adult outcomes. *Economics of Education Review*, 27(5):588-602.
- Lundberg, C. A., and Schreiner, L. A. (2004). Quality and Frequency of Faculty-Student Interaction as Predictors of Learning: An Analysis by Student Race/Ethnicity.
- Martin, A.J., and Elliot, A.J. (2016). The role of personal best (PB) goal setting in students' academic achievement gains. *Learning and Individual Differences*, 45, 222-227.
- Mayhew, M., et al. (2016). How College Affects Students: 21st Century Evidence that Higher Education Works.
- Melguizo, T. (2008). Quality matters: Assessing the impact of attending more selective institutions on college completion rates of minorities. *Research in Higher Education*, 49(3), 214–236.
- Noble, J., Maxey, J., Ritchie, J., & Habley, W. (2005). Enhancing college student retention: identification and intervention. Paper presented at the National Symposium on Student Retention, Dallas.
- Noble, J., Radunzel, J. (2007). College readiness = college success beyond the first year. Paper presented at the Annual Forum of the Association for Institutional Research, June 2–6, Kansas City, Missouri.
- Orr, D., Usher, A., Atherton, G., Cezar, H., & Geanta, I. (2017). Study on the impact of admission systems on higher education outcomes Volume I : Comparative report Vol. I.
- Park, K.H., and Kerr, P.M. (1990). Determinants of academic performance: A multinomial Logit Approach. *Journal of Economic Education*, 21, 101-111.
- Pascarella, E. T. (1980). Student-faculty informal contact and college outcomes. *Review of educational research*, 50(4), 545.
- Pascarella, E. T. (1985). Students' affective development within the college environment. *Journal of Higher Education*, 56(6), 640–663
- Pascarella, T. and Terenzin, P. (2005). *How College Affects Students, A Third decade of Research* (2nd ed.)

- Pascarella, E.T., et al. (2006). Institutional selectivity and good practice in undergraduate education: How strong is the link?
- Perkhounkova, Y., Noble, J.P., and McLaughlin, G. (2006). Factors related to persistence of freshman, freshman transfers, and non-freshman transfer students, AIR Professional File, N.99. The Association for Institutional Research.
- Pike, G. R., Smart, J. C., Kuh, G. D., Hayek, J. C. (2006). Educational Expenditures and Student Engagement: When Does Money Matter? *Research in Higher Education*, 47(7), 847–872.
- Robbins SB, Lauver K, Le H, Davis D, Langley R, Carlstrom A (2004). Do psychosocial and study skill factors predict college outcomes? A meta-analysis. *Psychol Bull.* Mar;130(2):261-88
- Rodríguez-Hernández, C. F., Cascallar, E., & Kyndt, E. (2020). Socio-economic status and academic performance in higher education: A systematic review. *Educational Research Review*, 29, 100305.
- Rosenbaum, P. R., & Rubin, D. B. (1983). The Central Role of the Propensity Score in Observational Studies for Causal Effects. *Biometrika*, 70(1), 41–55
- Rosenbaum, P. R., & Rubin, D. B. (1984). Reducing Bias in Observational Studies Using Subclassification on the Propensity Score. *Journal of the American Statistical Association*, 79(387), 516–524.
- Rubin, D. B. (1974). Estimating causal effects of treatments in randomized and nonrandomized studies. *Journal of Educational Psychology*, 66(5), 688–701
- Rubin, D. B. (1978). Bayesian Inference for Causal Effects: The Role of Randomization. *The Annals of Statistics*, 6(1), 34–58.
- Rubin, D. B. (1980). Randomization Analysis of Experimental Data: The Fisher Randomization Test Comment. *Journal of the American Statistical Association*, 75(371), 591–593.
- Rubin, D. B., & Schenker, N. (1986). Multiple Imputation for Interval Estimation From Simple Random Samples With Ignorable Nonresponse. *Journal of the American Statistical Association*, 81(394), 366–374.
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55, 68–78
- Ryan, R. M., & Deci, E. L. (2004). Autonomy Is No Illusion: Self-Determination Theory and the Empirical Study of Authenticity, Awareness, and Will. In J. Greenberg, S. L. Koole, & T. Pyszczynski (Eds.), *Handbook of Experimental Existential Psychology* (pp. 449–479). The Guilford Press.
- Ryan, J. F. (2004). The relationship between institutional expenditures and degree attainment at baccalaureate colleges. *Research in Higher Education*, 45(2), 97-114

- Schneider, M., and Preckel, F. (2017). Variables Associated With Achievement in Higher Education: A Systematic Review of Meta-Analyses. *Psychological Bulletin*. Advance online publication
- Schunk, D. H. (1989). Self-efficacy and achievement behaviors. *Educational Psychology Review*, 1(3), 173–208.
- Scott-Clayton, J., & Minaya, V. (2016). Should student employment be subsidized? Conditional counterfactuals and the outcomes of work-study participation. *Economics of Education Review*, 52, 1–18. doi:10.1016/j.econedurev.2015.06.006
- Shamsuddin, S. (2016). Berkeley or bust? Estimating the causal effect of college selectivity on bachelor's degree completion. *Research in Higher Education*, 57(7), 795-822.
- Skatova A, Ferguson E. Why do different people choose different university degrees? Motivation and the choice of degree. *Front Psychol*. 2014 Nov 13;5:1244
- Smart, J.C., Ethington, C.A., Riggs, R.O. et al. (2002) Influences of Institutional Expenditure Patterns on the Development of Students' Leadership Competencies. *Research in Higher Education* 43, 115–132
- Spady, W. (1970). Dropouts from higher education: An interdisciplinary review and synthesis. *Interchange*, 1(1), 64-85.
- Steinmayr, R., Weidinger, A. F., Schwinger, M., Spinath, B. (2019). The Importance of Students' Motivation for Their Academic Achievement – Replicating and Extending Previous Findings. *Frontiers in Psychology*, 10
- Stinebrickner and TStinebrickner (2003). Working during School and Academic Performance *Journal of Labor Economics* 21:2, 473-491
- Straus SE, Johnson MO, Marquez C, Feldman MD. Characteristics of successful and failed mentoring relationships: a qualitative study across two academic health centers. *Acad Med*. 2013 Jan;88(1):82-9.
- Stone Perumean-Chaney (2011). The Benefits of Online Teaching for Traditional Classroom Pedagogy: A Case Study for Improving Face-to-Face Instruction. *Journal of Online Learning and Teaching* 7(3)
- Tinto, V. (1975). Dropout from higher education: A theoretical synthesis of recent research. *Review of educational research*, 45(1), 89-125.
- Tinto, V. (1987). *Leaving College: Rethinking the Causes and Cures for Student Attrition*. Chicago, IL: University of Chicago Press.
- Titus, M. A. (2006). Understanding college degree completion of students with low socioeconomic status: The influence of the institutional financial context. *Research in Higher Education*, 47(4), 371-398.
- Triventi, M., Trivellato, P. (2008) Studio, lavoro e disuguaglianza nell'università italiana, in "Stato e mercato, Rivista quadrimestrale" 3: 505-538

- Triventi, M. (2014). Does working during higher education affect students' academic progression? *Economics of Education Review*, 41, 1–13.
- Trow, M. (2007). Reflections on the transition from elite to mass to universal access: Forms and phases of higher education in modern societies since WWII. In *International handbook of higher education* (pp. 243-280). Springer Netherlands.
- Vergolini, L., Vlach, E. (2023). Social Origins and University Drop-Out During the Great Recession: The Role of the Field of Study. *Res High Educ*
- Vulperhorst, J., Lutz, C., de Kleijn, R., & van Tartwijk, J. (2017). Disentangling the predictive validity of high school grades for academic success in university. *Assessment & Evaluation in Higher Education*, 43(3), 399–414
- Xie Y, Brand JE, Jann B. (2012). „Estimating Heterogeneous Treatment Effects with Observational Data.” *Sociol Methodol*. 42(1):314-347
- Yorke, M.(1998). Non-completion of full-time and sandwich students in English higher education: costs to the public purse, and some implications. *Higher Education* 36, 181–194
- Yorke, M. (1999). Assuring quality and standards in globalised higher education. *Quality Assurance in Education*, 7(1), 14-24.
- Webber, D. A., Ehrenberg, R.G., (2010). Do expenditures other than instructional expenditures affect graduation and persistence rates in American higher education?. *Economics of Education Review*, Elsevier, 29(6): 947-958
- Wigfield, A., Gladstone, J.R. and Turci, L. (2016), Beyond Cognition: Reading Motivation and Reading Comprehension. *Child Dev Perspect*, 10: 190-195.
- Wood, A., and Murray, H. (1999). Effects of teacher enthusiasm on student attention, motivation, and memory encoding. Paper presented at the annual meeting of the American Educational Research Association, Montreal, Canada.ck
- Zhang, L. (2005) ‘Do measures of college quality matter? The effect of college quality on graduates’ earnings’, *Review of Higher Education* 28: 571–96.
- Zhang, L. (2008). The way to wealth and the way to leisure: The impact of college education on graduates’ earnings and hours of work. *Research in Higher Education*, 49, 199–213.

Appendix

Tab.A1 Binomial logistic regression models to estimate the probability of being enrolled in a selective degree (propensity score): average partial effects and statistical significance (* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$)

VARIABLES	Full	Standard Error
Parental Education: Upper Secondary	-0.00461	(0.0334)
Parental Education: Higher Education	-0.0475	(0.0383)
EGP Parents: Higher grade routine non-manual	-0.00459	(0.0250)
EGP Parents: Petty Bourgeoisie	-0.0247	(0.0358)
EGP Parents: Lower grade routine non-manual	-0.0394	(0.0422)
EGP Parents: Skilled and Unskilled manual workers	-0.00382	(0.0434)
Field of Study: Medical	0.225***	(0.0280)
Field of Study: Technical	-0.139***	(0.0396)
Field of Study: Social Sciences	0.172***	(0.0324)
Field of Study: Law	0.175***	(0.0368)
Field of Study: Humanities	0.129***	(0.0334)
Quality Ranking: 81-90	0.161***	(0.0278)
Quality Ranking: 91 -max	0.227***	(0.0350)
Gender: Female	-0.0405**	(0.0193)
Citizenship: migrant	0.00229	(0.0577)
School Province: MI	-0.0705**	(0.0358)
School Province: SA	0.156***	(0.0401)
School Province: VI	0.0492	(0.0413)
Randomization: Treated	0.0297*	(0.0179)
Age: 20	0.162**	(0.0632)
Age: 21 or more	0.0502	(0.0935)
Upper Secondary Final Mark: 71 – 80	0.0257	(0.0250)
Upper Secondary Final Mark: 81 – 90	0.00244	(0.0281)
Upper Secondary Final Mark: 91 - 100	0.0348	(0.0331)
School Tracking: Technical	0.0103	(0.0252)
School Tracking: Vocational	0.0709	(0.0472)
Lower Secondary Final Mark: Good	0.00426	(0.0480)
Lower Secondary Final Mark: Very Good	0.0168	(0.0478)
Lower Secondary Final Mark: Excellent	0.0381	(0.0515)
School Repetition: Once	-0.154*	(0.0804)
School Repetition: Twice or more	-0.0505	(0.116)
Difficulty University Studies: Neither agree or disagree	0.119***	(0.0380)
Difficulty University Studies: Agree	0.100**	(0.0392)
Probability of Success: 2	-0.0143	(0.223)
Probability of Success: 3	0.140	(0.212)
Probability of Success: 4	0.161	(0.210)
Probability of Success: 5	0.162	(0.211)
Desired Job: Degree Not Required	-0.0333*	(0.0188)
Inclined for University Studies: A little	-0.1000	(0.128)
Inclined for University Studies: Neither inclined or not	-0.0818	(0.116)
Inclined for University Studies: Quite inclined	-0.0917	(0.115)
Inclined for University Studies: Very inclined	-0.0823	(0.117)
Currently Working: No	0.0274	(0.0198)
Scholarship: Applicant not Recipient	0.0199	(0.0482)
Scholarship: Not Applicant	0.0131	(0.0348)
Observations	2795	

Fig. A1 Common support graph of propensity scores for treated (enrolled in selective degrees) and untreated (non-selective degrees) students.

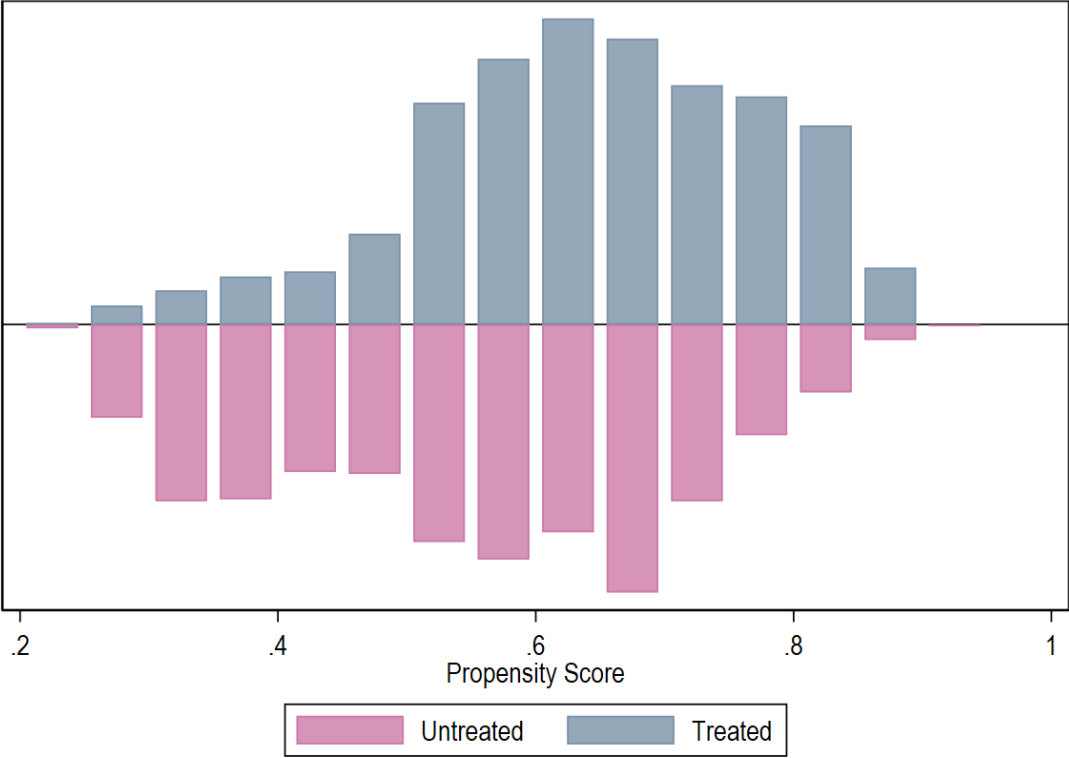
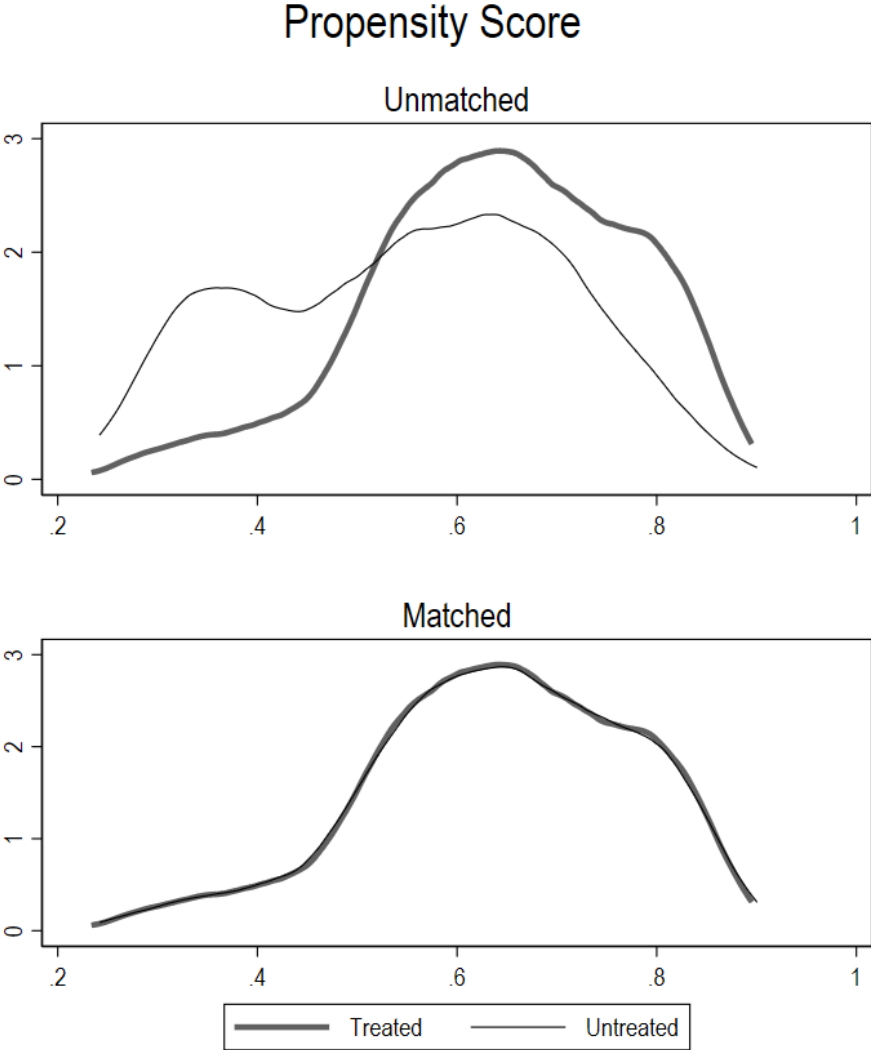


Fig. A2 Propensity score distribution for unmatched and matched data



Conclusions

This dissertation endeavors to enhance our comprehension of the impact of selectivity within higher education. Concentrating on the pivotal role of selectivity, it delves into two fundamental issues in the field of sociology of education: the reproduction of inequalities of educational opportunities and the determinants of students' academic outcomes.

Selective admission policies serve as a significant regulatory tool for balancing the quantity and quality of students in higher education. In the backdrop of the neoliberal evolution of tertiary institutions, the emphasis on performance necessitates ensuring a high-quality student body. Graduates who are more likely to complete their studies mitigate the risk of depleting public and private economic resources. Conversely, facilitating a broader segment of the population's access to higher education would bolster the accumulation of human capital, thereby enriching national economies.

However, major concerns about the inequalities of educational opportunities arose in public and academic debates. Students are admitted conditionally based on academic skills and prior achievements. However, purely merit-based systems have not successfully identified capable students irrespective of their background. Competitive access to higher education tends to favor students with superior economic, social, and cultural resources. Admission systems often prioritize class-based measures of merit, such as high school grades or standardized tests, contributing to what has been termed "testocracy" by Guinier (2015). These policies can pose additional barriers for low-income students seeking access to tertiary education.

This dissertation fits into this context. We started with the development of a comprehensive theoretical framework that accounts for selectivity effects aiming to guide our empirical inquiry into student educational choices and academic outcomes. By drawing upon established sociological and economic frameworks and empirical studies, we unraveled the underlying mechanisms that underscore access to higher education.

Our model considers micro factors like social background, academic skills, motivation, and aspirations, shaping individual choices and outcomes. Institutional characteristics, particularly selectivity and institutional quality, along with broader social, economic, and policy contexts, also impact student outcomes. This proposed framework highlights institutional selectivity's pivotal role in shaping individual choices and achievements through self-selection and institutional selection components. Three layers influence individuals' decisions: individual characteristics, institutional

characteristics, and broader socio-economic contexts. The degree of selectivity is influenced by students' characteristics, which, in turn, affect their aspirations, motivation, and performance. Institutional quality and selectivity are distinct concepts that influence each other.

To explore the association between institutional characteristics, namely institutional quality and selectivity is the aim of the first empirical chapter of this dissertation. In the second empirical chapter, we delve into the relationship between individual characteristics, selectivity, and educational choices: we ask empirically if the choice of a selective degree program is stratified by social background. In the last section, we explore the relationship between selectivity and student achievement: we aim to test empirically if institutional selectivity enhances student achievement.

Additionally, we have formulated a comprehensive conceptualization of selectivity. Higher education selectivity involves institutional selection, which consists of strategic measures governing access to study programs and institutions. These measures include admission tests, interviews, grade requirements, and limits on student numbers. Institutions combine these strategies to refine their selection processes. Prospective students self-select into institutions or programs, influenced by institutional selection criteria. The interplay between institutional and self-selection shapes the student body composition. Degrees of selectivity vary based on institutional rules, impacting both the types of admitted students and self-selection levels. Less selective institutions attract a diverse applicant pool, while highly selective ones draw high-quality students who self-select and are selected by the institution, resulting in a homogeneous student body. This alignment of academic and personal characteristics underscores the influence of selection processes on student composition.

The rationale behind this theoretical exploration stems from the belief that a nuanced understanding of selectivity is imperative for the formulation of effective policies and interventions aimed at fostering equitable access and favorable educational outcomes within higher education systems. In this pursuit, it is crucial to disentangle selectivity from institutional quality: while selectivity may contribute to assembling a more academically proficient student cohort, it should not be equated with institutional quality.

The first empirical paper in the second chapter assessed the impact of university rankings and institutional selectivity on enrolment decisions in Italy, specifically examining first-year enrolments and those of students from the academic track with high grades. The study introduced five key aspects: Firstly, it investigated the role of higher education supply features in driving enrolment choices. Secondly, it explored sensitivity to university rankings across student categories. Thirdly, it employed a multidimensional view of rankings at the faculty level. Fourthly, it separately evaluated

institutional quality and selectivity. Lastly, it conducted a dynamic analysis using panel data to provide more credible estimates.

The study used data from MIUR and CENSIS-la Repubblica, creating a macro-level longitudinal dataset. MIUR provides information on first-year enrolments and course-level selectivity, while CENSIS-Repubblica University Guide offers annual quality rankings based on four dimensions: student performance, research, teaching, and internationalization.

Using fixed-effect regression models from 2003 to 2011, the analysis revealed that university quality rankings positively impact enrolments and student quality. The effect is particularly notable for faculties climbing the rankings. Selectivity negatively affects enrolments, but this effect diminishes for top students. Students are generally more attracted to teaching and research quality than productivity and internationalization.

In the third empirical chapter, we investigated the impact of admission tests on social inequalities in university access for recent Italian high school graduates. Our study aimed to understand if the choice and access to selective degree programs are influenced by social background and at which stages of the enrolment process these inequalities are most pronounced. Additionally, we explored the compensatory advantage mechanism and resource substitution theory in shaping educational choices. Utilizing unique data from the longitudinal survey of the 'Family background, beliefs about education and participation in higher education' project, conducted in October 2013, we gathered information on students' socio-demographics, academic performances, and university choices.

Our contribution lies in introducing selectivity into the study of social background and university access. Unlike previous studies, we analyze various stages of the decision-making process – early preferences, application, admission, and actual enrolment – to distinguish self-selection (degree preferences and application) from institutional selection (admission and enrolment decisions).

Our findings revealed stratification by social background throughout the educational path to selective degree programs. Students from advantaged backgrounds are more likely to express a preference for and choose selective degrees. The presence of an admission test may discourage students from lower backgrounds from accessing certain programs.

Notably, differences in selective degree course choice between lower and higher social backgrounds diminish among high-achieving students but persist among low-achievers. Students from higher social backgrounds maintain an advantage across all stages of the educational path and tend to choose more selective degrees regardless of previous performance.

In the final empirical chapter, we explored the relationship between institutional selectivity and students' academic outcomes. We aimed to determine if degree programs with selective admissions contribute to improved academic progression.

Utilizing data from the "Family background, beliefs about education and participation in higher education" project, we addressed potential selection bias using a self-revelation model and propensity score matching techniques. This approach allowed us to discern whether higher academic progression in selective degree programs is attributed to the student body's qualifications or the institution's selectivity itself.

Our findings reveal a positive association between institutional selectivity and students' academic progression. Students in selective degree programs demonstrated higher chances of academic advancement compared to those in non-selective programs.

This chapter's contribution lies in establishing a causal relationship between institutional selectivity and academic progression, moving beyond correlational studies. Additionally, we broadened the perspective to a national context, rather than focusing on individual institutions.

In summary, this dissertation has uncovered significant insights into the impact of higher education selectivity on enrolment decisions and academic outcomes in Italy. The study highlighted the negative influence of institutional selectivity on enrolment patterns, particularly in faculties that have improved their selectivity. On the other hand, while negatively affecting overall enrolments, selectivity showed a diminishing impact on top students. Although institutional quality positively impacts overall and top student enrolment, selectivity significantly weakens the strong positive effect of quality rankings, especially on overall enrolments. Conversely, when looking at high-achieving students, the impact of institutional quality is not significantly lower when controlling for selectivity. However, institutional selectivity has a much lower impact on top student enrolments, although it is still negative. Therefore, high-achieving students are less influenced by the presence of selective admission procedures in their enrolment decisions.

Furthermore, besides being efficient in selecting better students and thereby being successful at regulating the quantity-quality tradeoff, this study found that institutional selectivity positively correlates with academic progression, suggesting that students in selective degree programs are more likely to advance academically. In light of this, it seems that selective admission procedures may be an interesting mechanism to reduce dropout rates.

However, our investigation confirms that the downside of implementing selective admission schemes is a persistent social stratification in the choice of and admission and enrolment into selective degree

programs, with students from advantaged backgrounds expressing preferences, securing admissions, and enrolling more frequently.

Thinking about policy implications, some final thoughts may also be derived from these empirical studies. These findings emphasize the need for policymakers to consider the potential consequences of selective admission policies, addressing both choice and enrolment social disparities and academic progression advantages associated with institutional selectivity.

The introduction of selective criteria in university admissions is deemed justifiable and promoted within a meritocratic framework, which prioritizes academic performance as the key determinant for gaining entry into higher education. This approach aligns with neoliberal trends prevalent in the higher education landscape. However, it also introduces potential hurdles for students from low-income backgrounds, thereby exacerbating existing disparities in access to desired degree programs. Selective criteria serve as a crucial mechanism for managing the balance between the quantity and quality of students admitted. Due to constraints such as limited resources and available spaces, not implementing selectivity may not be a feasible option. Nevertheless, the current approach, often reliant on admission tests, inadvertently excludes potentially talented low-income students, perpetuating inequities.

By examining various stages of the educational journey, we can discern the impacts of selectivity, shedding light on the underlying mechanisms. These insights lead to two key policy implications. Firstly, if admission tests remain integral, educational institutions should offer preparatory courses to equip students with the necessary skills to excel in these assessments. Additionally, given that disparities persist even during the supposedly merit-based admission phase, measures should be taken to ensure fairness. This could involve aligning test content with school curricula to mitigate biases favoring students from privileged backgrounds.

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