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Research project on education

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Beyond Compulsory Education in Europe

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I am really pleased that Unicredit Foundation is launching a new program to publish yearly reports monitoring access to education of students of different age and at different stages of their career.

The aim of the Foundation is to support students in upgrading their educational career paths, helping them moving up towards trajectories not at easy reach, especially targeting kids from disadvantaged backgrounds.

To achieve this goal the Foundation deploys many different tools. From direct financial support through scholarships at all levels of school and university careers, to helping several organizations expanding and upgrading their educational and support programs. In this respect, research plays a fundamental role as it helps the Foundation to understand the main challenges it faces in its areas of action and to fine tune and focus its operational activities.

The research activities of the Foundation combine frontier analytical enquiries with operative aims. They involve top researchers and they aim at devising new lines of action and possible interventions.

An obvious barrier to education is the transition from secondary to tertiary education and this is the topic of this report, coordinated by Professor Daniele Checchi. In the spirit of the work of the Foundation, which has the geographical span of the activities of the Unicredit bank, the report compares educational systems in different European countries. The breadth of such analysis helps highlighting the extraordinary heterogeneity of the transition regimes from school to university in the countries analysed. What is interesting is that there is not an obvious optimal system, but each of them is operational and functions well in the specific social and political context of the country analysed. Considering these specificities is important in order to target support interventions that can be effective in a given context. Equally, from each of these regimes it is possible to draw insights which, combined, can help identifying key features of an effective support system.

The very high diversity of students in high schools, in terms of their social, cultural background and country of origin, implies that students today must be able to cope with a very heterogeneous environment. Cultural awareness, effective communication, critical thinking, and the ability to engage with people from different backgrounds are increasingly recognized as essential for personal and societal success on top of standard academic learning. These Global competences are a fundamental tool to favour the transition towards tertiary education. Developing them calls for a pretty fundamental change in the toolkit secondary schools should provide. The report offers interesting insights on how this toolkit should be built.

The report also explores the motivational background that inspires students into moving up towards tertiary education. Besides for the psychological issues related to the students' actual perception of their ability, the motivational background of families is fundamental in affecting the likelihood of their being sufficiently motivated to undertake tertiary education. The report here becomes very operative and designs two potential lines of action to overcome this motivational distress, partly already implemented by the Foundation.

The first one is to provide scholarships to disadvantaged students in their last years of high school, combined with extra education and tutoring to help them nurture and strengthen their intellectual and motivational attitudes, thus helping them to perform well in entry tests in universities and more broadly in their studies.

The second one is to design a mechanism to encourage lifetime savings for families, starting as early as possible in the life of children, possibly at birth. The idea is that dispossessed families frequently think that they will never be able to provide sufficient resources to support their children in higher education. Even in countries where universities are state funded and tuition fees very low, the cost of living, frequently in different cities than the place of residence, discourages families and makes them think that their ability to support their children in advanced studies is out of reach. The scheme devised in

the report shows that with very limited sums and a complementary support from the Foundation and the Bank, it is possible to save enough to cover the costs of tertiary education.

These are two examples of how in-depth analysis and the urge to turn it into positive, operational actions can combine in helping the Foundation devise very effective lines of intervention. This is precisely how we see research in our house. We believe that action grounded in rigorous analyses will deliver great results and effective support for our stakeholders.

The Foundation is grateful to Professor Checchi and all the contributors for putting together such an insightful report.

Giorgio Barba Navaretti
Vice President Unicredit Foundation

UniCredit Foundation research project

BEYOND COMPULSORY EDUCATION IN EUROPE

edited by Daniele Checchi (University of Milan)

(present version 28/7/2024)

Table of contents:

Executive Summary

This research project aims to analyse the potential expansion of tertiary education in Europe. The European policy agenda associated with the European Education Area is focused on expansion of access in higher education systems as a pathway towards a more inclusive society: member states have agreed that by 2030 at least 45 per cent of 25 to 34 year-olds should have completed a tertiary degree. Opening up higher education systems to students from lower social strata or discriminated groups in society is viewed as the end result of a fair and equal youth transition process from schooling to tertiary education.

For this reason we have collected five contributions, that address this issue along different perspectives, yet delivering a common message: raising educational attainment of the younger cohorts at tertiary level is a complex issue, since it involves coping with individual factors (like cognitive competences, but also soft skills and aspirations), social origins (parental education and occupations, family income and wealth), institutional design of country specific educational systems (tracking or comprehensive secondary education, university autonomy and admission policies) and availability of financial resources (student loans or saving accounts). In the various contribution the reader may find up-to-date information of what is known in the relevant literatures, as well as novel evidence on the transition from secondary to tertiary education.

* * *

The first contribution on "Youth Transition Regimes in Europe: from Schooling to Tertiary Education" by Daniele Checchi and Paola Mattei (University of Milan) deals with macro and micro evidence on this transition among European countries. It opens with discussing the European policy agenda associated with the European Education Area that is focused on expansion of access in higher education (HE) systems as a pathway towards a more inclusive society. However HE systems mainly benefit the offspring of the middle and upper social classes. Thus, expanding the sector with greater public investment does not reduce socio-economic inequalities. The underlying policy issue becomes how do we design policy measures that promote both a smooth transition from secondary to tertiary education and also equality in educational opportunities? This chapter examines transition systems in terms of who gets into higher education (an equity dimension), how many complete their studies (an efficiency dimension) and the final attainment and outcome (an effectiveness dimension).

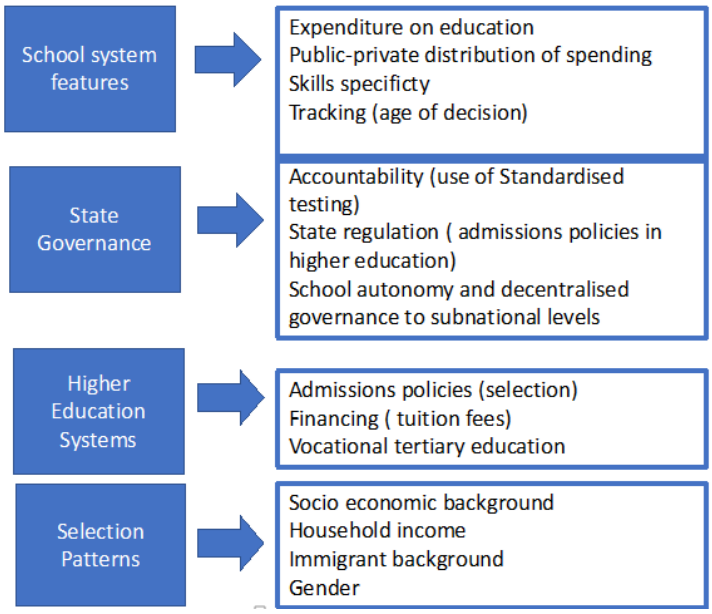
HE systems are integrated in a complex institutional environment, and therefore the existing literature in comparative politics and education research has developed multidimensional classification of HE systems. The authors consider two dimensions conditioning the transition from secondary to tertiary education:
a) Tracking students in the school systems and placing them in different streams, enabling or prohibiting access to HE;
b) HE institution selection of students through autonomous admissions rules.

They then propose a scheme for characterising transition regimes, which is synthesised in figure 1. The first institutional domain that affects the transition from schooling to higher education pertains to institutional features of the school systems, namely the organisation and financing of primary and secondary education (lower and upper levels), which varies in terms of years of schooling across countries. The second institutional domain relates to state governance, such as the features of centralisation and decentralisation in education systems. In addition to these features, school governance measures are also included, such as school autonomy, and the use of standardised testing as measures of school accountability. The third domain looks specifically at three fundamental dimensions of higher education governance: admissions policies of universities and higher education

institutions (selection of students), the use of tuition fees to finance universities (funding), and the availability of vocational tertiary programmes. The fourth institutional domain intends to capture individual heterogeneity, which is typically associated to gender, age and foreign origin. However, youth is also differentiated in terms of social background (parental education, parental occupation, family income and wealth).

One can identify **five transition regimes in Europe** based on the four institutional domains identified in the above framework. They are a Familistic regime (Mediterranean), a Universalistic regime (Nordic), an Employment-Centred Regime (Continental), a Market-Based Regime (Anglo-Saxon), and a Post-Communist Regime (Eastern).

Figure 1 – Transition regimes



In order to operationalise their conceptual framework the authors have collected institutional data on 29 European countries over the last two decades, mainly from Unesco and OECD. They have adopted two statistical tools to synthesise 43 institutional variables, factor analysis and cluster analysis. Both statistical tools allows the identification of five groups of countries that are not far from the transition regimes proposed according to theoretical expectations. These groups are reported in table 1.

Table 1 – Country clusters based on similarities in educational indicators – 29 countries – 2011-22

Nordic	Denmark, Estonia, Finland, Iceland, Latvia, Lithuania, Norway, Slovenia, Sweden
Continental	Austria, France, Germany, Ireland, Luxembourg, Netherlands, Switzerland
Mediterranean	Greece, Italy, Portugal, Spain
Anglo-Saxon	Belgium, United Kingdom
Post-Communist	Bulgaria, Croatia, Czech Republic, Hungary, Poland, Romania, Slovakia

The differences across clusters are significant. For example, the legal duration of compulsory education varies by almost two years (from 9.8 in Nordic to 11.5 of Mediterranean); the student/teacher ratio in tertiary education ranges between 14 and 22.8; the minimal tracking-age goes from 12 in Continental to 15.5 in Nordic. The repetition rate in lower secondary is close to zero in Nordic (0.77%) and highest in Mediterranean (5.1%). Enrolment in private institutions is highest across all stages of education in Anglo-Saxons (notably United Kingdom). Looking at educational

attainment in the adult population, it is lowest in Mediterranean and Post-Communist clusters, and higher elsewhere. Conversely, the NEET rates are highest in the Mediterranean countries.

The same clusters are then studied in terms of public opinions with respect to public support to educational expenditure. Using data from five poll surveys (INDEVUC, European Social Survey, International Social Survey Programme (ISSP), World Values Survey and Life in Transition) they find notable differences in the perceptions of the relevant populations. Public opinion in Nordic countries is fully confident of the «levelling the play field» contribution of education and is uniformly supporting further investment in early education. In Continental countries people is not worried by the actual working of the educational system, and is supportive of further expansion. In the Mediterranean cluster, people lack trust in the ability of education to reduce social differences, despite their desire for increased investment in higher education. In the Anglo-Saxon public opinion finds as normal investing private money in education. Finally in post-Communist people think of equality of opportunity characterizing education, and is less available to invest further money in the sector.

The five regimes are also validated by different patterns of behaviour of the corresponding populations, according to SILC data collected by Eurostat. By applying regression analysis on current educational choices in the adult population, they confirm that tertiary enrolment is socially conditioned by three order of factors:
i) the *institutional design of secondary education*, for those with a vocational degree are in a disadvantaged position;
ii) the *cultural capital of the student*, proxied by parental education, that does not vanish even after 11-13 years of compulsory education (not to speak of the one fifth who did not complete secondary education);
iii) *aspirations induced by parental social status*, proxied by parental occupations incorporating greater availability of financial resources. Financial resources or wealth appear uncorrelated.

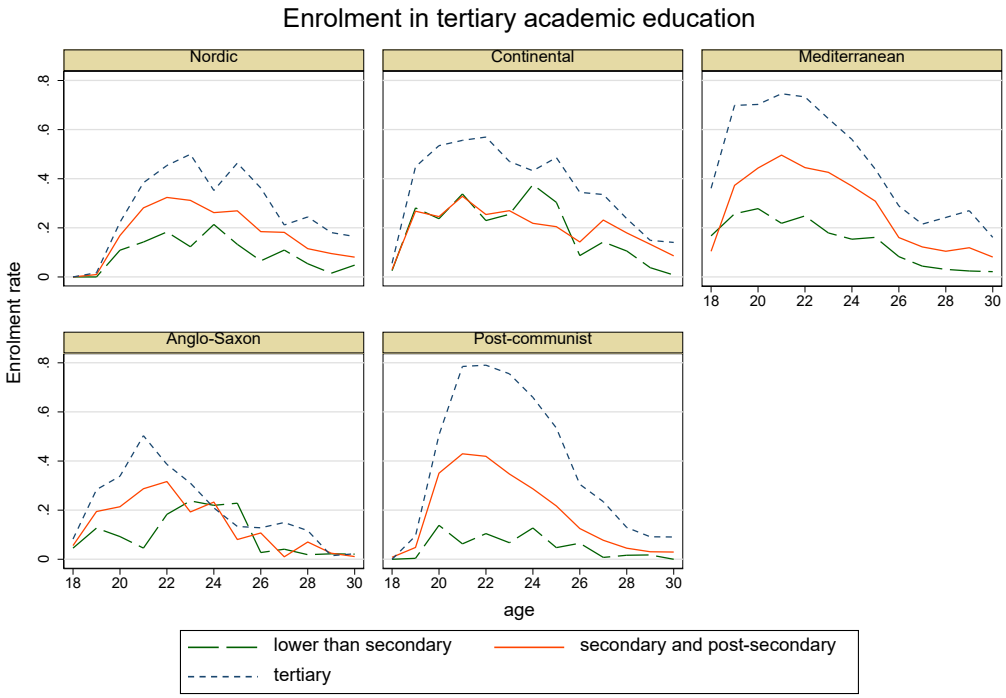
The authors propose three indicators for characterising transition regimes (see table 2):
① the probability differentials in secondary-to-tertiary transitions, by social origin
② the educational attainment
③ the drop-out rate during tertiary

Table 2 – Indicators of tertiary enrolment and graduation – SILC 2019

	Tertiary enrolment by highest parental education								
	low (primary and lower secondary)	medium (upper secondary and post-secondary)	high (tertiary academic)	total	① probability differential enrolment (tertiary/ secondary)	② tertiary attainment 30-35	tertiary enrolment 18-25	tertiary enrolment 26-30	③ estimated dropout rate
Nordic	0.071	0.147	0.224	0.179	**1.52**	**0.501**	0.295	0.186	**0.331**
Continental	0.140	0.200	0.362	0.257	**1.82**	**0.496**	0.369	0.184	**0.434**
Mediterranean	0.124	0.274	0.487	0.268	**1.77**	**0.374**	0.381	0.105	**0.531**
Anglo-Saxon	0.100	0.156	0.227	0.177	**1.45**	**0.480**	0.191	0.056	**-0.187**
Post-communist	0.043	0.173	0.363	0.193	**2.10**	**0.377**	0.310	0.073	**0.405**
Total	*0.115*	*0.202*	*0.362*	*0.236*	***1.80***	***0.435***	*0.333*	*0.126*	***0.412***

Inequality of opportunity in educational attainment (as measured by the different odds in tertiary enrolment) is lowest in Nordic, Anglo-Saxons and Continental countries and highest in Mediterranean and Post-Communist ones, as evident from figure 2. This is the result of social attitudes (age of home leaving, lifelong learning), public support (cost of HE enrolment, existence of scholarships) and institutional design (whether secondary education is tracked or comprehensive). As a consequence, the educational attainment in the population are highest in in Nordic, Anglo-Saxons and Continental and lowest in Mediterranean and Post-Communist countries.

Figure 2 – Enrolment in tertiary education by parental education – SILC 2019



Enrolment rates by highest educational attainment among parents relative to the age cohort, using sample weights

Nordic countries combine the greatest equality of opportunities (lowest probability differentials in secondary-to-tertiary transitions) with the greater effectiveness (highest educational attainment and the lowest drop-out rate in tertiary education), as a combination of three factors: early home living (thanks to public support); low educational cost at tertiary level; possibility of enrolment at later age (due to encouragement of lifelong learning). Conversely, Mediterranean and post-Communist countries represent the opposite side of the transition: late home living (due to imperfect welfare systems); high cost of tertiary enrolment (including the cost of living); high juvenile unemployment.

The chapter closes with five case studies of countries that are most representative of their cluster (Sweden, Germany, Italy, UK and Poland). This qualitative analysis sets out the key features of each educational system and draw attention on the governance dimensions, such as school autonomy and accountability mechanisms. In addition, it traces the policy changes to secondary education in the last few decades in order to identify key policy reforms that may have effects on the education outcomes.

In the concluding section the authors offer policy proposals intended to improve the equality of opportunities in European educational systems:
i) increase the generalist curriculum of professional training schools, raising the cultural capital of children enrolled in these tracks (courses should include generalist theory and not just practical subjects);
ii) introduce incentives to secondary schools in order to ease the transition to HE by means of information provision, guidance, preparatory courses. This should be accompanied by delegating greater autonomy to schools to develop extra tutoring for disadvantaged students, because contexts vary greatly (urban/rural, demographics of cities, etc.);
iii) expand the available pathways from secondary vocational to postsecondary non tertiary vocational, and from there to tertiary academic. This requires integrating secondary and

postsecondary education and not treat them as separate and disconnected sectors of policy interventions.
iv) create bridging programmes from vocational tracks to academic education, introducing additional terms of study, summer courses, postponed admission tests.
v) encourage home leaving in order to reduce the impact of family customs and financially support students attending higher education courses. Encouraging student mobility nationally and internationally requires financial support for students from families without resources; the financial aid could be conditional on targeted enrolment in best universities outside one's region.
vi) design carefully bursaries to disadvantaged students not only based on low income students, but also underrepresented and socially discriminated groups in society (ethnic minorities, women from ethnically discriminated groups, non-traditional students).
vii) support students during their higher education experience with tutoring, optimal course design, ECTS recognition. HE institutions should create additional tutoring for disadvantaged students, and they should gain recognition from the central government in terms of extra funding.

* * *

The second contribution by Andrea Guariso and Mariapia Mendola (both at the University of Milano-Bicocca) is titled "Beyond the Classroom: Global Competencies and the Path to Higher Education" is dedicated to the illustration of a new dimension of youth attitudes, that has been explored for the first time in the OECD PISA (Programme for International Student Assessment) 2018 survey, and unfortunately not replicated in the subsequent one.

This paper discusses the role of Global Competencies in the current landscape of education and their increasing relevance in preparing individuals for a successful life in today's rapidly changing, interconnected world. Traditionally, the assessment of educational quality and student success has focused on learning outcomes. Yet, this approach captures only a fraction of what it means to be ready to thrive in today's diverse and dynamic environments. Skills like cultural awareness, effective communication, critical thinking, and the ability to engage with people from different backgrounds are increasingly recognized as essential for personal and societal success. These competencies enhance employability in the global economy and foster social responsibility, ethical engagement with global issues, and adaptability.

The inclusion of Global Competencies in the 2018 PISA survey marked a shift towards measuring students' socio-cognitive skills and attitudes about global and intercultural issues, reflecting the growing consensus on the need for education systems to impart a blend of academic skills, attitudes, and knowledge essential for navigating global challenges.

Global Competence, as defined by the PISA framework, is a socio-cognitive skill comprising the ability to examine issues from various perspectives, interact respectfully with others, and take action toward sustainability and collective well-being. This concept emphasizes the need for education that develops knowledge, skills, attitudes, and values that enable students to adapt to different cultural environments and to address global challenges effectively.

The OECD's global competencies framework represents an ambitious attempt to standardize the definition and evaluation of these competencies globally, offering a benchmark for educational improvement across different cultural settings. Despite its ambitions, the framework faces several challenges, including the difficulty of quantifying soft skills like empathy and cultural sensitivity, the potential for biases toward Western values, and the risk of prioritizing measurable outcomes over deeper educational transformations. Furthermore, the reliance on self-reported measures to assess these dimensions introduces potential biases in the measurements. The 2018 PISA's effort to

standardize the measurement of global competencies should, therefore, be seen as an important step toward a shared definition and understanding of these skills, while acknowledging that this process is still in its early stage.

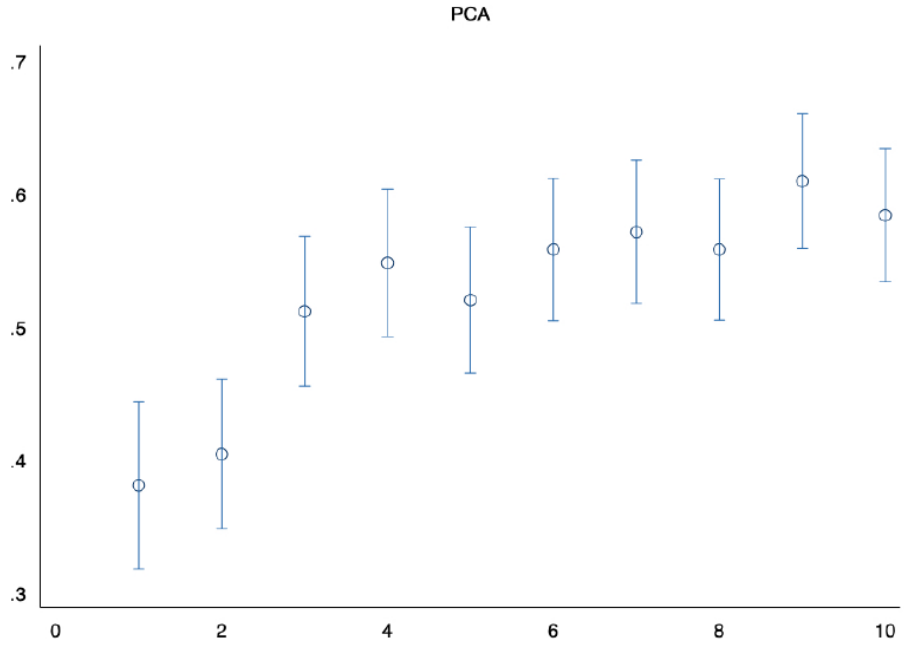
Despite these limitations, given the richness of the PISA data, the paper devote a great effort to investigating Global Competencies across countries and individuals, in an attempt to shed more light on this new concept and the dimensions that are most associated with it. The authors focus their analysis on the 29 European countries out of 66 countries participating to the survey. Starting from nine dimensions identified in the Global Competence framework that are assessed through self-reported agreement or disagreement on general statements, the authors combine the nine different measures into a single Global Competencies Index (GCI), using the first principal component of a factor analysis to generate a consolidated measure of global competencies.

When comparing Global Competencies across European countries, the authors highlight a significant variation in global competencies across countries, which is remarkably consistent across various dimensions of global competencies. In addition the overall country rankings in terms of global competencies do not align well with the standard educational system clusters identified earlier in this report, presenting an interesting divergence in the analysis of traditional educational skills and these new skills. In addition, global competencies at the aggregated country level appear uncorrelated with standard socio-economic and cultural dimensions, as captured by GDP per capita, share of immigrants, and educational attainments.

In the second part of this chapter, the authors switch to individual-level data and perform a richer analysis, holding constant specific country characteristics. Their analysis indicates that individual and family characteristics are strongly associated with global competencies: girls, older students, immigrants, students with higher academic scores, as well as students from wealthier families and whose parents have more prestigious occupations, tend to exhibit higher global competencies. School-level dimensions seem to play a much smaller role, as they are only weakly associated with global competencies.

In the last part of their analysis, Guariso and Mendola explore how global competencies relate to students' future ambitions and expectations, particularly their desire to continue studying and their expected occupational status. Controlling for individual, family, and educational factors, the study finds that higher levels of global competencies are significantly associated with greater ambitions among students, even after adjusting for socio-economic background. It is particularly interesting to observe how gender and achievements are intertwined with Global Competences. If we look at figure 3 it is noteworthy that 15-year-old girls exhibit greater global awareness (socio-cognitive skills) the stronger are their literacy and numeracy (cognitive skills).

Figure 3 – Gender and Global Competences by PISA test score deciles



Note: The graph illustrates the point estimates of the gender coefficient, together with its 95% confidence intervals, from a set of regressions similar to the one in column 3 of Table 4, which are however constrained to only consider students belonging to different deciles of the test score distribution. The deciles are defined within each country.

In light of this positive association, the key challenge remains in identifying effective strategies to enhance global competencies, which highlights the need for further research and innovative educational programs to foster these critical skills. In a box the authors report evidence of the impact assessment of a program called "Integration - Beyond Prejudices" (IBP), which was implemented in Milan and Genoa in 2022. The program aims to transform youth attitudes toward immigration using active learning and peer-to-peer teaching strategies. Drawing on Global Citizenship Education and Game-based Learning, the program engages students in workshops that promote critical thinking, collaboration, and empathy, led by university students trained for this purpose. This approach seeks to foster a nuanced understanding of immigration issues among adolescents. The authors studied the program's impact through a randomized controlled trial involving over 4,500 students across 252 classes. The results reveal significant positive shifts in attitudes towards migration and reductions in discriminatory behaviours, particularly in environments with a higher presence of immigrant students. Despite not significantly affecting implicit biases or empathy, IBP notably improved perceptions and social norms around migration, emphasizing the potential of educational interventions to combat prejudice and enhance social inclusion in diverse societies.

* * *

The third contribution by Antonio Filippin (University of Milan) and Maria Depaola (University of Calabria) deals with “The role of information and stereotypes”. The chapter is devoted to exploring the psychological roots of the choice of enrolling higher education and the related choice of field of study. The authors provide evidence of potential channels (mostly based on parental expectations and access to information) through which male students from disadvantaged families self-exclude from college enrolment. Similarly, they provide evidence of potential channels (mostly based on gender stereotypes) leading to a reduced female access to STEM fields of study.

Both findings open room for policy intervention, especially when the European Commission is pressing member countries to raise HE access. For instance, the Europe 2020 Strategy highlights the goal of increasing the share of the population aged 30-34 with a tertiary education or equivalent qualification to at least 40% by 2020. Moreover, the European Union is actively addressing gender disparities in STEM (Science, Technology, Engineering, and Mathematics) fields as part of its broader mission to promote gender equality and diversity across education, research, and the workforce.

In order to undertake optimal educational choices individuals need comprehensive and tailored information about the costs and benefits associated to higher education. However, predicting the expected returns involves navigating a complex landscape, as it involves considering both immediate and long-term factors in a rapidly evolving job market. Moreover, individuals, entering a specific educational program, also need to predict whether they will successfully complete the course, and whether, upon obtaining a particular educational qualification, they will find a suitable job. It is also to be considered that educational decisions are not made based on economic considerations alone and family expectations and social norms can heavily influence individual choices.

Indeed, the availability and quality of information play an important role in shaping optimal educational decisions. When students have access to higher quality information, they are better equipped to understand the application process and recognize the long-term benefits of pursuing higher education. However, it's important to acknowledge that the ability to obtain and process information can be closely tied to a student's socio-economic background. Students from wealthier families are often better equipped to navigate the complexities of the application process, understand the nuanced long-term benefits of pursuing higher education, and form more accurate perceptions of the feasibility and returns of tertiary education. Families can also differ along socio-economic status in terms of social norms and role models. For instance, how individuals perceive their probability of success in a certain degree program is formed relying upon signals received by parents, teachers and peers. Nonetheless, these signals might be distorted, possibly by unconscious attitudes or stereotypes.

All these factors can have a significant impact on the (sub)optimality of decisions regarding higher education. This is evident in two prominent stylized facts:
i) Students with a higher socio-economic family background enrol more often in higher education than their less advantaged counterparts with the same school performance.
ii) Females disproportionately choose less occupationally rewarding Fields of Study, in particular, leaving out of their landscape the so-called STEM disciplines.

To understand the role played by information and stereotypes in shaping the educational choices of students coming from less affluent families and in explaining why female students are under-represented in STEM fields, the authors make use of two distinct sets of data. The first comes from a field experiment conducted by one of the author and provides evidence about the intended educational choices of a sample of Italian students focusing on their determinants. The second is provided by INVALSI and includes information on both standardized blindly-graded test scores obtained by students and scores assigned by teachers on non-blindly-graded tests, allowing us to investigate whether teachers are susceptible to unconscious biases and stereotypes.

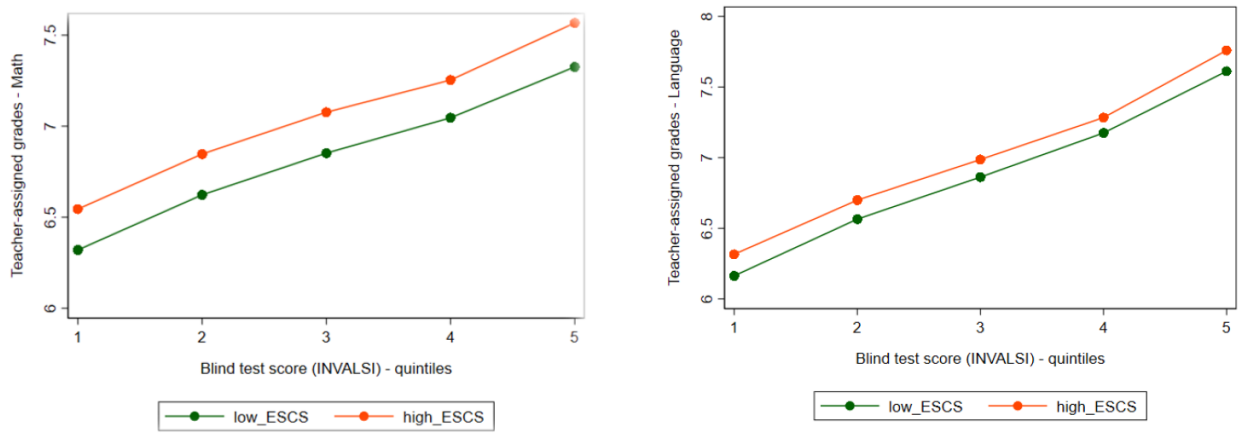
Their findings reveal several pieces of evidence concerning the role played by socio-economic background and gender norms.
1) *The quality of information matters*: Respondents from high socio-economic-status perceive the quality of information about tertiary education received by their parents to be significantly better.
2) *Influence of Family Education Level*: Students from more educated families report a significantly higher value placed on tertiary education by their parents.

3) *Grading Disparities*: Teachers grade less generously students coming from a weaker socio-economic background and males. Controlling for INVALSI standardized tests in math (language) and for individual, class and school characteristics, an increase of one standard deviation in the indicator of the student socio-economic background results in a math (language) grade increase of about 0.05 (0.06) (see figure 4).

These factors may contribute significantly to the reduced likelihood of male students and students from disadvantaged economic backgrounds attending university. On the other hand, they cannot rationalize the unbalanced distribution of choices along a gender dimension. In fact, as regards females we find that:
4) Female students display a significantly better situation than males in both the quality of information and the importance attached to higher by their parents.
5) Teachers tend to grade more generously female students both in language and in math.

Figure 4 – Teacher-assigned grades vs standardized test scores – low vs high ESCS - INVALSI

(b) Math (a) Language



INVALSI, 13th graders, school year 2021-22

The under-representation of females in STEM fields seems to be instead related to the following aspects highlighted in our analysis:
a) *Gender Wage Gap*: There exists a significant gender gap in expected wages, which tends to increase with the perceived strength of the field of study. This disparity in expected earnings may influence females' decisions regarding their choice of academic and career paths, leading them away from STEM fields that are often perceived as offering higher financial rewards.
b) *Preference for Humanities*: There is a pronounced difference in the preference for humanities subjects among high school students. Students who have such a preference are much less likely (-36%) to enrol in a strong field of study, and this variable has a clear gender connotation.
c) *Implicit Biases among Teachers, Parents, and Peers*: Research suggests the existence of implicit biases among teachers, parents, and peers, which can influence female students' academic performance and educational choices. These biases may stem from societal stereotypes and expectations regarding gender roles and abilities.

Their analysis on the effects of information provision (covering wages, duration of first job search, risks of over-education and risks of horizontal mismatch) reveals that:
d) No effect the intention to enrol of low SES student
e) No effect on the distribution of expected fields of study between genders that remains stereotypical.

f) Sizable decrease in interest in the humanities among the treated females.

Overall, their findings underscore the complex interplay of socio-economic background and gender norms in shaping educational choices and outcomes. Addressing disparities in information access, grading practices, and societal biases is crucial for promoting equity and diversity in education, and ultimately reducing barriers to higher education attainment for all individuals.

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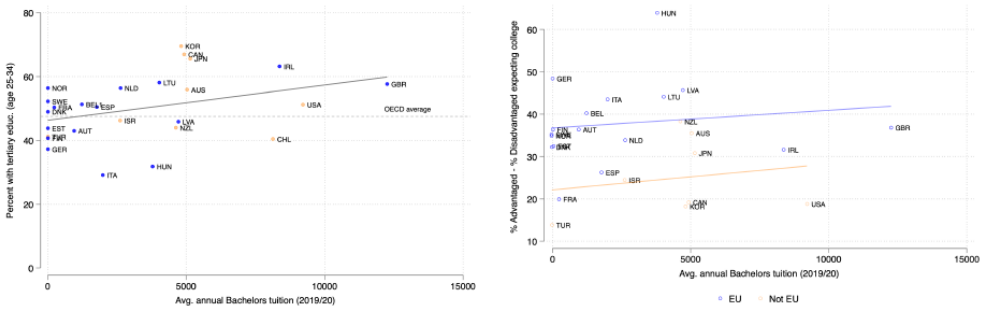
The fourth contribution by Massimo Anelli (Bocconi University) and Daniel Kreisman (University of Georgia and University of Milan) discusses of "Financial Constraints and University Attendance in Europe: Can Financial Institutions Lend a Hand?"

This contribution discuss the issue of financial obstacles in accessing tertiary education and market solutions to the potential liquidity constraints. The authors begin their analysis studying the relationship between the cost of university (in Europe, broadly defined) and university attendance and completion rates. Based on observational data and findings in the literature, they argue that in the European context tuition and fees, which are often zero for students from low-income families, are likely not the limiting factor in university enrolment. Rather, they claim that living expenses constitute the primary cost of for most students and can limit both enrolment and location.

To illustrate, Figure 5a shows a positive relationship between tuition and enrolment across countries. This does not imply that increasing tuition leads to increased enrolment. Rather it is meant to illustrate that tuition *alone* is likely not the limiting factor in university enrolment, at least in Europe. The accompanying Figure 5b furthers this point by plotting university *expectations* for advantaged and disadvantaged students by their home country's tuition rate (EU in blue and other OECD nations in orange). That the lines are always above zero documents a large gap in college-going expectations between wealthy and poor students in all countries. For example, non-socioeconomically disadvantaged Italians are nearly 45 percentage points more likely to expect to attend university than their disadvantaged peers. The (rising) slope of the lines signify that the advantage gaps is not increasing with tuition – in fact it suggests the opposite.

Figure 5 – National tuition and university attendance - OECD



(a) Share with Tertiary Education and Average Undergraduate Tuition

(b) Difference in University Expectations, Advantaged-Disadvantaged students

Notes: Tuition is from OECD (2022), Table C5.1. Share with tertiary education is from most recent reporting year for individuals age 25-34 from OECD (2024), Population with tertiary education (indicator). doi: 10.1787/0b8f90e9-en. Collegiate expectations come from PISA 2018 Results (Volume II, OECD 2019) Figure II.6.4 Students who expect to complete tertiary education

Thus, tuition is not the only cost students face, especially in Europe. To illustrate, they simulate university costs in Italy, where the fee structure is progressive and where the majority of students face virtually no tuition price in public universities. Despite a near zero tuition price for students from low-income families, more than 75% of children from households in the top quarter of the income distribution attend college, compared with less than 40% among those in the bottom-quarter. Our simulation shows that for a student attending university in Milan who came from a family with income at the country's median, *only 17% of the estimated direct cost is due to fees and supplies*, the rest is living expenses. Given our focus on financial barriers, we pay particular attention to the role living costs play.

The author then proceed discussing the role of financial products intended to relax these financial barriers, comparing loans with incentivized savings accounts. Concerning the former, much of the evidence on loan effectiveness comes from countries with comparatively high tuition costs, for which loans are primarily used (especially US and UK). Even in these countries, the evidence of loan effectiveness is mixed. Evidence from the US, where the loan market is largest, including a robust market for private loans, suggests that this would be a risky solution for a private lender. This is due to the fact that there is no collateral for human capital loans, and by nature, they are risky. Ample evidence exists that loan repayment rates are low in countries where they are prevalent, even when the government is the originator, when interest rates are low, and the state has extreme latitude to enforce collections. The second alternative is to consider educational savings accounts. These are normally tax-deferred investment vehicles set up for minors to be used for their education. These offer several features that loans do not or feature weakly, including incentive effects, integration into the financial community, and the ability to design progressivity into the product. Yet, designing an effective campaign has proven difficult, as less wealthy families are least likely to enrol, creating potential for further wealth distortion due to tax incentives.

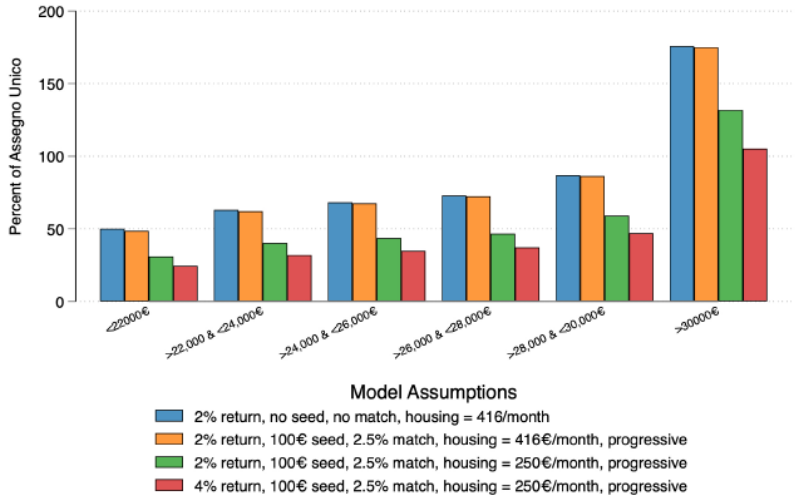
The final part of their chapter is dedicated to simulating a realistic educational savings accounts in the Italian context. While a progressive system of Child Savings Accounts (CSA) would require at least a minimal government intervention, financial institutions would almost certainly play a central role. They first propose a CSA that does not rely on government intervention, that has a progressive structure, and which can be accomplished without additional public funding under existing policies. They also consider how government policy could be leveraged to increase the progressive targeting of the program.

In recent years the Italian government reorganized all fiscal and welfare instruments targeting children into a single Universal Child Allowance (UCA), the "Assegno Unico". This benefit is universal as all families with children receive a monthly benefit independent of their income. It is also progressive as it is more generous for less wealthy families. Every family with a child is automatically eligible and receives the allowance in their bank account. While the Assegno Unico is a critical tool for easing financial burdens for disadvantaged families, it also represents an opportunity for forward looking investments. Families could therefore provide the IBAN of their children CSA as destination of part of the benefit each month.

The authors have conducted an empirical exercise that models required family investments, as a percentage of the Assegno Unico, under various assumptions about university costs and investment growth. The key challenge is enrolling low-income families that are liquidity constrained and might not be able or willing to forego current consumption to save for potential university enrolment. Prior efforts make clear that a few features are vital for overcoming these hurdles. In particular, seed grants, ease of enrolment and automatic deductions, and the progressivity of the program.

Figure 6 presents simulation results for the six different wealth brackets from ISEE, and the estimated the share of Universal Child Allowance (UCA) that families would be required to deposit to finance the entirety of a 3+2 university program. Using the most conservative real rate of return, at 2%, the baseline model estimates that the most disadvantaged families would have to divert 50% of their UCA transfer to a CSA to finance university of their children. Excluding the wealthiest families, all others would be able to finance university by setting aside only a portion of the subsidy.

Figure 6 – Estimated monthly contribution to finance university attendance as share of wealth-bracket-specific UCA benefit



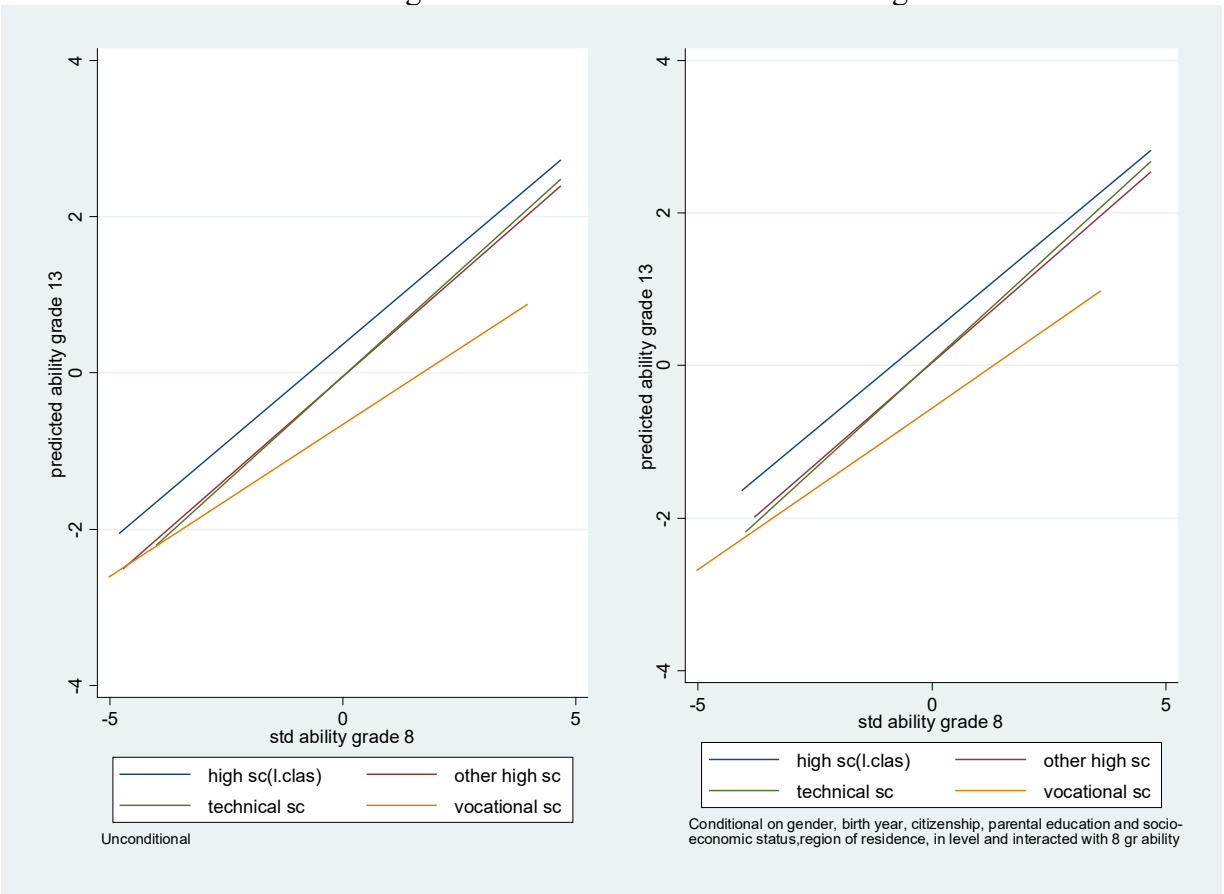
Notes: Vertical axis shows share of Assegno Unico dedicated to child savings account. ISEE categories on horizontal axis. Assumptions include average annual rate of inflation adjusted returns on investment, initial seed, match rate on each euro deposited, and whether seed and match rate are progressive. Authors' calculations.

* * *

The fifth contribution by Daniele Checchi and Tommaso Frattini (University of Milan) deals with "Tracking and academic prospects" in the Italian case. This paper examines the impact of secondary school tracking onto the transition to tertiary education of Italian students. The authors start by examining longitudinal data on the cohort of students born in the year 2000, observed in junior high school before tracking choice in 2014 and for those survived at the end of 5 years of upper secondary education in 2019. They show that track assignment implies a different evolution of competencies during secondary education (as illustrated by figure 7): students in vocational schools who do not drop-out lose positions in the distribution of ability, vis a vis students in high schools who gain ranks. They argue that other things constant differences in tracks (in terms of teaching contents and teacher selection) is detrimental for students who are already weaker on learning grounds.

In order to examine aspirations to college (already discussed in previous contributions) they also resort to the PISA survey conducted in 2018 among 15-year-old Italian students. Even though the intersection of college aspirations between students and their family may represent a rough proxy for future decisions, one can study the role of measured ability and family background in forming these aspirations. They show that tracks affect college aspirations, since students in vocational tracks, other things constant (including ability net of family background) are less likely to apply.

Figure 7 – Cumulative effects of tracking



In a partial equilibrium analysis, the choice of selective admissions by universities pays back in term of signaling in the tertiary education market, since it makes them more attractive for high ability students who aim self-selecting with similar peers. But one should consider the aggregate consequences of these transitions. Admission tests, when adopted by universities intended to switch to selective admissions, either set a very low threshold or they hinder the ability of the country to make the Lisbon 2030 target of reaching a 40% of the young population with tertiary education.

They also discuss the usefulness of admission tests as predictor of the academic career. Making use of selective admissions in one large university in Milan to study the correlation of three outcomes (probability of drop-out during the first year, number of ECTS obtained and GPA), both at the end of first year. We find that the admission score is correlated to these outcomes, in a very similar way as the graduation marks (*voto di maturità*). However the admission score works worse for students from vocational than for students from other tracks, possibly because students from vocational have other interior strengths that help them to navigate the system, despite discouragement and lack of information. So even when admitted to selective courses, the small minority of students from vocational schools does not obtain recognition of their real efforts.

This new evidence confirms that students attending vocational schools are in a disadvantage position, even when they start with the same level of potential of students attending high schools: their competencies grow less, their aspirations are contained and they end up underrepresented among the students admitted to universities, especially under selective admissions. If one were to improve the equity in accessing tertiary education one cannot abstract from students attending vocational education.

Among the available policy options they discuss de-tracking secondary education, or at least extending the comprehensive junior high school until grade 10, postponing the track choice by two years and ensuring the same teaching contents to everyone. A third alternative would be revising the teaching curricula in vocational education giving more space to theoretical approaches, on the argument of making students more adaptable to a changing world.

Universities could anyhow undertake actions at local level to encourage applications from students in vocational tracks. They could design orientation modules stressing the complementarities of some university programs with subjects taught in this track. But if universities intend to attract best students from vocational tracks who are discouraged by their lower level in admission tests, they could either introduce different admission thresholds by track of origin or adopt compensatory scores in admission for students from vocational, in recognition of the cumulated disadvantage associated with such attendance. A final alternative would be the replacement of admission test with the graduation marks obtained at the exit of secondary education, or the test score measured by INVALSI during 13th grade. Both measures have analogous predictive power on future careers, but have the advantage of being universally available, thus removing the informational (and economic) barrier of test taking.

Youth Transition Regimes in Europe: from Schooling to Tertiary Education[♣]

Daniele Checchi and Paola Mattei (04.04.2024)

Table of Contents

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Introduction

Higher participation systems have become a global policy norm around the world. Governments, international organizations, and pressure groups have all celebrated the growth of the higher education sector, exemplified by the move from the elitist to the mass higher education system. There is a global tendency towards higher participation systems as a norm of modernization, economic development and a duty of the state (Shofer and Meyer, 2005). Another source of significant pressure is the increasing competiveness and technological superiority leading to skill upgrade of the labour force (Lauder and Mayhew, 2020). Despite occasional concerns about 'over-education', states mostly support expansion. What are the drivers of such global norm? Public investment in higher education is expensive and it benefits mainly the middle and upper classes (Ansell, 2010). It seems the main driver is not the economic rationale. Rather, states respond to pressures from both social elites and growing middle classes who want better educational opportunities for their children. States in the field of education also respond increasingly to the European policy agenda (Ferrera, 2013). Some states nurture high-fee private schools and Ivy League universities, in market-based higher education systems (Dobbins, 2011) or maintain league table competitions in schooling that create value on affluent suburbs (Dorling 2014). Other states resist the rich and powerful and conceive of higher education as a public and collective good. However, all states respond to pressure from below for higher educational expansion.

The European policy agenda associated with the European Education Area is focused on expansion of access in higher education systems as a pathway towards a more inclusive society (European Commission, 2017a). Member countries have agreed that by 2030 at least 45 per cent of 25 to 34 year-olds should have completed a tertiary degree (Council of the European Union, 2021). The international policy agenda has also conceived high participation levels in higher education systems as a long-term policy goal (UNESCO SDGs). Opening up higher education systems to students from lower social strata, for instance, or discriminated groups in society is viewed as the end result of a fair and equal youth transition process from schooling to tertiary education (European Commission, 2017b). It is no surprise that participation in Higher Education is growing rapidly (according to UNESCO database, the enrolment rate is growing 1% a year) and includes one-third of the nominal school leaver age group. Whereas expansion in Higher Education is driven by occupational status and family aspirations in European countries, in developed countries it is mainly powered by economic growth and political strategies to increase human capital. The demand for an expanding higher education system serves not only economic drivers, but also political interests. It responds to

pressures from social elites and a growing middle class who wants better occupational opportunities for their children. The demand for Higher Education also serves the political need for modernisation and improvement of state capacity, according to the OECD.

However, this policy agenda focused on mass expansion of higher education is not accompanied by more equal access to elites institutions, and the quality of mass higher education remains problematic (Jacobs and van der Ploeg, 2006). Higher education systems mainly benefit the offspring of the middle and upper social classes. Thus, expanding the sector with greater public investment does not reduce socio-economic inequalities. The English-speaking countries have the highest share of the population with tertiary education (OECD, 2018); yet, this higher education regime is one of the most unequal in terms of educational opportunities. Shavit et al (2007) show that higher education systems with a high share of private spending and private actors show a larger participation rate than other systems. Thus, if we place the issue of high levels of participation in higher education on the policy agenda without an analysis of the complex institutional environment in which education systems are embedded, we risk to underestimate a wicked problem (Head, 2019).

To date, the relationship between the expansion of higher education and equalization of access has remained a prominent field of sociological theories (Erikson and Jonsson 1996; Paradise, Reale et al. 2009; Triventi, 2014). The question of educational inequality remains a central one in the sociological debate (Erikson and Jonsson, 1996), but there is a need, as much as possible, to create a bridge between microlevel studies and policy-focused analyses of the reform process. This will hopefully facilitate discussion of the implications of recent university governance reforms on equality in general and on the equalization effects of higher education expansion in particular.

The crucial question is: How do we design policy measures that promote both a smooth transition from secondary to tertiary education and also equality in educational opportunities? Strategies of higher education massification and modernization of higher education in Europe might benefit from addressing head-on the issues of supporting equality (Anderson, 2007; Baker et al, 2006; Boudon, 1974) and improving the performance of students from disadvantaged backgrounds. One of the consequences of rapid massification of higher education, combined with a lack of structural reform and decrease in public spending, is the entry of private actors into the higher-education sector and the move towards a market-based higher education model (Clark, 1983; Dobbins, 2011; Braun, 2001). The recent transformations of the higher-education landscape in Central and Eastern Europe are illustrative of the potential for privatization of higher education as a sector. However, the case of

Poland is particularly revealing of the controversies associated with the entry of new private actors in higher education. The massification of higher education as a European-wide experience is therefore intimately connected with the emergence of private actors in higher education and a diminishing support for the welfare state.

Despite the globalization of education policy agendas, individual member states and countries around the world continue to go their own way in designing policy instruments and programmes to tackle educational inequalities, improve access to different levels of education, and the politics of education reforms continue to be significantly influenced by national frameworks (Gingrich, 2023; Mattei et al, 2023). The marked variations within groupings of countries which are normally clustered in one single group merits greater scholarly attention. We will try to shed light in this paper on the heterogeneity of educational systems in Europe, and compare them across-countries. When it comes to education policy trajectories, it is important to note that a great heterogeneity within cluster of countries exists. This is not surprising if we consider the historical and institutional origins of national education systems in Europe (Archer, 1979; Busemeyer and Nikolai, 2018).

This paper develops a multidimensional and complex explanatory framework of analysis to address the following questions. In this paper, we focus on the transition from secondary to tertiary education as an institutional process. We focus mainly on national structural characteristics and institutional features of educational and training systems, both at upper secondary and tertiary levels. We aim at identifying the institutional dimensions of higher education participation and explain cross-country variations in the levels of attainment. The paper addresses the following empirical research puzzles:

What are the institutional effects of different education and training systems on the quantity and quality of youth transition to tertiary education (both academic and vocational, where it exists)?
Can we identify clusters of youth transition education regimes? If so, what are the features of these groupings of countries?
What education and training system(s)/clusters lead to the highest completion rate in tertiary education? (most effective)
What type of system/ cluster is best at mitigating inequalities of opportunity given by socio-economic background? (most inclusive)

This paper examines transition systems in terms of who gets into higher education (an equity dimension), how many complete their studies (an efficiency dimension) and the final attainment and

outcome (an effectiveness dimension). Theoretically, the paper advances our multidimensional conceptualisation of transition regimes and offers a new and up to date classification of five youth transition regimes in Europe. Section 1 of the paper identifies and develops the institutional domains that influence participation to higher education, measured as enrolment rates of students into universities. The four institutional domains used in this paper to explain different patterns across countries are: school systems, state governance, individual characteristics (including family background), and higher education systems. These categories are drawn from the existing literature that is explored in this section. The second section of the paper focuses on the debate on varieties of transition regimes, by setting out our theoretical expectations and then presenting the findings from the cluster analysis we have performed along the institutional variables identified in section 1 of the paper. The purpose of clustering education systems is to map and explain the differences and similarities across countries and refine the existing clusters available in the literature. Section 3 investigates the advantages of using a mixed methods approach of the study of institutional process of transition from secondary to tertiary education. The emphasis is on the temporal dimension by tracing the key policy changes in secondary education in the last twenty years. Section 4 analyses individual microdata from the analysis of the EU-SILC database and the educational choices of students. Section 5 presents the results of the qualitative case study empirical investigation, comparing Sweden, Germany, Poland, Italy and the United Kingdom. Section 6 concludes.

1. Youth transition regimes: the institutional framework

Education systems are constellations of structures and institutions that serve the goals of enhancing equality of opportunity for every citizen and diminishing the social inheritance effects on future opportunities (Glennerster, 1998; Halsey,1997) . The goals of any public educational systems are contested and often conflicting. For instance different political parties vary in their positions on the allocation of redistributive resources, with left-leaning parties supporting policies in favour of equality of outcome and removal of stratified structures of differentiation (Gingrich and Giudici, 2023; Ansell,2010). Normatively, ideas of equality have the power of shaping outcomes (Anderson, 2007) and underpin education institutions and social investment policies (Hemerijck, 2018). Empirically, institutions have sorting effects and institutional design may create itself educational inequalities (Checchi and Flabbi, 2007). Thus, education has at the same time a strong equalizer effect and creates inequalities, especially in highly stratified educational systems. Educational institutions are contested structures, subject to political conflict, party competition and continual political reforms that determine new governance arrangements (Milner, Mattei and Ydesenl, 2021). Political parties and organized interests are involved in the distributive implications of institutional choices in education policy (Ansell 2008, 2010) as the balance of power between politico-economic coalitions during critical junctures of historical development had a lasting impact on the formation education and training regimes in European countries.

1.1 Education and equality of opportunity

Émile Durkheim suggested that the most important institutional mission of a school is to simultaneously integrate pupils functionally with respect to the structure of the labour market, and to integrate them normatively through the adherence of new generations into the dominant social values (Durkheim, 1956). In the historical development of the relationship between education and society, compulsory schooling has played a central role, especially primary education. National educational systems in Europe are among the oldest and most stable public institutions, given the constitutional and in many cases “social” right to education (Marshall, 1950), the state-centred institutional mechanisms for the transmission of knowledge. Its organisational structure has remained almost unchanged in many European countries (Garritzmann and Garritzman, 2023). The historical foundations of many educational systems are based on the constitutional values of equality of opportunity (Darling Hammond, 2010).

As Durkheim suggested, educational institutions are embedded in national context and form an integral part of society (Durkheim, 1938, 1956). Educational institutions are societal institutions, and

it is arduous to understand them if they are analysed in isolation from societal changes and concepts that evolve historically (Archer, 1979; Prost, 1968). History matters as it determines the institutionalisation of patterns that have long-lasting implications for educational systems (Mattei and Aguilar, 2014). The majority of mass educational systems were established in Europe in the twentieth century. However, it was during the French Revolution that the first public inspections into the state of education were launched. The revolutionary government drew up a blueprint for introducing a universal system of primary education. Before the French revolution, the notion of a culturally unified France did not exist and people living in France identified with their local communities and villages. Thus, the link between education and equality pre-dates the formation of the modern welfare state, and is intrinsically linked to the institutional principle of citizenship (Ravitch and Viteritti, 2001).

The famous historian Antoine Prost argues that the French Revolution anticipated educational goals of equality of access, but it lacked the financial means to be implement it in its immediate aftermath (Prost, 1968). The French system of primary education has been the subject of study of comparative sociologists for many years given its centralised administrative structure and institutional features (Archer, 1979) and educational goals inspired by equality of opportunity (Boudon, 1974; Anderson-Levitt et al., 1991). The republican principle of equality is based on giving a fair chance and same universal principles of justice to all citizens. Since the early nineteenth century, primary schools have been known as the '*école du peuple'* (school of the people). The French school system had two types of institutions: the *école des notables* and the *école du people* based on two primary social classes in nineteenth century society The former was secondary education for the elites, whereas the latter was primary education for the masses. The historical legacy of education is underpinned by an authentic and solid aspiration to educate all young French citizens with equal treatment, regardless of social background, origins, geographical residence, and religion. In a remarkable speech on 10 April 1870, Jules Ferry, who was inspired by his revolutionary predecessors, presented the educational republican project of the nineteenth century in a visionary spirit:

"*The objective of our century is to abolish inequality of education which derives from social origins. This is our problem and we need to tackle it. I am devoting all my intelligence to this problem, all my heart to the education of the people...if a society has to be based on freedom, there is a need to abolish social classes. There are only two classes in France: those how have received an education and those who have not. There should be a fusion of these two classes in one egalitarian nation* (*une nation égalitaire)*" (Jules Ferry, De l'égalité de l'éducation, 10 April, 1870)

Despite these notable historical antecedents, Harold Wilensky argued that "education is special" (1974) in so far as it differs profoundly from other social policy fields. In his view, education contributes less than other social policy transfers to reducing socio-economic inequality and equality of outcomes. He argued that: "*A nation's health and welfare effort is clearly and directly a contribution to absolute equality, the reduction of differences between rich and poor, young and old, minority groups and majorities; it is only a secondary contribution to equality of opportunity. In contrast, a nation's educational effort, especially at the higher levels, is chiefly a contribution to equality of opportunity - enhanced mobility for those judged to be potentially able or skilled; it is only a peripheral contribution to absolute equality.*" (Wilensky 1975: 6). In his view, the difference between social policies and education is related to the different principles of social justice that these policies serve: equality of opportunity in the field of education and equality of outcomes in redistributive welfare service transfers. Because we expect that there will be a strong relationship between family income levels and students' participation in higher education, we then conceptualise social justice in education as equality of opportunity, and we argue that education isa much more important determinant of equality than Wilensky suggests.

Wilenski's argument is based on the view that education is primarily a positional good and does not serve the goal of mitigating socio-economic inequalities. The "tyranny of meritocracy" has attracted attention in the contemporary scholarly debate (Sandel, 2020). In the form of wage increased, education is a private good that is allocated to those who have talents and merits (Bell, 1972; Young, 1958). Wilenksy's work has had a long-lasting influence on comparative welfare state research, which has ignored education all together. The purpose of this contribution is to consolidate the link between education and the study of inequalities in the framework of education and training regime systems. We build upon the existing literature on education and training regimes developed by Busemeyer (2014), Busemeyer and Nikolai (2010), Iversen and Stephens (2008). These studies contribute to analyzing cross-national patterns of educational systems and outcomes and linking those to welfare regime theories (Esping Andersen, 1990; Ferrera, 1996).

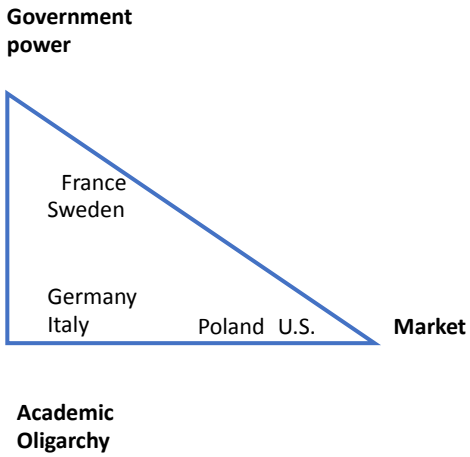
1.2 Higher education systems

As discussed in the previous section, public investment in education and the historical expansion of education to the masses underpins the development of democratic societies (Iversen and Stephens, 2008). Ansell argues that democracy is associated with the strength of labour and the Left who have traditionally supported public investment in education (Ansell, 2008). Primary and secondary

education have become universal during the post-WWII period in all European countries. As this process unfolded, political conflict over the allocations of resources and the politics of reforms has shifted away from primary and secondary schooling towards higher education. Children of skilled blue-collar workers face class barriers in accessing higher education and thus support policies to improve their access. As shown by Iversen and Stephens in their seminal study of three worlds of human capital formation (published in 2008), spending on higher education was the only category of social service spending that did not benefit the bottom quintile greater than the top in per capita terms. Garritzman shows how cross-country differences in private spending are driven by higher education arrangements because private tuition fees are included in the "private spending" statistical data (Garritzman, 2016). Thus, higher education public investment and the relationship between public and private funding is one of the most politically and socially salient empirical and analytical category of classifications of higher education systems. Many European systems have moved along the market-based system, despite their century long tradition of state-controlled systems, especially in the post-communist countries.

Higher education systems are integrated in a complex institutional environment, and therefore the existing literature in comparative politics and education research has developed multidimensional classification of higher education systems. There are multiple institutional domains used to compare higher education systems across countries (Dobbins, 2011; van Vught, 1995; Braun, 2001; Mattei, 2014): state-market coordination mechanisms, labour market characteristics, and individual families and student choices. With regards to the first dimension, our starting point is the widely used Clark's triangle (1983 – see figure 1).

Figure 1 Coordination Mechanisms in Higher Education Systems



Source: Authors' elaboration on Clark (1983)

According to the model developed by Clark, there is a tripartite distinction in higher education systems, characterised by the influence of power of different coordination mechanisms. The state control model reflects the bureaucratised Napoleonic higher education systems, exemplified by France and Italy. The state coordinates admission requirements, curricula, students' evaluations, and universities are subject to administrative controls and regulation by the central government. In this model, the central state controls also quality assurance, efficiency and the relationship between universities and external stakeholders, and industry.

The Humboldtian model, which is found in Germany, Austria, and post-communist countries, reflects self-governance and academic self-rule (Scott, 2022), in contrast with the Napoleonic hyperregulated and centralised system. Universities are managed by an academic oligarchy which safeguards the freedom of teaching and learning. Higher education systems in this mode are governed by corporatism and collective agreement, and generally run with weak performance-based criteria (Braun, 2001; van Vught, 1995).

The third model reflects the Anglo-American market-based higher education system ideal type. In Europe, the British case has traditionally been the typical one. Universities operate as economic enterprises. Market mechanisms coordinate the admissions of students and funding is mainly private,

through tuition fees and diversified funding resources. The entrepreneurial university exemplifies this model (Mattei, 2023). Only in this market-based model, decisions on admissions policy, specializations, size of the institution, are left to university management. In the state-control and Humboldtian systems, the state has a strong regulatory and financial controls on university policies.

University institutional autonomy and state regulation

These analytical models have been widely used in the higher education research and are useful tools for comparing different higher education systems. What we find crucial in our research is the allocation of institutional autonomy. It is a crucial variable because it determines the allocation of power, influence and resources between different institutional levels and actors. If universities operate within a market-based system, they will determine with a high degree of autonomy and flexibility their admissions policy, whilst in highly state-control higher education systems, the regulatory state will heavily influence individual universities' policies. However, the higher education landscape has been adaptive to a massive reform impetus in the last twenty years, unlike primary and secondary education which have remained much more stable institutions.

The "modernization agenda" has entailed two key reform trajectories: the emergence of institutional autonomy and new competitive funding arrangements (European Commission 2006). In the first instance, public universities have increasingly transformed into independent legal entities with autonomous, self-governing institutions that are responsible for their own teaching and research strategies, staffing, and investment policies (Goodman 2001; Goodman 2005). Processes of autonomization of public agencies from ministerial control has challenged existing hierarchical and pyramidal mechanisms of coordination (Verhoest, MacCarthaigh, et al. 2010), as well as traditional relationships between different levels of government (Peters 1992; Rhodes 1997). There is considerable evidence to suggest that the English system has been used over the past decade as a model for many of the reforms in Europe (Mattei, 2009), particularly those concerning the relationship between universities and the state. Continental reformers driving the transformation of national universities into independent agencies have made explicit reference to the English case (Christensen and Laegreid, 2006).

Despite important variation across nations, the modernization agenda pursued by European universities has been remarkably similar across nations, a development that must be understood in the context of greater coherence and cooperation between higher-education institutions in Europe

(Mattei, 2014). The increasing centrality of European programs in developing a European Higher Education Area (EHEA), as established by the Bologna Declaration signed in 1999, has generated a degree of policy diffusion and convergence, especially in the context of university governance and funding reforms. As such, the modernization agenda needs to be understood in national as well as the supranational context. Despite national variations in organizational form and design, both of which reflect normative, cultural, and historical legacies, European supranational institutions have promoted the harmonization of degree structure across universities through the Bologna Process, as well as the mobility of students across universities in Europe through the European Community Action Scheme for the Mobility of University Students (ERASMUS) programs.

Higher education expansion, between globalization and persistent national variations

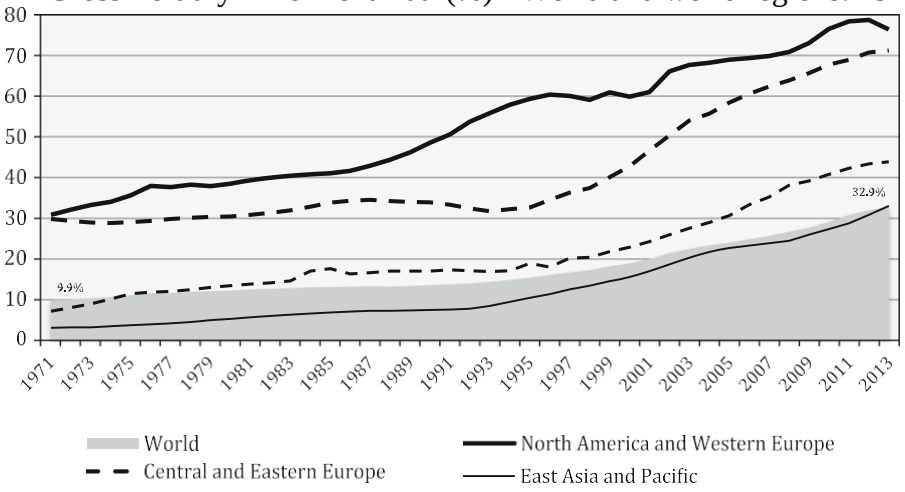
As Ischinger (2009) puts it, "*higher education is thus simultaneously a response to, and a scene for, global competition, collaboration, mobility and cross-cultural encounters*". Higher education institutions are key actors in the globalisation process providing highly skilled professionals and facilitating knowledge circulation, essential elements in a knowledge-based economy. Globalisation is taken here as the phenomenon of "*widening, deepening and speeding up of worldwide interconnectedness*" that contains different aspects, and the increasing inter-dependence and convergence of economic markets, rights, and the exchange of knowledge and cultural objects (Marginson & Wende, 2009; Rhoads & Torres, 2006).

The increase on the higher education enrolment rates has been a global trend. From 2000 to 2020, the number of students enrolled in higher education institutions more than doubles (from 200 millions to 435 millions enrolled students in 2020), according to the 2022 UNESCO Higher education global data report. The number of students increased by 24% in Europe and North America, and by 268% in Central and Southern Asia (which experienced the highest rise in the enrolment rate). The gross enrolment rate, which measures the system capacity, has increased from 19 to 40 % between 2020 and 2022. Whilst higher education expansion continues to be a global trend, despite varying distribution of students' enrolment across regions, and it remains a desirable goal, it is costly for political economies.

From the national perspective, the main driver was the need of countries to be prepared to face intense international economic competition. For this task, they need high-quality and skilled workforce, normally provided by tertiary education (Barr, 2009). Valero and Van Reenen (2016) estimated that

increases in the number of universities are positively associated with future growth of GDP per capita and that doubling the number of universities per capita can lead to an increase of 4% higher future GDP per capita. The Figure below, elaborated by S.Marginson (2016), shows that since 1971 the enrolment rate in tertiary education has been rising strongly and steadily in the great majority of countries in different regions (UNESCO, 2015). The world number of tertiary students multiplied by 6.12 while global population multiplied by 1.9 (World Bank, 2015). As the Figure 2 shows, from the late 1990s. Higher education expansion of participation has accelerated in Central and Eastern Europe.

Figure 2 - Gross Tertiary Enrolment Rati (%) - World and world regions: 1971-2013.



Source: Marginson, 2016 using data from UNESCO (2015)

As discussed earlier in this paper, Germany is typical of the Humboldtian higher education ideal type, whilst the UK is representative in Europe of the market-based system. Was there any cross-national variation regarding the growth of higher education enrolment in these two countries? According to Teichler (2016), the fact that Germany, one of the economically advanced countries in OECD, has a relatively low higher education entry rate and a relatively low graduation rate is due to its well-developed vocational training system. Conversely, in the UK, there was a substantial upgrade of vocational programs to tertiary type-B education(Teichler & Burger, 2009) . Both the UK and Germany experienced an increase on higher education entry rates, which is the number of new entrants compared to the population of the typical age for entering tertiary education. However, it was not in the same extent. In 2000, in the UK, the entry rate in tertiary education type-A programmes (three years' full-time or equivalent) was 47%. In 2011, this number rose by 64%. In 2000, in Germany, the entry rate was 26%. In 2011, this number was 46% (OECD, 2013, p.301). Although the entry rate increased significantly in Germany, it was still distant from the UK rate in 2011.

1.3 A new typology of transition regimes

In this contribution, we aim to investigate the structures and processes that determine the transition from the schooling system in Europe to higher education institutions (HEI). By "transition", we do not limit our empirical scope to "access" to HEI, and thus we do not only focus on structures at the points of entry to higher education. We do not limit our investigation to the study of admissions policies to universities, designed by university regulations, state-controlled rules, or university management boards. On the contrary, we take a holistic approach and a "pathway" approach to the study of the transition from schooling to higher education. A Pathway approach encompasses tracking decisions in school systems (at primary and/or secondary level, see for instance Table 1 below) and admissions policies into HEI. In our view, the process of transition starts at some point in schooling. This depends on national systems' institutions and structures, and *the "end product" is attainment in higher education*.

Table 1 – Secondary and tertiary tracking

		Tertiary	
Secondary		Vocational + academic	Academic only
	Tracking (early)	**Germany** A: 78.2% B: 60.0%	**Italy** A: 76.5% B: 54.2%
	Tracking (late)		**Poland** A: 70.5% B: 58.3%
	Never tracking	**Sweden** A: 84.1% B: 34.8% **UK** A: 82.6% B: 65.6%	

Note: **A**: fraction of youth aged 20-21 holding a secondary school degree (Germany includes ½ of students still holding a lower secondary degree for they will obtain a secondary degree later)
B: fraction of youth aged 24-25 holding a secondary school degree and enrolled in tertiary education or already having obtained a tertiary degree – Source: SILC 2019 (see below)

The study of admissions policies of HEI is complicated by the level of institutional autonomy that universities have in designing their own structures and policies. Thus, mapping in details admissions policies in Europe is beyond the scope of this paper. There are four admissions systems studied and developed by a work commissioned by the European Commission to a group of experts in 2017. It is one of the few comparative and European studies of admissions policies that adopt a holistic approach like ours (European Commission, 2017).

A typology of four admissions systems in Europe is based on two dimensions:
a) Tracking students in the school systems and placing them in different streams, enabling or prohibiting access to HEI;
b) HEI selection of students through autonomous admissions rules.

Table 2 - Typology of HEI admissions policy

Selection / Streaming	(Nearly all) HEIs can select with additional criteria	HEIs cannot select with additional criteria (in normal circumstances)
At least one pathway through the school system does not lead to a qualification enabling higher education entry (to some part of the system)	***Type 4: Double selection*** *Czech Republic, Iceland, Norway, Romania, Serbia, Slovakia, Spain, United Kingdom*	***Type 1: Selection by schools*** *Austria, Belgium, Denmark, Germany, Hungary, Italy, Luxembourg, Netherlands, Poland, Slovenia*
In general, all pathways may lead to higher education entry (in some part of the system)	***Type 2: Selection by HEIs*** *Bulgaria, Croatia, Cyprus, Estonia, Finland, Portugal, Lithuania, Latvia*	***Type 3: Least selection*** *Albania, France, Greece, Ireland, Malta, Sweden*

Source: European Commission, 2017

The typology developed in table 2 is not used as a heuristic tool in our analysis. It is, however, useful in so far as it provides contextual information about the complexity of youth transition regimes. The institutional set up of admissions policies to higher education institutions determines the type of transition we observe in different national education and training systems. The five types described below are a useful classification of the dimensions of selection in the higher education system, associated with school tracking systems.

Type 1 – Selection by schools: on one hand these systems are effective in so far as effectiveness is concerned (defined as how many attain a tertiary degree). One the other, these systems have the lowest participation rate by low social backgrounds. These are efficient only for those who do not belong to the lower social groups and have the social advantages to succeed in the pathway.

Type 2 – Selection by HEIs: These systems have slightly higher-than-average graduation rates, and are more likely to recruit students over the age of 30.

Type 3 – Least selection: These systems *do well in terms of equalising chances* in higher education for students from more disadvantaged backgrounds, improving balance by gender and by socio-economic background. However, they are not particularly good at securing completion rates.

Type 4 – Double selection: These systems seem to be the most efficient in terms of completion rates.

This typology is useful in suggesting that institutional autonomy and the associated admissions policies have an impact on the equity and efficiency of the transition pathway to higher education. The four types identified by the European Commission report (2017), however, remain highly descriptive and only remotely linked to the regime clusters discussed in our contribution. The heterogeneity of admissions policy measures across different countries, and within national systems, does not allow for a systematic cross-national analysis of transition patterns, due to the lack of adequate indicators of selectivity.

The transition from schooling to tertiary education has not yet received in political science and sociology the same level of attention than the transition from education to the labour market. The framework we propose here aims at advancing our understanding of the complex environment that determines the relationship between higher education participation (equity, efficiency and effectiveness) and four institutional domains. They are the role of State governance and regulatory frameworks, the school system (especially tracking in upper secondary education), selection patterns, and some features of entry to higher education institutions. The four institutional domains are represented in the Figure 10 below. This is a visual representation of our theoretical framework. This is not exhaustive, and we are aware that the literature on the determinants of the labour market on higher education participation is well developed in economics (Brunello and Checchi, 2007) and sociology (Ballarino, 2023)

We take a "transition regime" to mean an institutionally determined process that encompasses four institutional domains, including the structure of the education and training system, how the state regulates aspects related to selection in higher education (admissions policies) and institutional autonomy of schools, the individual preferences and choices of families and students according to their educational background, household income, immigrant background and gender. We classify the institutional characteristics of the transition regime in four domains, as shown in Figure 3 below:

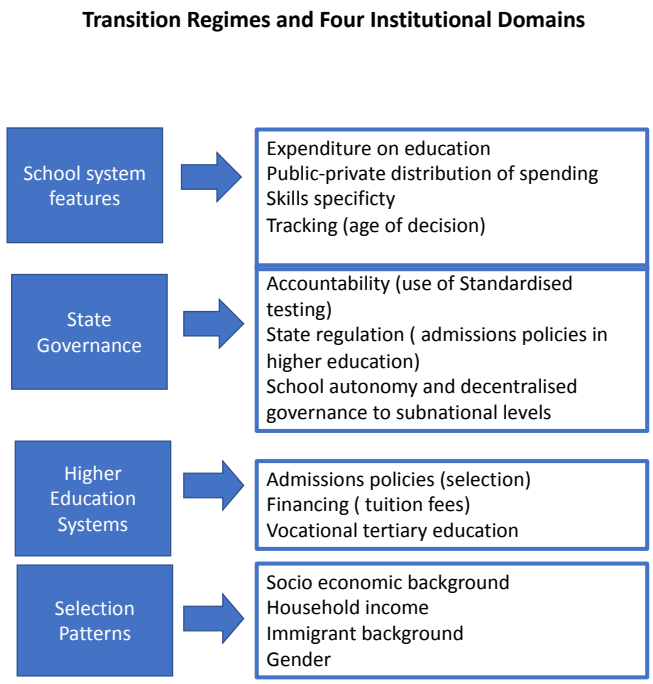
i) School system features

ii) State Governance

iii) Higher education systems.

iv) Selection patterns

Figure 3 – Transition regimes



The **first institutional domain** that affects the transition from schooling to higher education pertains to institutional features of the school systems, as discussed in the previous sections. By this, we mean the organisation and financing of primary and secondary education (lower and upper levels), which varies in terms of years of schooling across countries. The variables that we use in the qualitative and quantitative study to compare schools systems across countries include level of spending (education spending per student), private spending on education, skills specificity (the share of students enrolled in vocational vs. academic general studies), the degree of institutional stratification and the tracking features. In such a context, the effects of school tracking on inequalities takes a central role. Some countries stream students at an early age of 10 (Germany), whilst others do not have formal tracking (Sweden). The existing literature reviewed for this paper suggests that early school tracking has a negative effects on equality of opportunity (Brunello and Checchi, 2007; Hanushek and Woessmann, 2006).

The **second institutional** domain relates to state governance, such as the features of centralisation and decentralisation in education systems as we discussed in the previous sections. In addition to these features, school governance measures are also included, such as school autonomy, and the use of standardised testing as measures of school accountability. The qualitative part in this paper offers a descriptive account of how educational systems in Sweden, Germany, Poland and Italy are organised in terms of overall structure and territorial decentralisation of legislative and administrative competences to central bureaucracies, regional governments and municipal authorities. In many European countries, school systems governance variables are organised by statutory frameworks and reforms are enacted by law. Admissions policies to universities are regulated by the state in some countries, whilst in others university management structures have the authority to establish their own selection criteria. The qualitative analysis in this paper takes account of the state governance framework in so far as it affects school level dynamics.

The **third domain** looks specifically at three fundamental dimensions of higher education governance, as discussed in the previous sections: admissions policies of universities and higher education institutions (selection of students), the use of tuition fees to finance universities (funding), and the availability of vocational tertiary programmes. In this contribution, we have given centrality to the relationship between students' access to universities and increased autonomy on admissions policy. This question has received less attention in the existing literature on higher education systems.

The **fourth institutional** domain intends to capture individual heterogeneity, which is typically associated to gender, age and foreign origin. However, youth is also differentiated in terms of social background (parental education, parental occupation, family income and wealth). All these dimensions are available in surveys, where they can be associated to educational choices, as we do in the 5th paragraph.

We identify **five transition regimes in Europe** based on the four institutional domains identified in the above framework. They are a Familistic regime, a Universalistic regime, an Employment-Centred Regime, a Market-Based Regime, and a Post-Communist Regime. In Table 3 we locate our transition regimes typology against the backdrop of other classifications in the existing literature, that we discuss in this contribution.

Table 3 - Transition regimes in Europe: from secondary to tertiary education

TRANSITION REGIME	MEMBER COUNTRIES	DIFFERENTATION MECHANISM	VOCATIONA EDUCATION ENROLMENT	UNIVERSITY ADMISSIONS	LINK TO EDUCATION REGIME	LINK TO WELFARE STATE REGIME	CASE STUDY
FAMILISTIC	IT, EL, ES, PT	Grade retention	Low/medium	State-control	Mediterranean	Mediterranean	Italy
UNIVERSALISTIC	DK, FI, IS, NO, SE, EE, LV	Comprehensive school and integration	High	State-control with limited autonomy	Nordic	Social Democratic	Sweden
EMPLOYMENT ORIENTATED	AT, BE-FR, DE, CH, NL	Early tracking	High	University management under state regulation	Continental	Conservative	Germany
MARKET-BASED	AU, NZ, UK, US, BE-FL	Ability grouping	Low	University management	English speaking	Liberal	UK
POST-COMMUNIST	BG, HR, CZ, HU, PL, SV	Tracking at lower secondary Early tracking (Croatia and Hungary) Highly stratified	Medium	University management with increasing autonomy	Eastern European	Hybrid model Conservative and Social Democratic	Poland

Source: Authors' own elaboration

The **Familistic** transition regime has the following characteristics: comprehensive education system, low status of vocational education relative to academic general, high level of early school leavers, free admissions to HEI and irrelevant tuition fees, state-control governance systems of entry into HEI. In this transition type, students tend to leave the family later than in other clusters. The family plays a strong effects on educational choices. This will be explored in depth in section 4 of this paper. The typical case study is Italy.

The **Universalistic** European youth transition regime is characterized by an inclusive and comprehensive education system, high level of investment in tertiary education (tax financed), and a secondary role attributed to VET (Sweden is the only country in Europe where enrollment into VET is decreasing since 2005). The transition from secondary to tertiary education is smooth because education is inclusive and comprehensive. The typical case is Sweden.

In the **Employment-Orientated** youth transition regime there is a high level of selectivity in education and training systems in this cluster. Vocational education and training has greatest prominence in comparative terms with the other clusters. VET is school-based and also company-based. There is a high level of private spending by employers in vocational training.

Countries in the **Market-based** youth transition regime cluster have comprehensive education systems with a predominant general academic schooling system. VET is low status. Higher education

is funded also by tuition fees and diverse income revenue sources. Universities design their own admissions entry requirements and have a greater degree of institutional autonomy than the other clusters.

In the **Post-communist** regime, compulsory education systems are comprehensive, with a predominance of post-compulsory general education. There is a low prominence of VET (school or company based) and vocational education is a less popular choice, because of excessive rigidity and poor reputation. The countries belonging to this cluster generally have high levels of educational attainment. With regards to higher education policy, there is a high level of heterogeneity within the cluster with countries adopting the market-based approach (Poland, for instance), while others follow the Employment-based (Czech Republic). Countries exhibit a mixture of conservative and liberal features. No regular pattern of higher education policy is found and there is no distinct regime that can be identified regarding specifically higher education policy (admissions and financing).

2. Clustering transition regimes

2.1 Varieties of "education regimes": theoretical expectations

The comparative politics literature on welfare states has only recently placed education at the heart of scholarly debates that explore the link between education and social policy. The work by Jane Gingrich has emphasized that the politics of education reforms are intertwined with other welfare reforms. Busemeyer and Nikolai (2010) have argued that specific governance features of educational systems in Europe have important implications on socio-economic inequalities. There are two dimensions in their work that have a strong relationship with outcomes inequality: first, the public and private spending patterns, and second, the relationship between vocational education and training (VET) and general academic education in upper secondary schools. The variety of education regimes developed by Busemeyer's theory identifies four types of clusters that correspond to rather heterogenous groups of national education systems in OECD countries. Let us review the main features of the education regimes in their work. According to him, the four varieties of education regimes in OECD countries are: Northern Europe with 3 subgroups (Scandinavian, German-speaking and Continental countries), East European countries, Mediterranean countries and English-speaking countries. We will review thereafter the main features of the four clusters as discussed by Busemeyer. However, in our own clusterisation, we have used a larger set of dimensions and have proposed five clusters as discussed in the previous section of the paper (see table 3 on "Youth Transition Regimes").

Northern Europe

This cluster includes three subgroups: the Scandinavian countries (Denmark, Finland, Norway, and Sweden), the German-speaking countries (Germany, Austria and Switzerland), and the Continental European (France, Netherlands, Belgium, Ireland).

Scandinavian

The so-called Nordic model has been discussed and developed by Telhaug (2006). The main features are: a comprehensive school system and universal access since 1950s, with tracking at the age of 16; they are committed to VET, provided in vocational schools. Vocational training is integrated into the general schooling system (Erikson and Jonson, 1996). All programmes provide access to tertiary education. Their share of 24-35 year-olds with tertiary education is above the OECD average; in addition these countries have a high level of public spending in education and low levels of private spending. Sweden exemplifies this cluster and will be a typical case for further analysis in this paper.

German-speaking

The German-speaking countries are treated as one separate subgroup by Busemeyer, mainly due to the similarities with the Nordic model. But, in our contribution we will consider this group of countries in a separate (Continental) cluster. The countries in this cluster are highly stratified (Pfeffer, 2008; Almendinger, 1989). Germany has early tracking with an age of decision as early as 10 years-old. VET is provided in segmented secondary education system, which produce inequalities in potential future outcomes. Although Austria has managed to introduce a few reforms to tackle the socio-economic inequalities derived from early tracking, Germany has been highly stable and shows policy continuity. Generally, all countries in this cluster show a strong emphasis on vocational training programmes, which is accompanied by an employment-based dual system of apprenticeship. Generally, this cluster has a low share of private spending in education (mainly higher education), and irrelevant private spending in all other sectors (primary and secondary). The German-speaking countries show a significantly lower public spending on education than the Nordic countries. This is probably due to spending of firms on vocational training that is calculated as private spending (Heidenheimer 1996; Schmidt, 2002).

In our research, we have selected Germany as the typical case for analysis. In this education and training system, the provision at upper secondary level may be of similar duration across the different tracks (as with the normatively three-year apprenticeships and final stage Abitur courses in Germany),

and the vocational track may contain significant mandatory components of general education as in all dual system apprenticeships (Solga et al. 2014). The general and vocational tracks remain very distinctive, with sharp differences in forms of regulation, curricula, and assessment (Green et al, 2006), and with clearly differentiated final qualifications and subsequent progression possibilities in education, training, and work (e.g., in Germany, university for Abitur graduates from the Gymnasium and Realschule, and skilled jobs or higher technical courses for apprentice graduates).

Continental European countries

France, the Netherlands, Belgium, and Ireland, are part of the Continental European countries of education regimes, according to Busemeyer and Nikolai's regime typology. This is the most heterogenous grouping with the highest degree of within-cluster variance. These countries show a below average share of the youth population with at least an upper secondary degree, contrary to Germanic countries that exhibit above average levels in the population with at least an upper secondary degree. They have a medium to somewhat above average level of public spending in primary and secondary education, and low public spending on higher education.

Eastern European countries (post-transition)

In this cluster, Busemeyer and Nikolai include the Czech Republic, Estonia, Hungary, Latvia, Poland, the Slovak Republic, Slovenia. This too is a rather heterogenous cluster. They were all socialist education systems, characterized by comprehensive education systems, polytechnic education influenced by the Soviet mode, school-based VET and state-centered higher education model. As argued by Kogan (2008), the transition process after 1989 has introduced a differentiation between them. Some of these education systems have moved towards the Continental model, and others have moved towards the English speaking model (especially in higher education). Thus, the current landscape remains mixed and hybrid. Eastern European countries have a low level of public and private spending, in comparative terms. The private schools landscape plays a marginal role. They have more stratified schools systems than in the past, with early age tracking in schools (especially in the Czech Republic and Hungary). The Gymnasium was restored in the Czech Republic after 1989. The dual system of VET was created in the 1990s in many Eastern European countries. The higher education landscape is market-based in many countries. There has been a huge expansion of private spending and high tuition fees were introduced. The cluster reflects the market-based variety of higher education systems (Dobbins, 2011). It is worth noting that the PISA achievements in these countries remain above average levels (especially Estonia), despite the low level of spending.

Mediterranean Countries

This cluster includes Italy, Greece, Spain and Portugal. It is a cluster on their own and quite homogenous, in contrast with other clusters. The countries have a stratified education system, and the age of decision ranges between 13 and 15 years old. These countries have a low level of public and private spending, especially on tertiary education. They are below OECD average for the share of the population with at least an upper secondary degree. They have a very high proportion of early school leavers (especially Italy). VET is school-based in this country and the curricula in general academic and vocational programs share a certain common core approach. Italy exemplifies this cluster and we will choose this typical case for our in-depth analysis.

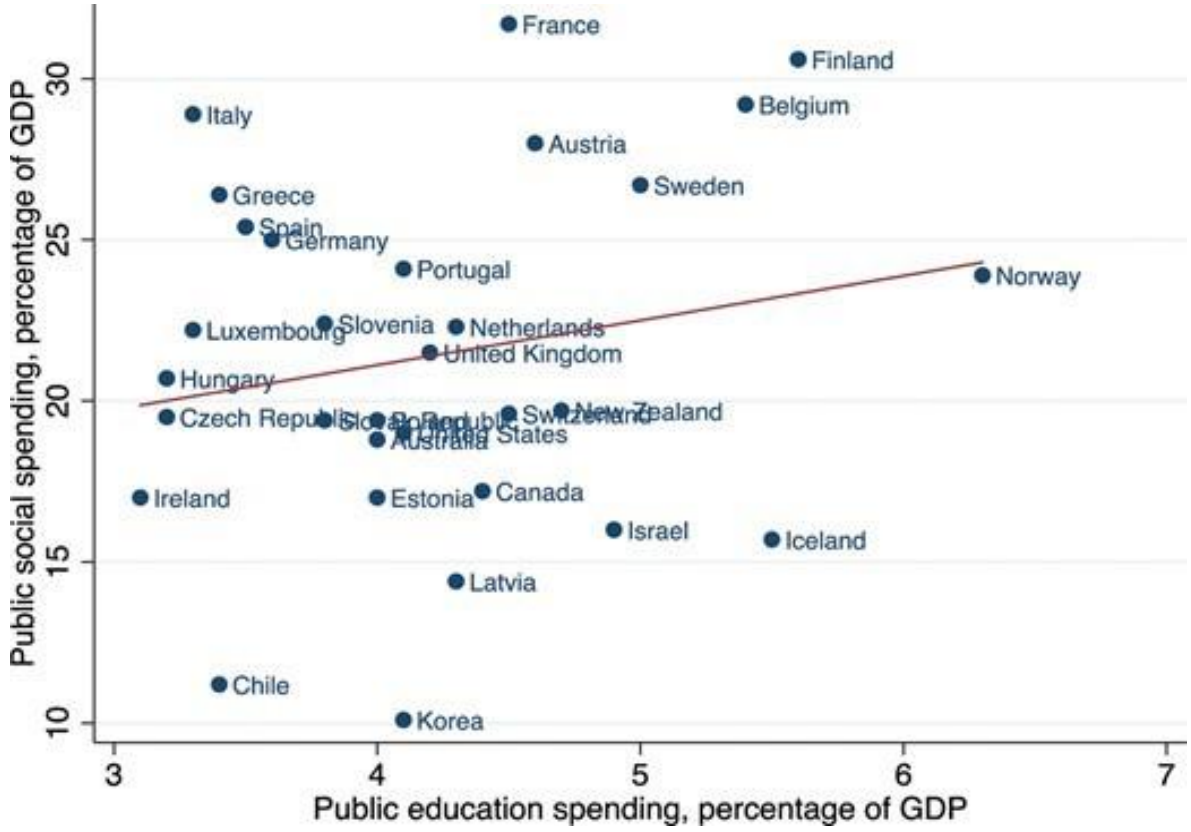
English-speaking countries

In this cluster, Busemeyer and Nikolai's typology includes the United Kingdom, Canada, the United States, Australia, and New Zealand. It also includes Japan and Chile. This cluster is rather homogeneous. These countries have medium levels of public spending and high levels of private spending. Over time, they have experienced a huge expansion of private schools, and high tuition fees. They have a high share of the population with tertiary education. These are "mixed systems" with regards to the school system (Green et al, 2006). Vocational training education includes many different school- and employment-based programs of variable length and quality but with dominant academic tracks. Programs in these systems are often organized on a modular basis, to promote flexible combinations of options. Vocational courses are often competence-based and students are assessed on the basis of their ability to demonstrate competences rather than on their knowledge of a syllabus, and programs often do not have a prescribed duration. Regulation and governance in such mixed systems is generally more liberal and market-oriented than in other systems, with much diversity in programs and types of providers, including private training organizations and, in the case of the UK, private awarding bodies.

What emerges from the existing literature discussed thus far is that national education systems in Europe continue to display varying institutional characteristics that shape diverging outcomes. This relevance of national patters is prominent, as a trajectory, despite globalisation of norms and institutions (Mattei et al, 2023; Marginson, 2023, Marginson, 2016, Verger, 2016). We expect that cross-national marked differences and diverging patters across cluster continue to characterise the European education landscape, and that we will find a great heterogeneity within grouping of countries. Figure 4 below represents the association between public social and education spending in OECD countries. In general, we see that there is a positive association between high spending on

social policies and education. If we look at the regression line and the distance of countries from it, however, there we find significant differences. Clusters are quite heterogeneous relative to the link between social and education spending. For instance, we observe that the Scandinavian countries exhibit high levels of social and education spending in general, but there are different combinations of education and social spending. It appears that clusters have increased over time their internal heterogeneity (Busemeyer and Nikolai, 2021)

Figure 4 – Public spending composition in European countries



Sources: Busemeyer and Nikolai (2021), OECD 2018: 267 Social Expenditure Database (http://www.oecd.org/Social/Expenditure.Htm).

2.2 Data and Empirical results

In order to operationalise our conceptual framework and test our theoretical expectations, we have collected institutional data on 29 European countries over the last two decades.[1] Our sources of data are Unesco[2] and OECD[3]. Most of the data are available on a yearly base, but they do not change significantly from one year to the other. For this reason we have considered decadal averages, and in the present report we focus on the most recent decade (2011-2022).

Among hundreds of variables, we have selected those that in our understanding are more appropriate in describing the entire educational pathway available to the national youth population. We have classified the variables into three categories (inputs-processes-outcomes). The full list of variables is in table 4, while table A.1 in the Appendix contains detailed data sources and descriptive statistics.

[1] The 29 countries are: AUT-Austria, BEL-Belgium, BGR-Bulgaria, CHE-Switzerland, CZE-Czech, DEU-Germany, DNK-Denmark, ESP-Spain, EST-Estonia, FIN-Finland, FRA-France, GBR-United Kingdom, GRC-Greece, HRV-Croatia, HUN-Hungary, IRL-Ireland, ISL-Iceland, ITA-Italy, LTU-Lithuania, LUX-Luxembourg, LVA-Latvia, NLD-Netherlands, NOR-Norway, POL-Poland, PRT-Portugal, ROU-Romania, SVK-Slovakia, SVN-Slovenia, SWE-Sweden.
[2] Unesco data are obtained from their website (http://data.uis.unesco.org, dataset: Education) downloaded on 31/8/2023.
[3] OECD data are obtained from their website (https://data.oecd.org/education.htm) downloaded on 31/8/2023.

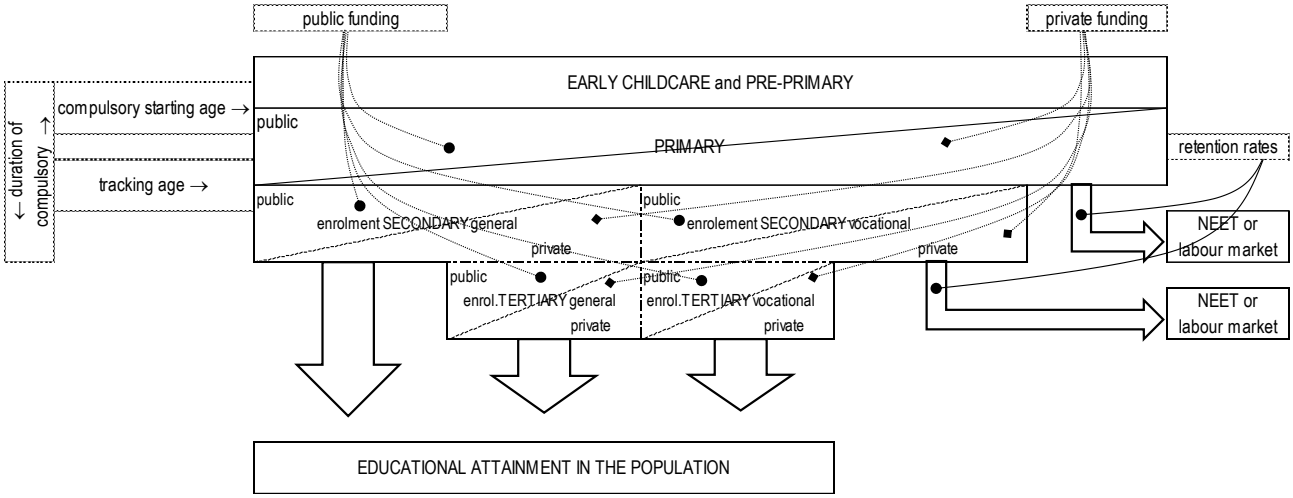
Table 4 – Features of the educational systems

inputs	
primtosec_exp_gdp	Education spending - Primary to post-secondary non-tertiary, % of GDP, 2011 – 2020
privexp1	Private spending on education - Primary to post-secondary non-tertiary, % of GDP, 2011-2020
prim_exp_gdp	Education spending - Primary, % of GDP, 2011 – 2020
sec_exp_gdp	Education spending - Secondary, % of GDP, 2011 – 2020
tert_exp_gdp	Education spending - Tertiary, % of GDP, 2011 – 2020
dur_comp	Duration of compulsory education (years)
hours	weekly learning hours (2018)
inst_time_prim	Students' instruction time in compulsory education - primary - 2021
stud_teach_prim	Students per teaching staff - Primary, Ratio, 2013 – 2020
stud_teach_sec	Students per teaching staff - Secondary, Ratio, 2013 – 2020
stud_teach_tert	Students per teaching staff - Tertiary, Ratio, 2013 – 2020
processes	
childhood1	Gross enrolment ratio, early childhood education, both sexes (%)
childhood2	Gross enrolment ratio, early childhood educational development programmes, both sexes (%)
childhood3	Gross enrolment ratio, pre-primary, both sexes (%)
tracking_age	First age of selection in the education system
housexp	Spending on tertiary education Household, % of education spending, 2011 – 2020
sh_priv_pri	Percentage of enrolment in primary education in private institutions (%)
sh_priv_sec	Percentage of enrolment in secondary education in private institutions (%)
sh_priv_post	Percentage of enrolment in post-secondary non-tertiary education in private institutions (%)
sh_priv_ter	Percentage of enrolment in tertiary education in private institutions (%)
off_ent_age_pre	Official entrance age to pre-primary education (years)
off_ent_age_pri	Official entrance age to primary education (years)
rep_pri	Repetition rate in primary education (all grades), both sexes (%)
rep_low	Repetition rate in lower secondary general education (all grades), both sexes (%
sh_sec_gen	Share of all students in secondary education enrolled in general programmes (%)
sh_sec_voc	Share of all students in secondary education enrolled in vocational programmes (%)
sh_post_gen	Share of all students in post-secondary non-tertiary education enrolled in general programmes (%)
sh_post_voc	Share of all students in post-secondary non-tertiary education enrolled in vocational programmes (%)
test_gr2o3_r	Administration of a nationally representative learning assessment in Grade 2 or 3 in reading (number)
test_gr2o3_m	Administration of a nationally representative learning assessment in Grade 2 or 3 in mathematics (number)
outputs	
enrol_17	Enrolment rate in secondary and tertiary education 17 year-olds, % in same age group, 2013 – 2020
enrol_18	Enrolment rate in secondary and tertiary education 18 year-olds, % in same age group, 2013 – 2020
enrol_19	Enrolment rate in secondary and tertiary education 19 year-olds, % in same age group, 2013 – 2020
pop_tert_25_34	Population with tertiary education25-34 year-olds, % in same age group, 2011 – 2022
pop_tert_25_64	Adult education level Tertiary, % of 25-64 year-olds, 2011 – 2022
pop_belowsec2564	Adult education level Below upper secondary, % of 25-64 year-olds, 2011 – 2022
pop_upsec_25_64	Adult education level Upper secondary, % of 25-64 year-olds, 2011 – 2022
att_voc	Educational attainment rate, completed short-cycle tertiary education or higher, population 25+
att_ba	Educational attainment rate, completed Bachelor's or equivalent education or higher, population 25+
att_ma	Educational attainment rate, completed Master's or equivalent education or higher, population 25+
att_phd	Educational attainment rate, completed Doctoral or equivalent education, population 25+
neet_15_19	Youth not in employment, education or training (NEET)15-19 year-olds, % in same age group, 2011 – 2022
neet_20_24	Youth not in employment, education or training (NEET)20-24 year-olds, % in same age group, 2011 – 2022

In figure 5 we have visualised how these variables frame a generic educational system, which is expected to take each cohort of children through various stages of education and bring most of them to the maximal educational attainment (a dimension that we have indicated as *effectiveness*). Each educational system starts with early childcare and preprimary, the latter being compulsory in some countries. Thus, the starting age for compulsory education varies, as does the length of compulsory education. Primary education is comprehensive in all countries, but some countries are characterized

by a significant fraction of privately run schools. Secondary education is tracked in many countries, but the age of tracking decision varies. Fewer countries also exhibit vocational tertiary education. For all these stages and tracks, one has to consider that it can be publicly or privately provided (though the private sector may be heavily subsidised by the state), in association to the sources of funding. A fraction of youth is diverted outside the educational pathway, either because they face repeated retention or because lack of adequate family resources (cultural and/or financial). The educational attainment in the adult population is the final outcome of the interplay of all these dimensions. Countries may differ in terms of possibilities of transition across tracks and between secondary and tertiary. Since we have measures associated to all of them, we can investigate comparatively how countries are distributed along these dimensions and whether there are similarities/dissimilarities across countries, and eventually across clusters, in accordance to the theoretical patterns.

Figure 5 – A typical educational system



We have adopted two statistical tools to synthesise these 43 variables, factor analysis and cluster analysis. Factor analysis identifies commonalities between the variables.[4] In table 5 we present the results: 28 factors span 43 variables (since some of them are collinear), but the first four factors capture half of the total variability. In the table we report the first 12 factors with an eigenvector greater than unity, and the factor loadings associated to each original variable (omitting values in absolute terms lower than 0.3 for ease of reading). If we focus on the first two factors, the former is

[4] In fewer cases where there are missing values, we have replaced them with the sample mean of the variable, in order not to lose the country in the analysis.

associated to greater expenditure in education, childcare attendance, later tracking, student testing in lower or upper secondary, private schools and universities, high enrolment rates at the relevant age (17-18) and high graduate share in the population; symmetrically, the NEET share is lower. The second factor is associated to longer duration and higher instructional time, high repetition rates, lower attendance of tertiary academic, involvement of household in educational expenditure and higher share of uneducated adult population. These two factors seem to capture two stages of development of educational systems: the first describes a "post-industrial society", where compulsory education is fully attended and most of the resource effort is dedicated ro tertiary education; the second captures an "industrial society", when educational systems are still catching up without obtaining impressive results in terms of attainment.

Countries are distributed along these two dimensions, as visible in figure 6. It is easy to visualize five groups. In the north-west quadrant we find the Nordic countries, that are high on the first factor and low on the second, suggesting that they have attained a good level of effectiveness. In the north-east quadrant we find United Kingdom and Belgium, which are high on both factors, suggesting that they also feature effectiveness but retain elements of late development. Because of UK we are tempted to characterize them as Anglo-Saxon, even though a larger sample would be needed to validate this classification. In the south-east quadrant we find the Mediterranean countries, which are typically low in the educational attainment in the population as a result of late scholarisation. Eventually, in the bottom part of the graph we find the Post-Communist countries, which are evidently less effective in their educational systems, even though some of them (Romania and Bulgaria) in a worse situation than others (Poland or Czech Republic). It can be debated whether the Baltic countries (Estonia, Latvia and Lithuania) or Slovenia are to be attributed to the Nordic group (purple) or to the post-communist group (light blue). Finally, in a middle position along the two factors we find the Continental countries, with Ireland being part of the group. The only country that seems an anomaly is Switzerland (that we would have expected in the Continental group), but all the remaining countries look close to the theoretical patterns identified in Table 3 we developed earlier to propose "Youth transition regimes".

Table 5 – Factor analysis (principal components) – 29 countries – 2011-22

Factor	Eigenvalue	Difference	Proportion	Cumulative	
Factor1	8.042	2.058	0.187	0.187	
Factor2	5.984	1.552	0.139	0.326	
Factor3	4.432	1.279	0.103	0.429	
Factor4	3.153	0.475	0.073	0.503	
Factor5	2.677	0.141	0.062	0.565	
Factor6	2.537	0.143	0.059	0.624	
Factor7	2.394	0.207	0.056	0.680	
Factor8	2.186	0.189	0.051	0.730	
Factor9	1.998	0.440	0.047	0.777	
Factor10	1.558	0.161	0.036	0.813	
Factor11	1.398	0.336	0.033	0.846	
Factor12	1.062	0.122	0.025	0.870	
Variable	**Factor1**	**Factor2**	**Factor3**	**Factor4**	**Uniqueness**
Education spending - Primary to post-secondary non-tertiary, % of GDP,	0.850				0.259
Private spending - Primary to post-secondary non-tertiary, % of GDP		0.331	0.430	0.506	0.392
Education spending - Primary, % of GDP,	0.775				0.319
Education spending - Secondary, % of GDP,	0.634		0.356		0.392
Education spending - Tertiary, % of GDP,	0.635				0.482
Duration of compulsory education (years)		0.509	0.386		0.569
weekly learning hours (2018)		0.562			0.573
Students' instruction time in compulsory education - primary	0.441	0.549			0.441
Students per teaching staff – Primary			0.541	0.650	0.274
Students per teaching staff – Secondary			0.445	0.615	0.384
Students per teaching staff – Tertiary			-0.302		0.785
Gross enrolment ratio, early childhood education, both sexes (%)			0.582		0.564
Gross enrolment ratio, early childhood educational development prgms	0.543	-0.307	-0.386		0.432
Gross enrolment ratio, pre-primary, both sexes (%)	0.466		0.536		0.394
First age of selection in the education system	0.441		-0.652		0.306
Spending on tertiary education Household, % of education spending,		0.338		0.517	0.591
Enrolment in primary education in private institutions (%)	0.392	0.566			0.453
Enrolment in secondary education in private institutions (%)	0.520	0.460			0.403
Enrolment in post-secondary non-tertiary education private institutions (%)					0.827
Enrolment in tertiary education in private institutions (%)	0.364			0.307	0.771
Official entrance age to pre-primary education (years)					0.962
Official entrance age to primary education (years)	-0.361	-0.554			0.453
Repetition rate in primary education (all grades), both sexes (%)		0.497	0.352	-0.508	0.355
Repetition rate in lower secondary general education (all grades)		0.702		-0.424	0.308
Share of all students in secondary education enrolled in general prgms			0.589		0.565
Students in secondary education in vocational programmes (%)			-0.589		0.565
Students in post-secondary non-tertiary education in general prgms (%)	-0.309			-0.474	0.543
Students in post-secondary non-tertiary education in vocational prgms (%)			0.507		0.672
Nationally representative learning assessment in Grade 2 or 3 in reading	0.580	0.327			0.486
Nationally representative learning assessment in Grade 2 or 3 in math	0.586	0.354	-0.323		0.424
Enrolment in secondary and tertiary education 17 year-olds	0.522				0.647
Enrolment in secondary and tertiary education 18 year-olds	0.330	-0.562		-0.323	0.468
Enrolment in secondary and tertiary education 19 year-olds					0.923
Population with tertiary education - 25-34 year-olds (%)	0.670				0.513
Adult education level Tertiary - 25-64 year-olds (%)	0.734				0.388
Adult education level Below upper secondary - 25-64 year-olds (%)		0.811			0.292
Adult education level Upper secondary - 25-64 year-olds (%)	-0.564	-0.556			0.303
Completed short-cycle tertiary education or higher, population 25+	0.785				0.375
Completed Bachelor's or equivalent education or higher, population 25+	0.633				0.473
Completed Master's or equivalent education or higher, population 25+		-0.363			0.744
Completed Doctoral or equivalent education, population 25+		-0.413			0.703
Youth not in employment, education or training (NEET) 15-19 year-olds	-0.415	0.520		0.429	0.352
Youth not in employment, education or training (NEET) 20-24 year-olds	-0.451	0.576	-0.404		0.265

The second analysis that we have performed on the same variables is a cluster analysis. After standardizing them in order to avoid distortion created by differences in magnitudes, we have applied a statistical test in order to identify the optimal number of clusters. The Calinski/Harabasz F-test suggests the existence of 3 (F-test=3.43) or 4 clusters (F-test=3.15) in the data. The clusters are differently identified according to the chosen algorithm. We have chosen the complete linkage method, which is agglomerative. Agglomerative hierarchical clustering methods begin with each observation's being considered as a separate group (N groups each of size 1). The closest two groups are combined ($N - 1$ groups, one of size 2 and the rest of size 1), and this process continues until all observations belong to the same group. This process creates a hierarchy of clusters that are visible in the corresponding dendogram shown in figure 7.

The clusters confirm the results of the factor analysis at a great extent: the two Anglo-Saxons are perfectly identified as separate entities, as it occurs in the case of Switzerland; the Mediterranean now include Romania and Bulgaria (two countries scoring low in many educational ranking. The post-Communist group is now split between the Continental group (Hungary, Czech Republic and Slovakia) and a large group of Nordic countries. France and Ireland seem closer to the Mediterranean pattern than to the Continental one. If we were to adopt a different aggregative algorithm (average linkage method where the closest two groups are determined by the average (dis)similarity between the observations of the two groups) results are rather similar, even though Croatia and Slovenia get closer to the Mediterranean group (see figure 8).

Figure 6 – Country distribution along the first two factors extracted from 43 original variables

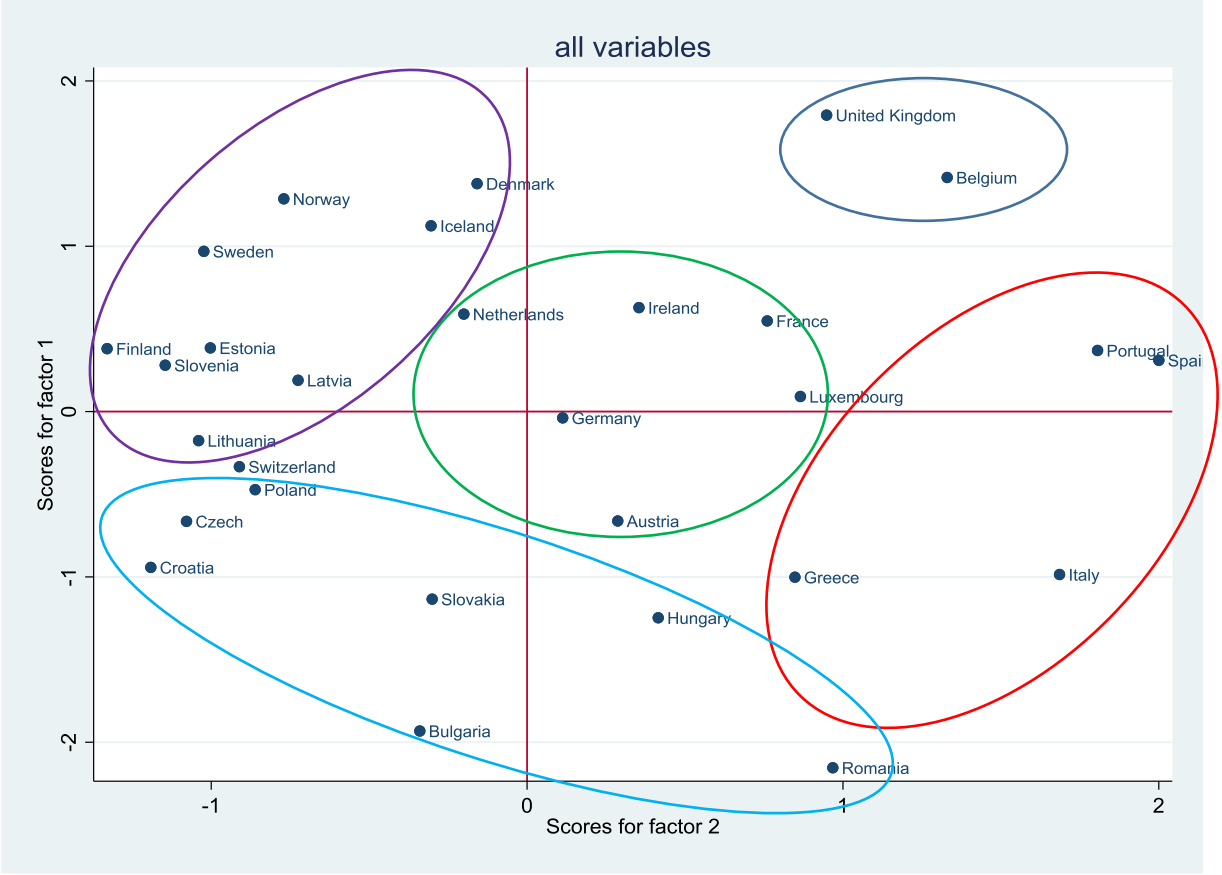


Figure 7 – Dendogram corresponding to complete-linkage clustering

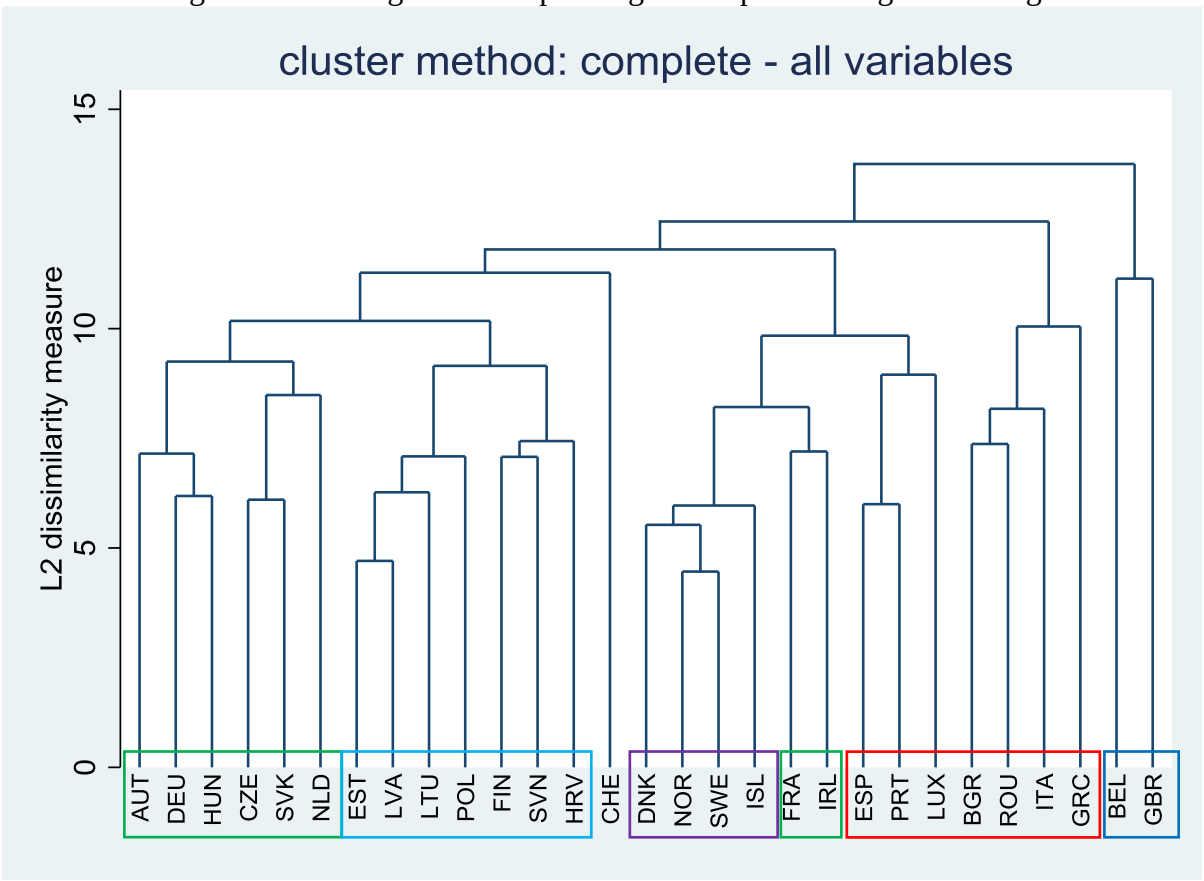
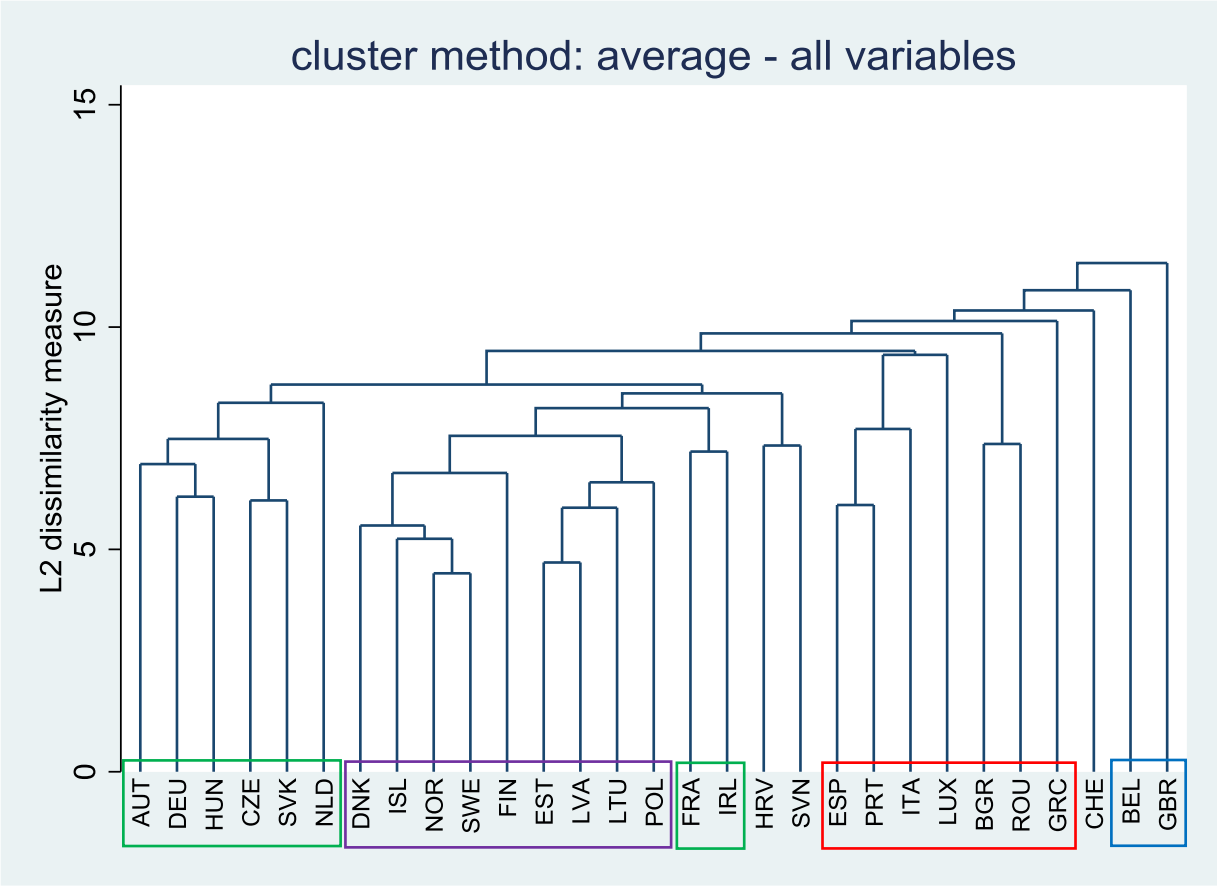


Figure 8 – Dendogram corresponding to average-linkage clustering



Based on this empirical evidence and institutional description obtained by different sources,[5] we identify five clusters reported in table 6.

Table 6 – Country clusters based on similarities in educational indicators – 29 countries – 2011-22

Nordic	Denmark, Estonia, Finland, Iceland, Latvia, Lithuania, Norway, Slovenia, Sweden
Continental	Austria, France, Germany, Ireland, Luxembourg, Netherlands, Switzerland
Mediterranean	Greece, Italy, Portugal, Spain
Anglo-Saxon	Belgium, United Kingdom
Post-Communist	Bulgaria, Croatia, Czech Republic, Hungary, Poland, Romania, Slovakia

These clusters are rather dissimilar among them, as one can get from table 7, where we have bolded the highest value among the five clusters.[6] Even if do not focus on the Anglo-Saxon cluster for the presence of just two countries, the differences across clusters are significant. Just to highlight few examples: the legal duration of compulsory education varies by almost two years (from 9.8 in Nordic to 11.5 of Mediterranean); the student/teacher ratio in tertiary education ranges between 14 and 22.8;

[5] We have resorted to the country profiles on educational systems available in Eurydice (https://eurydice.eacea.ec.europa.eu/national-education-systems), Unesco (https://tcg.uis.unesco.org/country-profile-new/) and OECD Education at a glance (https://www.oecd.org/education/education-at-a-glance/).
[6] Full descriptive statistics of the same variables are in table A.2 in the Appendix.

the minimal tracking-age goes from 12 in Continental to 15.5 in Nordic. The repetition rate in lower secondary is close to zero in Nordic (0.77%) and highest in Mediterranean (5.1%). Enrolment in private institutions is highest across all stages of education in Anglo-Saxons (notably United Kingdom). Looking at educational attainment in the adult population, it is lowest in Mediterranean and Post-Communist clusters, and higher elsewhere. Conversely, the NEET rates are highest in the Mediterranean countries.

Table 7 –Indicator means by clusters – 2011-22

	Nordic	Continental	Mediterranean	Anglo-Saxon	Post-communist
Education spending - Primary to post-secondary non-tertiary, % of GDP, 2011 – 2020	3.67	3.03	3.24	**4.31**	2.57
Private spending on education - Primary to post-secondary non-tertiary, % of GDP, 2011-2020	0.11	0.29	0.30	**0.39**	0.18
Education spending - Primary, % of GDP, 2011 – 2020	1.80	1.22	1.42	**1.86**	1.03
Education spending - Secondary, % of GDP, 2011 – 2020	1.97	1.95	1.92	**2.65**	1.55
Education spending - Tertiary, % of GDP, 2011 – 2020	1.52	1.27	1.10	**1.71**	1.09
Duration of compulsory education (years)	9.83	**11.61**	11.00	11.50	10.19
weekly learning hours (2018)	26.41	27.49	**28.75**	27.35	26.10
Students' instruction time in compulsory education - primary - 2021	714.11	**837.00**	829.25	824.00	614.43
Students per teaching staff - Primary, Ratio, 2013 – 2020	12.11	14.67	**11.84**	15.86	15.07
Students per teaching staff - Secondary, Ratio, 2013 – 2020	10.89	12.26	**9.86**	13.15	11.41
Students per teaching staff - Tertiary, Ratio, 2013 – 2020	14.18	**14.14**	22.79	18.20	14.71
Gross enrolment ratio, early childhood education, both sexes (%)	75.29	**86.94**	66.74	54.30	73.83
Gross enrolment ratio, early childhood educational development programmes, both sexes (%)	**50.19**	9.34	17.18	18.06	5.75
Gross enrolment ratio, pre-primary, both sexes (%)	92.00	100.74	90.76	**106.91**	85.80
First age of selection in the education system	**15.56**	12.14	14.75	14.00	12.71
Spending on tertiary education Household, % of education spending, 2011 – 2020	8.34	11.54	24.64	**27.12**	18.74
Percentage of enrolment in primary education in private institutions (%)	4.98	6.15	14.16	**36.73**	4.62
Percentage of enrolment in secondary education in private institutions (%)	8.86	11.62	14.28	**61.22**	8.26
Percentage of enrolment in post-secondary non-tertiary education in private institutions (%)	24.13	23.39	**55.12**	38.99	38.23
Percentage of enrolment in tertiary education in private institutions (%)	28.41	14.29	11.98	**78.93**	15.88
Official entrance age to pre-primary education (years)	**3.00**	3.36	3.25	**3.00**	**3.00**
Official entrance age to primary education (years)	6.56	6.00	6.00	**5.50**	6.60
Repetition rate in primary education (all grades), both sexes (%)	0.43	1.59	**1.63**	1.22	1.09
Repetition rate in lower secondary general education (all grades), both sexes (%	0.77	2.54	**5.10**	3.31	1.85
Share of all students in secondary education enrolled in general programmes (%)	25.97	27.60	23.64	**36.79**	30.37
Share of all students in secondary education enrolled in vocational programmes (%)	74.03	72.40	**76.36**	63.21	69.63
Share of all students in post-secondary non-tertiary education enrolled in general programmes (%)	73.17	78.84	**93.75**	46.97	76.76
Share of all students in post-secondary non-tertiary education enrolled in vocational programmes (%)	6.83	**12.59**	0.00	3.03	8.96
Administration of a nationally representative learning assessment in Grade 2 or 3 in reading (number)	0.85	0.57	0.72	**1.00**	0.19
Administration of a nationally representative learning assessment in Grade 2 or 3 in mathematics (nmb)	0.85	0.57	0.72	**1.00**	0.13
Enrolment rate in secondary and tertiary education 17 year-olds, % in same age group, 2013 – 2020	94.96	91.76	93.63	**95.01**	88.90
Enrolment rate in secondary and tertiary education 18 year-olds, % in same age group, 2013 – 2020	**91.21**	80.58	79.04	78.40	80.74
Enrolment rate in secondary and tertiary education 19 year-olds, % in same age group, 2013 – 2020	64.87	63.84	64.06	**71.11**	61.53
Population with tertiary education25-34 year-olds, % in same age group, 2011 – 2022	44.43	45.82	36.35	**48.76**	32.61
Adult education level Tertiary, % of 25-64 year-olds, 2011 – 2022	38.73	37.96	27.27	**42.31**	24.55
Adult education level Below upper secondary, % of 25-64 year-olds, 2011 – 2022	**14.75**	18.10	40.26	21.86	13.61
Adult education level Upper secondary, % of 25-64 year-olds, 2011 – 2022	46.52	43.93	32.48	35.83	**61.85**
Educational attainment rate, completed short-cycle tertiary education or higher, population 25+	31.04	31.11	21.30	**35.96**	16.68
Educational attainment rate, completed Bachelor's or equivalent education or higher, population 25+	28.18	23.19	19.91	**32.40**	20.41
Educational attainment rate, completed Master's or equivalent education or higher, population 25+	13.78	12.09	11.01	12.33	**14.22**
Educational attainment rate, completed Doctoral or equivalent education, population 25+	1.12	**1.24**	0.57	0.78	0.53
Youth not in employment, education or training (NEET)15-19 year-olds, % in same age, 2011 – 2022	**4.38**	5.38	8.57	6.90	6.74
Youth not in employment, education or training (NEET)20-24 year-olds, % in same age, 2011 – 2022	13.14	**12.21**	24.92	15.63	17.92

But clusters are not necessarily internally homogeneous. In order to explore similarity/ dissimilarity we have computed the Eucledian distance[7] of each country from the cluster mean. In table 8 we have bolded the country that are closer to the mean (the most "representative" country) and highlighted in red the country that is farest away from the mean (the most "eccentric" country). **Sweden** is the most representative of the Nordic, **Germany** of the Continental, **Portugal** of the Mediterranean and **Slovakia** of the post-Communist.[8]

We are no ready to investigate the transition from secondary to tertiary education by clusters, in order to assess efficieny and equity of such transition.

Table 8 – Similarity to the cluster – 29 countries – 2011-22

	Nordic	Continental	Mediterranean	Anglo-Saxon	Post-communist
Denmark	21.236				
Estonia	14.935				
Finland	20.642				
Iceland	18.113				
Latvia	21.002				
Lithuania	**31.360**				
Norway	14.786				
Slovenia	30.439				
Sweden	**14.617**				
Austria		28.119			
France		25.323			
Germany		**21.035**			
Ireland		34.316			
Luxembourg		41.045			
Netherlands		30.828			
Switzerland		**51.102**			
Greece			**41.603**		
Italy			24.814		
Portugal			**19.092**		
Spain			20.407		
Belgium				29.902	
United Kingdom				**29.902**	
Bulgaria					18.566
Croatia					33.701
Czech					37.917
Hungary					21.948
Poland					26.950
Romania					**44.170**
Slovakia					**14.036**

[7] Indicating with x_{ij} the standardized indicator for country j and with $\bar{x}_i$ the cluster mean of the same variable, the similarity indices computed in table 8 for each country are computed as $s_j = \sum_{i=1}^{43}(x_{ij} - \bar{x}_i)^2$.

[8] Grouping the Baltic with the post-Communist cluster replaces Sweden with Norway, and put Poland close to Slovakia as representative of the post-Communist countries.

2.3.Public support for education expansion

Once we have defined potential clusters of countries that can identify educational regimes, we aim to validate their euristic capability. Our first strategy is exploring the features of public support for the expansion of education, following the proposed clustering. Since clusters are built on resource investment and school participation, it will not come as a surprise that clusters characterised by high participation will also record greater support to educational investment, and viceversa. However, the European Commission and national governments in Europe accordingly set output targets in order to increase the participation of students into higher education systems, as we have discussed earlier in this paper. This is costly and requires higher public investment of public resources to achieve them: are citizens ready for reforms that increase taxation to expand investment in higher education, relative to other sectors of education (Primary and secondary)? Is the support of public opinion based on income and material self-interest?

Education policy making is a field of public policy analysis that traditionally focused on political parties' strategies and organised interests, drawing attention to an actor-based framework. The politics of education reforms is intertwined with the role played by political parties on the Left-Right spectrum (Ansell, 2005, 2010). However, comparative education research has paid little attention to the role of public opinion, until recently. Education policy preferences have been somewhat ignored until recently in the comparative literature, despite the implications for the legitimacy of reforms. Governments in the field of education policy making seem more responsive to trade unions and partisan interests that what citizens and taxpayers want. Is public opinion an exogenous and independent driver of education reforms? If so, how relative is it to organised interests and political actors? This research question has been investigated in the work by Busemeyer, Garritzman and Neimanns "A Loud but Noisy Signal? Public opinion and education reforms in Western Europe" (2020). Their theoretical framework draws on Pepper Culpepper's theory on quiet politics and issue salience (2011).

There are two conditions that make public opinion matter for the reform process: first, issue salience, and second the degree of coherence of attitudes towards an issue. An education policy issue gains salience when people care about it and are prepared to mobilise their policy preferences to support reforms that are favourable to it. When an issue is salient, Culpepper theorises that organised interests will matter less for the policy making process. In the world of "quiet politics", interest groups have greater chances to influence public policy change. The second condition pertains to the degree of coherence of attitudes towards a policy change. In this case, public opinion cannot always find a

"clear" signal to influence governments, because there is no clear consensus among citizens when an issue may be highly divisive. Therefore, the signal that public opinion gives policymakers is not always clear, but on the contrary could be loud and noisy.

In this section, we have used the INDEVUC (Investing in Education in Europe: Attitudes, Politics and Policies) project datasets, the European Social Survey wave 9 on "Timing of life, justice and fairness", fielded in 2018 in 26 European countries, another survey conducted in 2019 within the International Social Survey Programme (ISSP) on "Social Inequality V", the World Values Survey v.7 conducted between 2017 and 2020 and Life in Transition survey (LiTs) fielded in 2016, targeted on post-Communist countries. We investigated the following theoretical expectations:

1) The association between individual income and support for expansion will vary across different sectors of education, and will be greatest for early childhood education and higher education.
2) The relationship between individual income and support for education is less pronounced generally than in other area of social policy redistribution (in this respect education is different from other social policy sectors, see Le Grand, 1982, Ansell, 2010).
3) Middle and upper classes will benefit the most from access to HEI, and therefore will be among the most supportive of expansion in this sector of education.
4) Support of education will be linked to one's own experience of the educational system.

Public Opinion Data Findings

In search for country variations in public opinions supporting educational investment as a mean for social advancement, we have found that expectations from (and consequently support for) education is maximal in post-communist and continental countries, and minimal in Mediterranean ones. Despite its scattered nature (since different countries participate to different surveys), this evidence is consistent with previous results on the effectiveness of educational systems. In our analysis, we have used the five clusters discussed in great details in previous section 1.3 (see Table 3 "Youth Transition Regimes").

We start with the European Social Survey wave 9 on "Timing of life, justice and fairness", fielded in 2018 in 26 European countries.[9] There are two items that are relevant for our purpose: the first one

[9] Data downloaded on 10/11/2023 from https://ess.sikt.no/en/?tab=overview. See also ESS 2023. Greece, Luxemburg and Romania did not participate. We exclude Cyprus, Serbia and Montenegro.

corresponds to the statement "*Everyone in the country has a fair chance of achieving the level of education they seek*" (variable EVFREDU), while the second claim is "*Compared to other people in [country], I have had a fair chance of achieving the level of education I was seeking*" (variable IFREDU). The level of agreement is expressed by a Likert scale ranging from 1 to 10. In figure 9 we plot the average score by family income decile and cluster of country. While it is not surprising to find a rising trend in this opinion (people seem inclined to attribute part of their economic success to their educational career – a very similar graph can be obtained by replacing the income decile with the educational attainment), it is more interesting to notice that the strongest agreement is encountered among Nordic and Continental countries, while it is weakest among Mediterranean countries.

Figure 9 – European Social Survey 2019

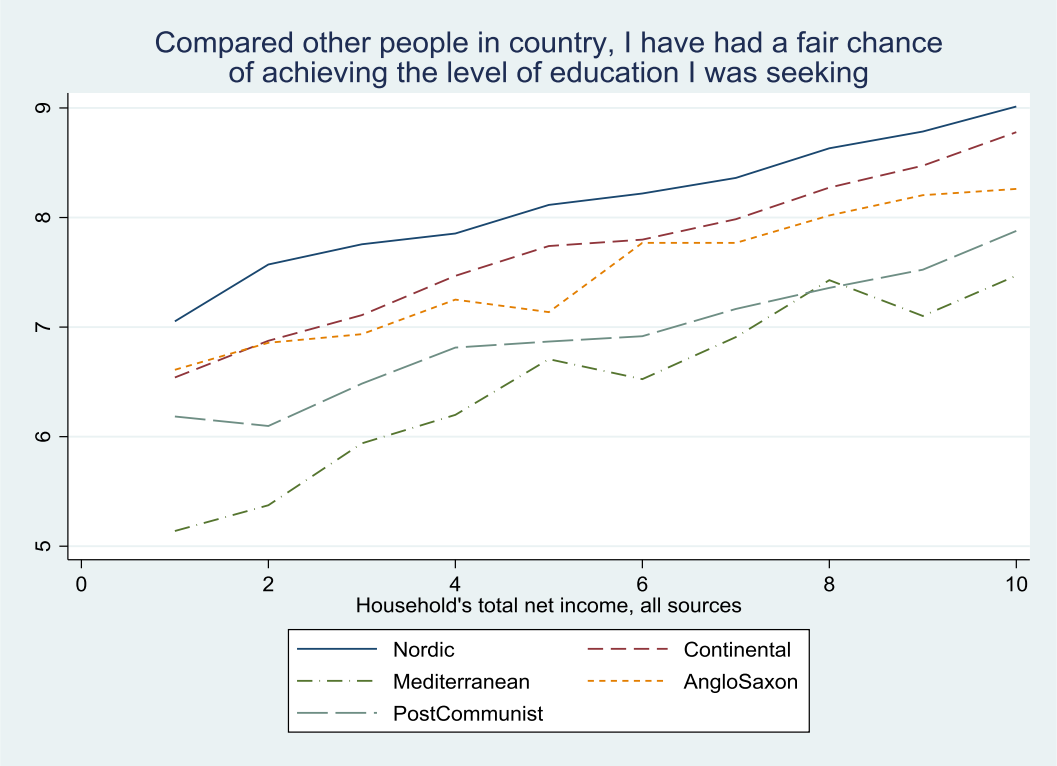
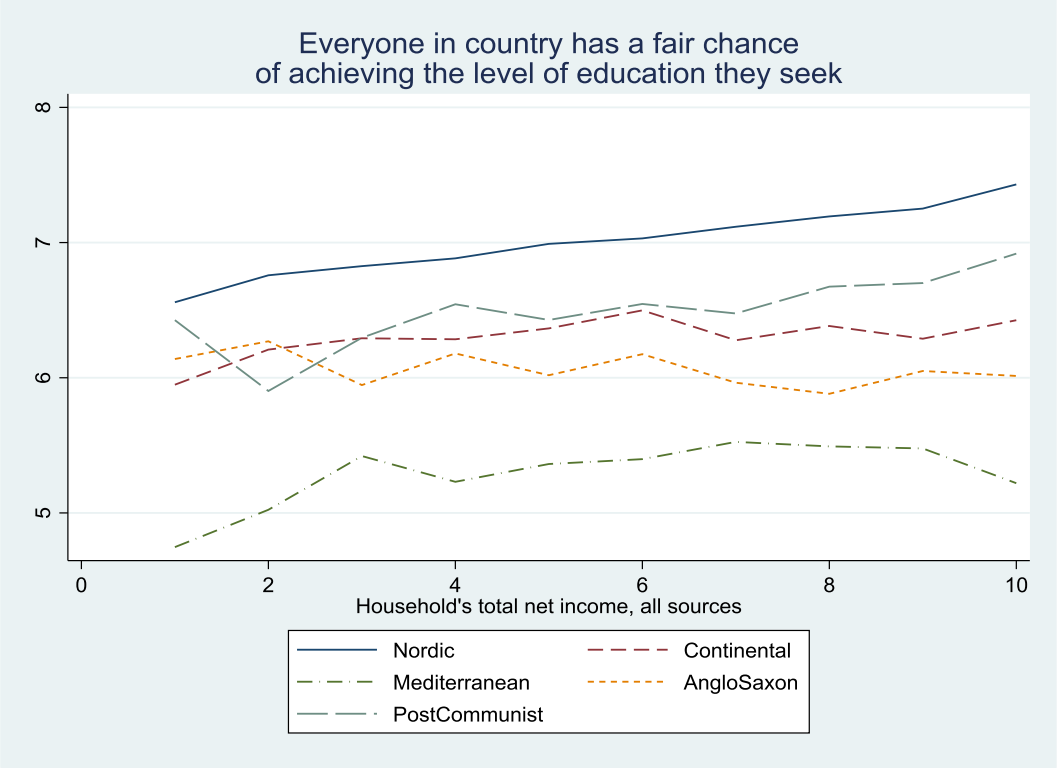


Figure 10 – European Social Survey 2019



When we consider the opinion about the fairness of the national educational system, the line become flatter, and the ranks are somehow modified: interviewees in Nordic and post-Communist countries hold the opinion that their educational system offer equality of opportunities, whereas this claim attenuates in Anglo-Saxon and Mediterranean countries. The distribution of the agreement does not exhibit a hump-shape, as one would have expected in case of stronger support by the middle classes.

The ranking pattern among country clusters remain unaffected even when controlling for compositional effects (gender, age, educational attainment and income position – see table 9). Nordic people believe that their educational system is fairer, also because most of them have experienced it in their own life. Similar attitude is found among post-Communist populations. At the opposite extreme, people living in the Mediterranean countries seem less convinced about the equity in accessing education.

Table 9 – Fairness of the national educational system – ESS 2018

	raw mean	standardised agreement	conditional on gender, age and education	conditional on gender, age, education and income	observations
Nordic	7.00	0.25	1.00	0.97	12585
Continental	5.97	-0.19	-0.06	-0.09	11794
Mediterranean	5.34	-0.46	-0.59	-0.64	4972
Anglo-Saxon	6.08	-0.14	0.13	0.10	3839
Post-Communist	6.48	0.03	0.48	0.50	9895
Total	5.99	-0.18	0.00	0.00	43085

Note: Nordic includes Denmark, Estonia, Finland, Iceland, Lithuania, Latvia, Norway, Sweden and Slovenia; Continental includes Austria, Switzerland, Germany, France, Ireland, and Netherlands; Mediterranean includes Spain, Italy and Portugal; Anglo-Saxon includes Belgium and Great Britain; Post-Communist includes Bulgaria, Czech Republic, Croatia, Hungary, Poland and Slovak Republic.

A partially different perspective emerges from another survey conducted in 2019 within the International Social Survey Programme (ISSP) on "Social Inequality V".[10] Here we find three items that are related to the opinion regarding the equity of the national educational system:

i) "[…] *how important you think it is for getting ahead in life having a good education yourself?* (variable V3)

ii) "[…] *how important you think it is for getting ahead in life having well-educated parents?* (variable V2)

iii) "*Is it just or unjust – right or wrong – that people with higher incomes can buy better education for their children than people with lower incomes?*" (variable V31).

The answers to these items have been recoded in a reverse order, in order to associate higher values to stronger agreement to the statement. The unconditional answers are shown in figures 11-12-13.

Interviewees in Mediterranean countries are strongly convinced of the importance of education, coupled with the importance of a favourable background (proxied by educated parents). At the opposite extreme, Nordic people place less emphasis on the relevance of individual education for success in life, not to speak of having educated parents.

When requested to express a normative judgment about a "market" approach to education, the opposition is strongest in the bottom deciles of all clusters except Great Britain (the only country in the Anglo-Saxon cluster). Notice that the opposition declines with family incomes in all countries, suggesting that rich family are likely to access private education more frequently than poor ones.

[10] Data downloaded on 6/11/2023 from https://www.gesis.org/en/issp/modules/issp-modules-by-topic/social-inequality/2019. See also ISSP 2022. Its coverage is reduced in comparison to the previous survey, since Netherlands, Ireland, Greece, Spain, Estonia, Latvia, Belgium, Slovak Republic Poland Hungary and Romania did not participate to this survey.

Figure 11 – International Social Survey Programme 2019

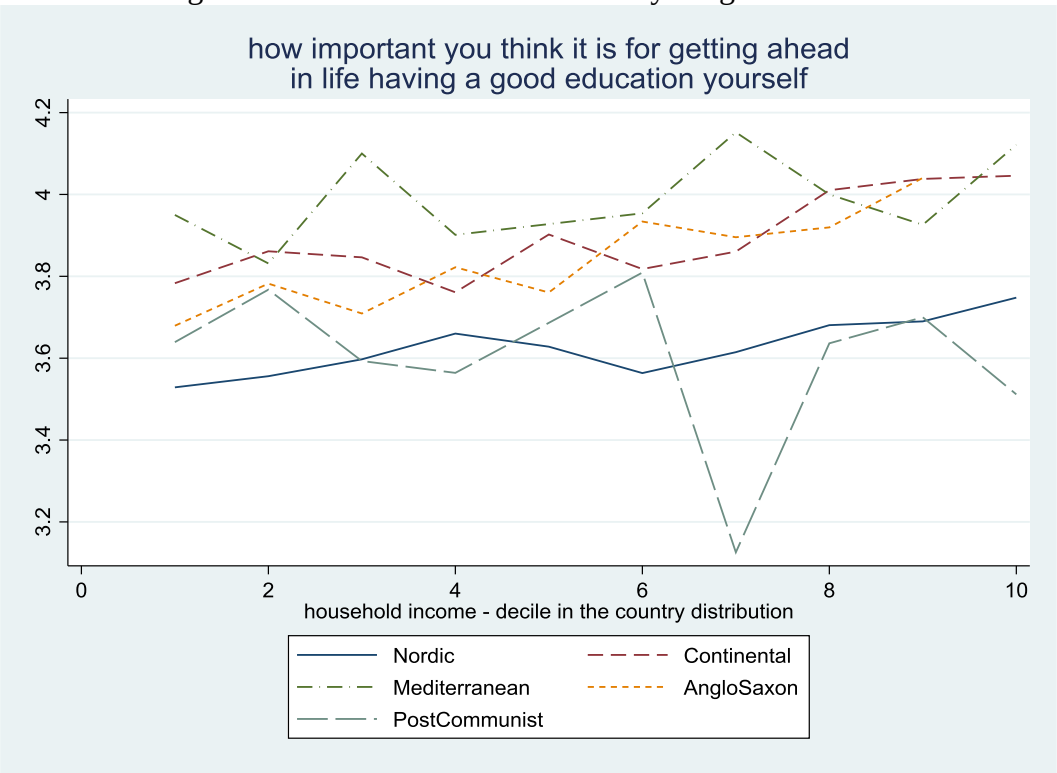


Figure 12 – International Social Survey Programme 2019

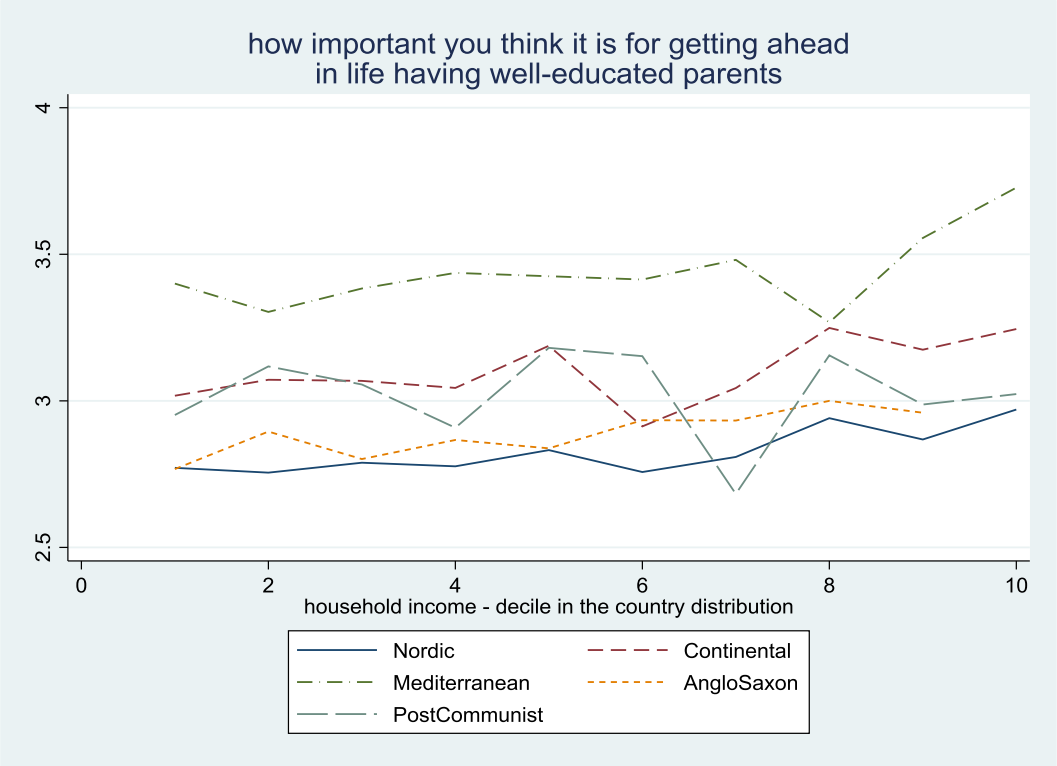
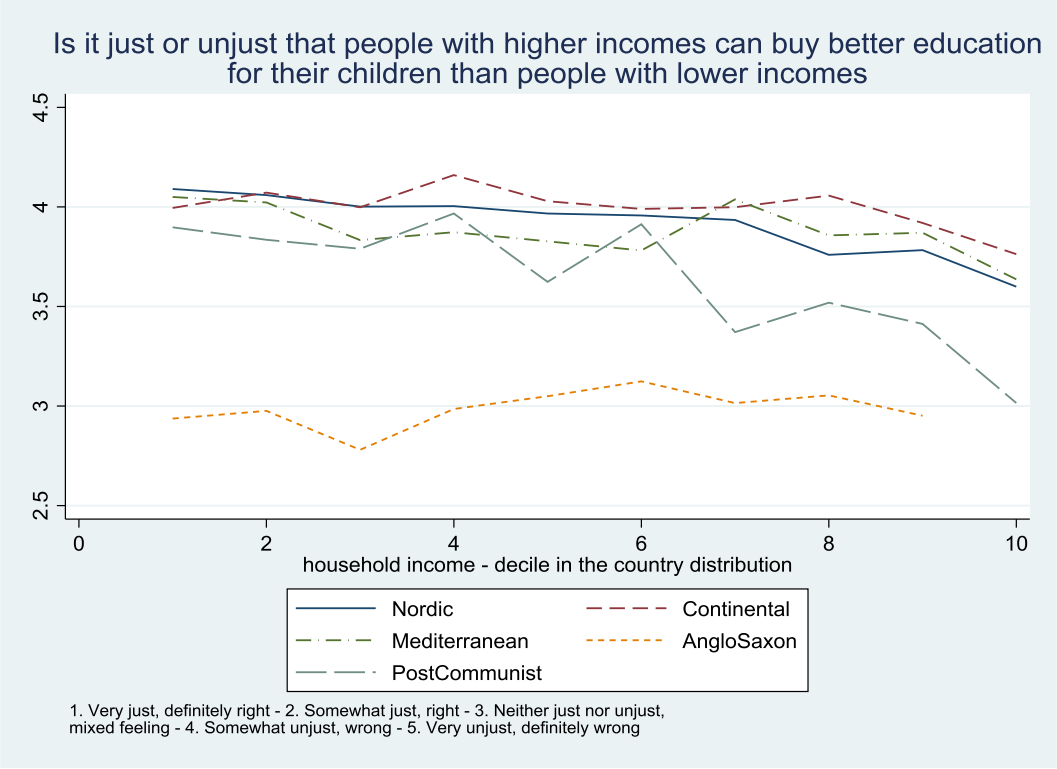


Figure 13 – International Social Survey Programme 2019



Continental countries appear as the strongest opponents to a "market" approach to education, unconditional or conditional on gender, age, education and income position, as evident from table 10.

Table 10 – Injustice in buying better education with money – ISSP 2019

	raw mean	standardised agreement	conditional on gender, age and education	conditional on gender, age, education and income	observations
Nordic	3.61	0.07	-0.24	-0.18	8404
Continental	3.70	0.12	-0.14	-0.08	7226
Mediterranean	3.56	0.02	-0.32	-0.06	1215
Anglo-Saxon	2.60	-0.75	-1.24	-1.19	1724
Post-communist	3.57	-0.04	-0.28	-0.28	4075
Total	3.55	0.00	-0.30	-0.23	22644

Note: Nordic includes Denmark, Finland, Iceland, Lithuania, Norway, Sweden and Slovenia; Continental includes Austria, Switzerland, Germany and France; Mediterranean includes Italy; Anglo-Saxon includes Great Britain; Post-Communist includes Bulgaria, Czech Republic and Hungary.

More scattered evidence, due to the limited sample sizes, can be obtained from two other surveys. In the World Values Survey v.7 conducted between 2017 and 2020 we find another item expressing concerns on the fairness of the educational systems: question 143 asks "*To what degree are you*

worried about […] Not being able to give my children a good education" (variable Q143).[11] Despite the limited representativeness of the countries available, Continental and post-Communist countries record a limited concern for the inability to provide good education to their own children, possibly reflecting the fairness of the national educational systems. At the opposite extreme, Mediterranean (Greece) and Anglo-Saxon (Great Britain and Northern Ireland) express greater concern for their potential inability (table 11). When tabulating the data by self-assessed income decile, there are variations at both tails of the distribution (more concern in the bottom, less concern in the top), but the perceptions is flat between third and ninth deciles.

Table 11 – (Lack of) Concern about inability of providing good education – WVS 2017-20

	raw mean	standardised agreement	conditional on gender, age and education	conditional on gender, age, education and income	observations
Continental	3.23	0.19	0.16	0.19	2392
Mediterranean	2.91	-0.11	-0.19	-0.13	930
Anglo-Saxon	2.77	-0.25	-0.15	-0.09	1887
Post-Communist	3.00	-0.03	0.02	0.03	3357
Total	3.00	-0.03	0.00	0.03	8566

Note: Continental includes Germany and Netherlands; Mediterranean includes Greece; Anglo-Saxon includes Great Britain and Northern Ireland; Post-Communist includes Czech Republic, Romania and Slovak Republic.

Finally, we considered the third Life in Transition survey (LiTs) fielded in 2016, targeted on post-Communist countries.[12] Here respondents are asked to indicate the following "*In your opinion, which of these fields priority should be the first and second priorities for extra government spending?*" (variable q406a and q406b); the options available are: Education, Healthcare, Housing, Pensions, Assisting the poor, Environment, Public infrastructure. We merged the two questions obtaining the fraction of individuals indicating Education as first or second priority. Once again, Nordic countries put a great emphasis on educational spending, followed by Continental (Germany) and post-Communist countries. The Mediterranean countries end up with a lower attention to such a priority, possibly due to the lack of confidence revealed by the other surveys.

[11] Data downloaded on 24/11/23 from https://www.worldvaluessurvey.org/WVSDocumentationWV7.jsp. See also Haerpfer et al 2022. The question is coded as 1 "Very much" 2 "A great deal" 3 "Not much" 4 "Not at all" and therefore a higher value indicates lack of concern, thus suggesting more fairness of the educational system.
[12] Data downloaded on 6/11/2023 from https://www.ebrd.com/what-we-do/economic-research-and-data/data/lits.html# . See also EBRD 2018.

Table 12 – Priorities of public spending – LiTs 2016

	% indicating Education as 1st or 2nd priority	conditional probability on gender, age and education	conditional probability on gender, age, education and income	observations
Nordic	0.36	0.36	0.36	5865
Continental	0.42	0.34	0.33	1487
Mediterranean	0.29	0.31	0.31	2996
Post-Communist	0.32	0.33	0.33	10422
Total	0.34	0.34	0.34	20770

Note: Nordic includes Estonia, Latvia, Lithuania and Slovenia; Continental includes Germany; Mediterranean includes Greece and Italy; Post-Communist includes Bulgaria, Croatia, Czech Republic, Hungary, Poland, Romania and Slovak Republic.

A better focused survey for our purpose is INVEDUC (Investing in Education in Europe: Attitudes, Politics and Policies).[13] Despite the limited number of countries involved (8), people are interviewed about the internal allocation of public expenditure among different stages of education. The interviewees were alerted that spending reallocation may imply personal cost in terms of additional taxation. The relevant question asks: "*Let's talk about the distribution of public spending in the education sector. Please tell me whether you would like to see more or less government spending in each of the following areas. Keep in mind that 'more' or ,much more' might require a tax increase.*

i) Pre-school and early childhood education

ii) General school education

iii) Vocational education and training

iv) Universities and other higher education."[14]

Figure 14 plots the distribution of the strength of support for extra-spending along the income distribution of four clusters (none of the post-Communist countries was involved in the survey), while table 13 displays the conditional cluster means, controlling for individual characteristics of the interviewees. Two comments are at hand: first, there is no relevant differences about educational priorities along the household income distribution, since all lines tend to be flat and not to intersect. Second, priorities in educational stages are markedly different among clusters. The Nordic are mostly concerned about initial stages of education, whereas the Mediterranean put more emphasis on the later stages. It is also noticeable that three out of four clusters would reduce emphasis onto tertiary education, possibly thinking of private spending contribution. Relative to the other groups,

[13] Data downloaded on 28/11/2023 from https://search.gesis.org/research_data/ZA6961. See also Busemeyer et al 2018.

[14] Variable Q26 – available answers: 5 "*Spend much more*" 4 "*Spend more*" 3 "*Spend the same as now*" 2 "*Spend less*" 1 "*Spend much less*", reversely recoded from the original file.

Continental and Anglo-Saxon countries would be inclined to reduce educational expenditure, the former focusing on vocational education and the latter on tertiary education.

Figure 14 – Investing in Education in Europe: Attitudes, Politics and Policies 2014

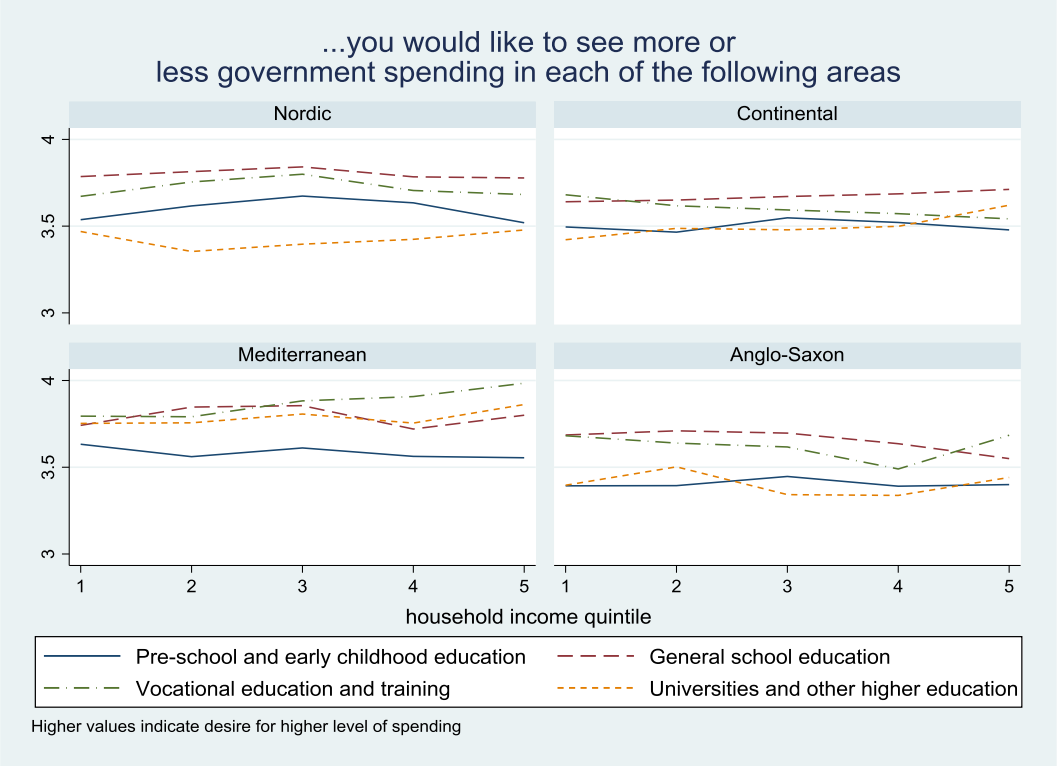


Table 13 – Allocation of additional public spending financed by taxation – Ineduc 2014

	ECEC and preschool	General school education	Vocational education and training	Universities and other higher education
Nordic	0.12	0.14	0.04	-0.14
Continental	-0.02	-0.05	-0.07	-0.05
Mediterranean	0.05	0.08	0.12	0.18
Anglo-Saxon	-0.09	-0.05	-0.05	-0.16
Total	0.00	0.00	0.00	0.00

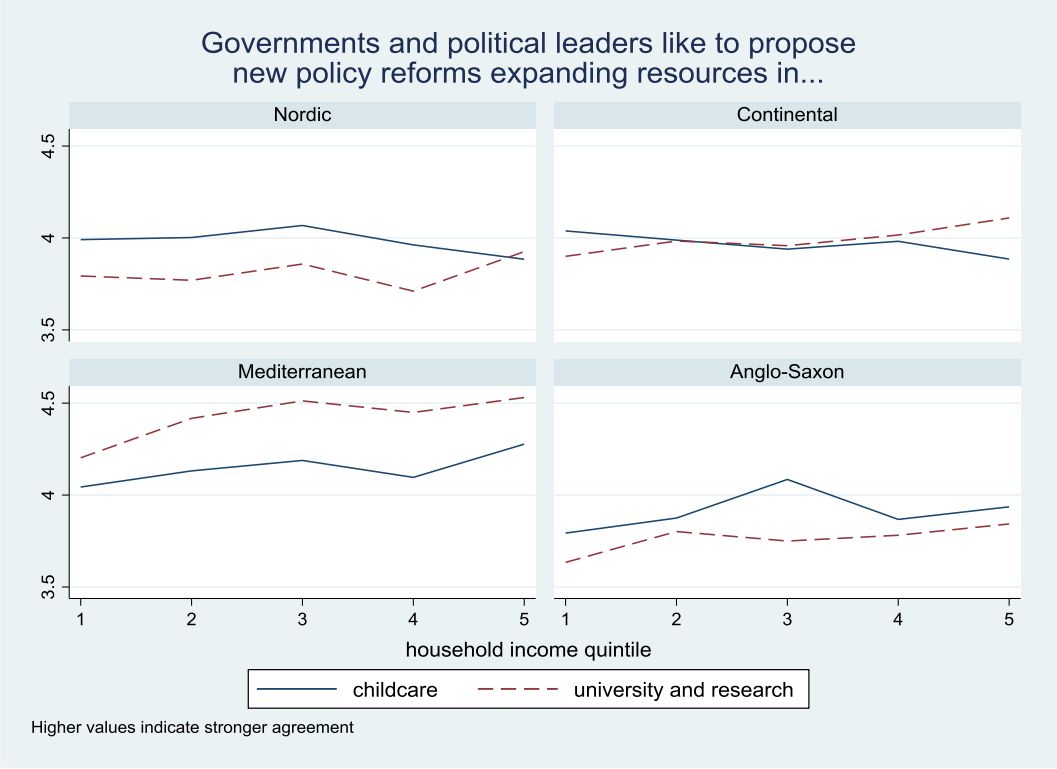
Note: The table reports the residual of regression of individual judgment onto gender, age, educational attainment and income decile - Nordic includes Sweden and Denmark; Continental includes France, Germany and Ireland; Mediterranean includes Italy and Spain; Anglo-Saxon includes Great Britain.

Different priorities are also confirmed by another question, related to expectations with respect to potential reforms: "*Governments and political leaders like to propose new policy reforms in order to address important social issues. Please indicate whether you would strongly agree (5), agree (4), neither agree nor disagree (3), disagree (2) or strongly disagree (1) the following reform proposals:* a) *Expanding access to early childhood education and improving its quality* (variable Q18_3 – recoded from original file)

b) *Investing more money in university education and research at universities*. (variable Q18_5 – recoded from original file)"

Figure 15 plots the support to each potential reforms by household income quintiles: Nordic and Continental countries do expect further reforms consolidating childcare and preprimary education, whereas Mediterranean countries would like seeing more policy action in the field of higher education, where enrolment and graduation rates lag behind other European countries.

Figure 15 – Investing in Education in Europe: Attitudes, Politics and Policies 2014



3.Methodology

This section develops the methodological approach to answer the research questions outlined in the introduction and is tailored towards the inferential needs of understanding a complex institutional process as such as the transition from secondary to higher education. In particular, the qualitative case study approach is justified and scoped more specifically before the methodological twists of using EU SILC data are explained. In this paper we have used the opportunity to combine a quantitative analysis with a small-n case-study analysis, in order to understand the cluster and single individual countries dynamics.

3.1. *Qualitative Small-n* Case study Methodology

The criteria for retrieving a useful sample are "representativeness" whereby features of a larger universe are identifiable and "causal leverage", that is the variation in the dimension of interest. This implies selecting appropriate cases from a population of potential ones, with representativeness having priority in the case selection of a country within each cluster associated with a youth transition regime (Barzelay 1993; Yin 2012, 2014).

For this research, case selection is a middle road between a "pathway case" and a "deviant case" (Gerring 2007a.; 2007b). Deviant cases are normally viewed as the best fit to understand the theoretical implications of a theoretical anomaly. By departing from the norm (specific clusters), they are powerful in activating the full range of actors and processes (Bennett 2015; King, Keohane, and Verba 1994). In our paper, we do not purse this case selection strategy though. We are fully aware that multiple representative cases might lack causal leverage for the specific question (Gerring 2007a). We therefore have adopted a purposive and information-oriented case selection (Barzelay 1993; Ragin and Becker 1992, 2010; van Evera 1997). We have selected one representative case for each cluster: Germany for the employment-based type, Poland for the post- Communist transition regime, Italy for the familistic, Sweden for the universalistic regime and the United Kingdom for the market-based regime. Each of these countries is an illustration of certain institutional features pertaining to each transition regime.

Selection bias is actually more openly tackled in the comparative method and qualitative approaches compared to statistics, as purposeful sampling directly has to provide a reasoning for a specific selection (Collier 1993). Due to the very nature of using case studies, false positives are still a relevant risk. However, this contributes to the "*paradigm-generating*" character of such research (Gerring

2007a). Furthermore, case-selection procedures ensure reliability, while a case study protocol and methodological guideline are set up as well (Yin 2014).

Our understanding of a case is constituted by an education system associated with a specific country at the national level. Aligned with the scope conditions, this defines a population of inference (Goertz 2006, 157–58). Each case study will be analyzed on the basis of the institutional features and domains identified in the theoretical section of this paper, that define the predominant **school and higher education system.**

3.2. Quantitative Methodology and Data Strategy

We will in the next section of the paper consider individual educational choice within the European countries, making use of the information available in the EU-SILC survey.[15] Here we explain the methodological strategy we used. The most recent survey is 2021 but we have preferred using the 2019 survey for three reasons: the first one is avoiding the confounding impact of the Covid crisis occurred in 2019; the second is the possible inclusion of Great Britain and Iceland;[16] the third is the availability of a special module on intergenerational persistence collected in 2019, which contains information related to the social origins of the household head and spouse (parental education and occupation, wealth, books at home and relative deprivation when the interviewees were 14 year old).

The SILC survey contains three main files: a household file (where we derive information on household income and potential deprivation), a respondent file (where we find basic information on all cohabiting individuals in the household unit of the survey, as well as whether youngest members are attending schools) and a person file (restricted to individuals of age - aged 17 or older - it contains information on educational attainment, occupational status, health and their parental background). Sample sizes (unweighted) are reported in Table A4 in the Appendix.[17]

[15] European Union Statistics on Income and Living Conditions - https://ec.europa.eu/eurostat/web/microdata/european-union-statistics-on-income-and-living-conditions

[16] Following the "Brexit" referendum held on 23/6/2016, Great Britain ceased the participation to the European Union on 31/1/2020 and stopped participating to Eurostat initiatives. As a consequence, the last SILC survey including UK is 2018, which implies just one year difference from the other European countries. Unfortunately this excludes the information collected in the special module on parental background for Great Britain, which are relevant when studying educational choices of youngsters non cohabiting with their family of origin. In addition, Iceland stopped participating to SILC in 2018, which therefore is included with the latest survey.

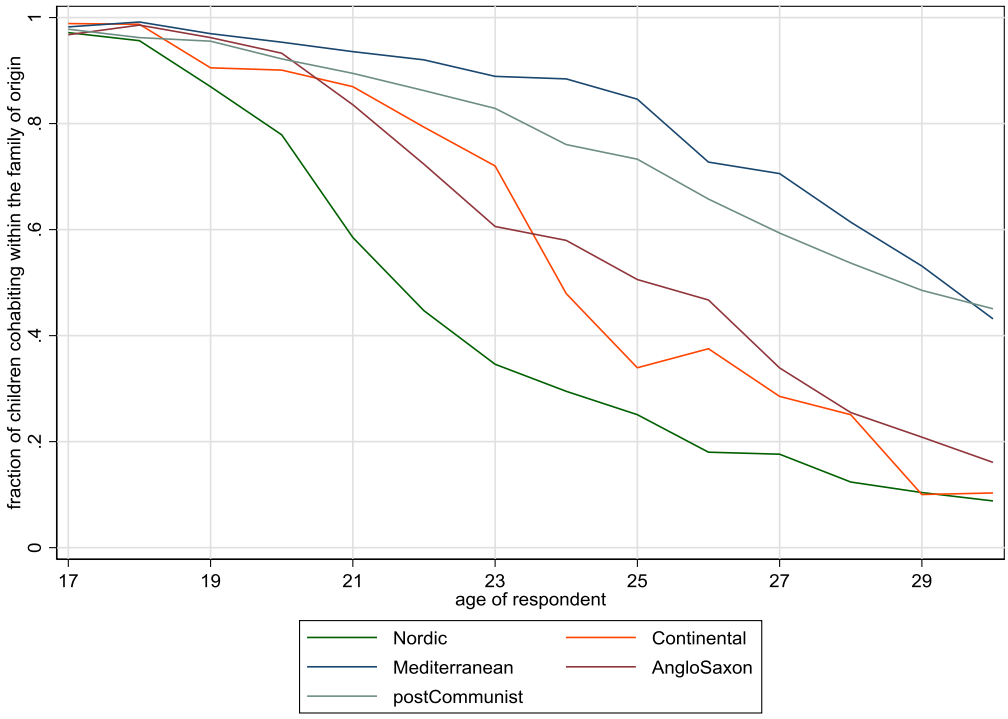
[17] The survey also includes Norway, Switzerland and Serb Republic despite their non-EU member status. Relevant statistics are weighed by personal weights (variable PB020). Data for Malta provides individual age at quinquennial intervals: we have therefore imputed individual values under the assumption of uniform distribution across year intervals.

The respondent file contains identifiers of the cohabiting father and/or mother that are present in the survey. We identify as "child" individuals that are cohabiting with an identified father and/or mother (including step/adoptive/foster ones). This allows the attribution to each child of the relevant information on the cohabiting parents: their presence/absence, education, occupation and incomes. Since in the 2019 survey the cohabiting parents were asked retrospective information on their parents, when a child leaves home and is interviewed as an independent household head, we can still retrieve information on their parents occupation, education and relative deprivation, but not on family income (which now corresponds to their own incomes).

European countries are significantly different in terms of home leaving age. This can be assessed by comparing the two columns of people aged 19-25 in Table A4 in the Appendix: the fraction of cohabiting children in this age range is 83% in the entire sample, but it ranges from 51% in Denmark but exceeds 90% in Cyprus, Croatia, Italy, Luxemburg, Malta, Portugal and Slovakia (not casually, most of them are in the Mediterranean area).[18] While the survey does not contain individual question related to the age of home leaving, we can infer some information from Figure 16 where we plot the fraction of cohabiting individuals by age. The complementary fraction is living outside the family. Since not all individuals leave home at the same age, the fraction of cohabiting children declines gradually or rapidly, also depending on the way in which tertiary education is organised at country level. Same statistics by country are available in Table A5 in the Appendix, where we have arbitrarily chosen a threshold of 80% of cohabitation to identify a potential starting age for leavers: in such a case 20 year-old is the (presumed) leaving age for Denmark, Finland, Norway and Sweden (all Nordic countries), while it is 25 for Spain, Italy, Serbia and Malta, reaching 27 for Hungary.

[18] When using sample weights, country differences are emphasised: Denmark records a fraction of cohabiting children in the age range 19-25 equal to 31.6%, followed by Finland (40.9%), Norway (44.9%) and Sweden (50.2%). At the other extreme, Portugal (90.6%), Spain (91.6%), Croatia (92.0%), Slovakia (92.1%), Italy (92.5%) and Malta (93.6).

Figure 16 - Share of children cohabiting within the family, by age – SILC 2019



Home leaving is connected to differences in welfare regimes. When a state provides publicly funded education and transfers covering the risk of unemployment and/or poverty, the student faces a larger set of possible choices, and can afford greater risks in educational choices. Conversely, if students have to rely on family resources only (or just on themselves), they will be discouraged from undertaking novel or risky pathways, and they are more likely to replicate parental choices. In addition, differences in home leaving change our framework of analysis. Looking at Figure 16 we observe that we can reasonably study secondary school attendance (typically ending between 17 – in case of vocational courses – and 19 – for most general secondary courses) presuming that all children are still cohabiting with their parents. On the contrary, this assumption does not hold for later ages, at least for the Nordic cluster of countries.[19] Thus in the case of tertiary education the family of origin influence should be less relevant also thanks to home leaving, even though part of financial resources available may still originate from parents.

To formally describe the educational pathway to completion of tertiary education we can assume compulsory education almost fully attended in Europe[20] and simplify the picture by considering a

[19] We have retained the same clusters previously derived in section 2, with the addition of Cyprus, Malta and Republic of Serbia. The clusters are therefore defined as follows: NORDIC (Denmark, Estonia, Finland, Iceland, Latvia, Lithuania, Norway, Sweden and Slovenia), CONTINENTAL (Austria, France, Germany, Ireland, Luxemburg, Netherlands, Switzerland), MEDITERRANEAN (Cyprus, Greece, Italy, Malta, Portugal, Spain), ANGLO-SAXON (Belgium, Great Britain), POST-COMMUNIST (Bulgaria, Croatia, Czech Republic, Hungary, Poland, Republic of Serbia, Romania, Slovakia).

[20] This statistics can be computed in SILC using the variable RL020 (hours attended in education at compulsory school), referred to family members not older than 12. Excluding the anomalous values for Germany (70%) and Great Britain (62%), the average attendance rate is 97% for the remaining countries.

sequence of two stages, secondary and tertiary. If g_p is the population that completes compulsory education, the population that will complete tertiary education g_t is given by

$$g_t = g_p(1-\alpha)\beta(1-\delta)$$

where α is the early school leaving rate, β is the enrolment rate in tertiary education of secondary school graduates $g_s = g_p(1-\alpha)$ and δ is the non-completion rate during tertiary education. SILC data are inappropriate to study early school leaving, since they do not collect information on children status between 14 and 16, such that official statistics are usually computed by Eurostat using Labour Force Surveys. On the contrary, the transition from secondary to tertiary education can be identified in SILC cross-sectional data by comparing adjacent age cohorts in the neighbourhood of the end of secondary education. Finally, the dropout rate during tertiary education requires longitudinal data. SILC contains a rotating panel structure, with an expected permanence of 4-year. However sample sizes are small and non-random attrition poses a problem of reliability of the estimates. An indirect strategy, pursued here, is comparing enrolment rates and attainment rates for the relevant age cohorts (say between 18 and 30 year old), the difference representing an estimate of the dropout rate in tertiary education.

In SILC each member of the household older than 16 is requested to indicate their educational status (whether "*In education*" or "*Not in education*" – variable PE010) as well as their labour current condition (whether "*At work*", "*Unemployed*", "*In retirement or early retirement*" or "*Other inactive person*" – variable RB210). By crossing these two pieces of information, combined with the type of school attended (variable PE020) we obtain the distribution of the youngster population shown in Figure 17 that describes the educational condition of recent birth cohorts (born between 1989 and 2003).[21] The distribution by country of the same variable is in table A6 in the Appendix. The distribution of the educational position by observable characteristics (gender, age, citizenship, parental background) allows for comparison of relative advantages/disadvantages. In the extreme case where the distribution of educational status were independent of these characteristics, one could claim that the situation would grant the *equality of opportunities*, since all members of the population would face the same choice set. It does not imply that all individuals achieving the same educational attainments (this would correspond to *equality of outcomes*), but simply observing similar odds irrespective of initial conditions.

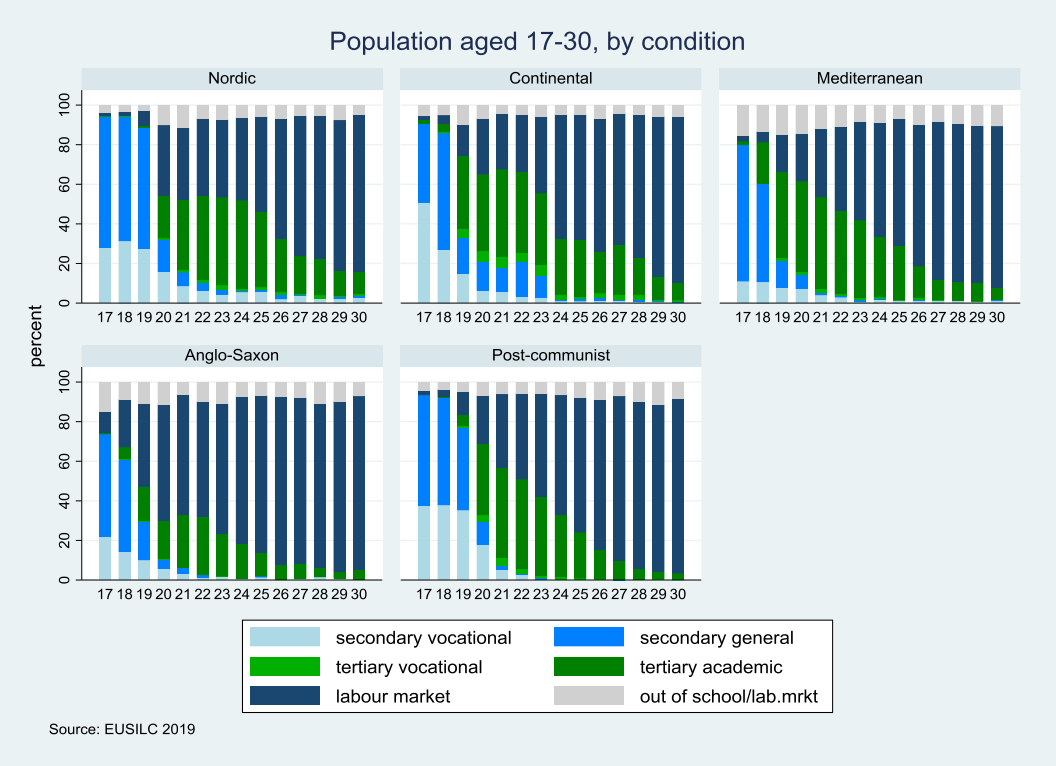
[21] These pieces of information (education attendance and labour market condition) are available in the person file, which corresponds to questions only asked to people aged 17 or older. This explains why we start our analysis from this age.

Unfortunately we do not have all information that would be necessary for fully accounting of the determinants of secondary-tertiary transition. In particular, we miss information on student achievements at the time of the relevant choice. This information is available in other datasets like PISA (where in-school students are tested at the age of 15) or PIAAC (where adult population is tested in the survey year) but not in SILC. We are perfectly aware that achievements are correlated to parental education and occupation, and therefore include these controls as partial proxies for this missing information.

In the relevant age range (17-30) there is a limited fraction (6.2%) of working students, namely individuals that are classified as enrolled and working as the same time. They are mostly common among continental countries (in Germany reaching almost 30%). In the subsequent analysis, they are counted as enrolled, and their fraction is reported in the penultimate column of table A6. Looking at the last column of Table A6, one can notice that two countries (Poland and Great Britain) present an anomalous rate of missing information on the educational status.

The Nordic cluster is characterised by the highest secondary school attendance, mostly general, then followed by tertiary academic enrolment that continues until the age of 30 (see below). The Continental cluster is characterised by a vocational pathway, both at secondary and tertiary level, with the highest enrolment in tertiary education. Conversely, the Mediterranean cluster records the lower enrolment in secondary education associated to the largest fraction of youngsters outside education and labour market. The Anglo-Saxon cluster is made by just two countries: UK is associated to an early and massive transition to the labour market, while Belgium is more similar to the Continental model. Eventually the post-Communist cluster suffers lower enrolment in tertiary academic that is not compensated by the tertiary vocational track.

Figure 17 – Enrolment and labour market condition by age – SILC 2019

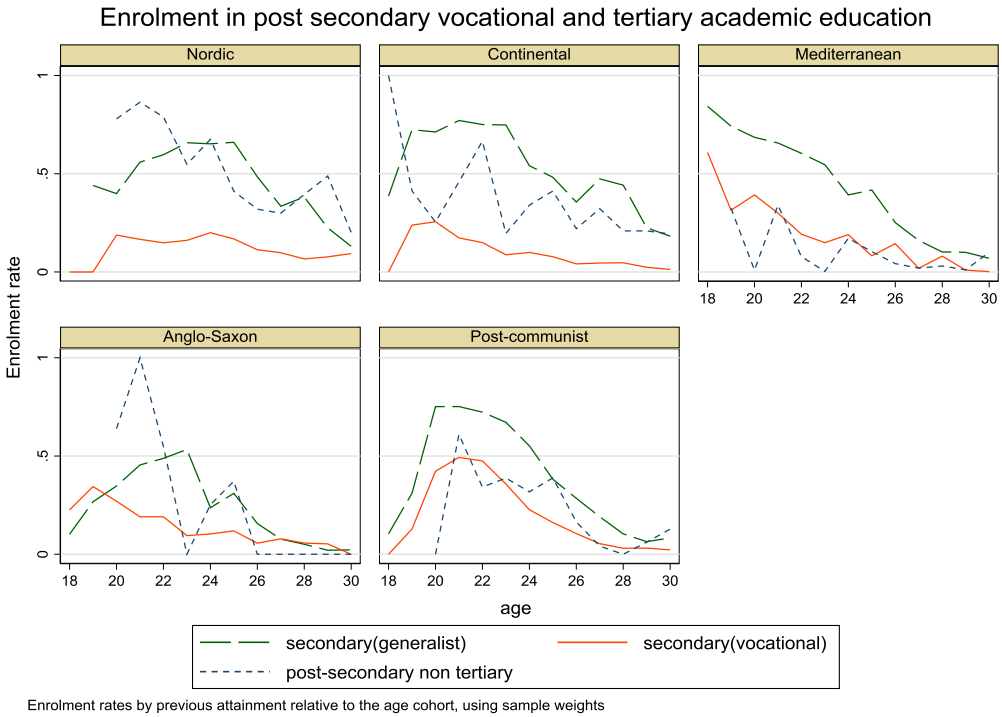


4. Individual educational choices

There is significant heterogeneity in the transition between secondary and tertiary education, given the institutional diversity across countries as we discussed in section 1 of this contribution and will be further explored in the Qualitative case studies later. Educational systems vary significantly in school types, their duration, and regulations regarding access to further education. Therefore we have decided to partition the answers into two large groups, corresponding to the tracks, namely "generalist" and "vocational".[22] If we restrict to the young population in the 20-25 age range, over the entire sample almost one fifth (18.7%) has not attained a secondary education degree, two fifths (41.3%) possesses a secondary generalist degree, one fifth (19.0%) completed a vocational secondary education and another fifth (18.4%) has already obtained a tertiary degree. Detailed information at country level and type of secondary degree attained is in table A7 in the Appendix.

[22] See the note to table A7 in the Appendix

Figure 18 – Enrolment in tertiary academic education by age and secondary school attainment



In figure 18 we have plotted the enrolment rate in post-secondary vocational and tertiary academic education conditional on previous secondary educational attainment. Separate plots for the enrolment in post-secondary non-tertiary and tertiary academic education are reported in figures A1 and A2 in the Appendix). As expected, previous attendance of generalist/comprehensive secondary schools raises the probability of enrolment in tertiary education relative to having attended a secondary vocational. In addition, one can notice that part of the academic tertiary enrolment derives from people who had previously attained a post-secondary degree, signalling the existence of pathways across different tracks.

Parental Education and Educational Choice

While tracked secondary education seems conditioning further education, especially for those who have attended vocational tracks, also the family background constitutes a possible barrier to further education. In table 14 and in figure 19 we have reproduced the enrolment rates by parental education (proxied by the highest educational attainment in the parent couple).[23] We observe that in all clusters children with at least one college-educated parent outperform children from less educated parents, even though this differential is highest in post-Communist countries and lowest in Nordic and Anglo-

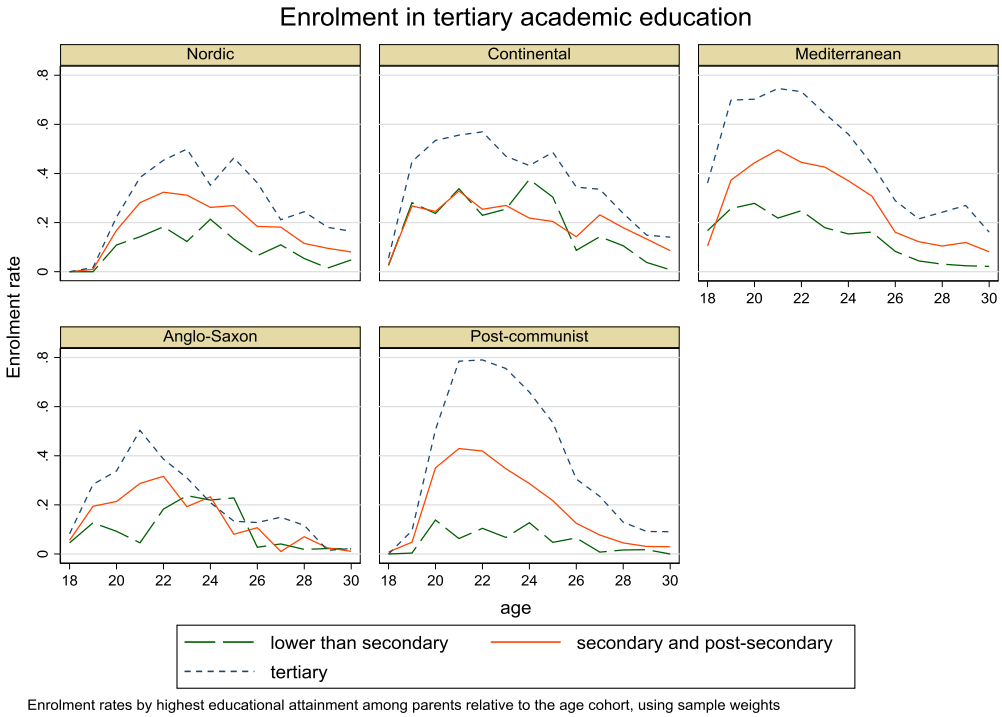
[23] For cohabiting children we have considered the highest educational attainment among the household head and spouse (or the household head only when the spouse is missing), recoded in order to be comparable with the next group. For children living alone, we have retrieved parental education from the family of origin special module. We have also explored a finer grained classification of parental education, distinguishing whether the father or the mother was the only higher education graduate in the family of origin, without finding a consistent pattern across clusters.

Saxons countries. If we take the ratio between the enrolment rate of children of tertiary educated parents and enrolment rate of children of secondary educated parents as measure of the *Inequality of Opportunity in tertiary enrolment*, this (odds-)ratio is 2.1 among post-Communist countries, 1.8 among Continental countries, 1.7 among Mediterranean countries and 1.5 among Nordic countries.[24] The corresponding country level measures are available in table A8 in the Appendix.

Table 14 – Tertiary enrolment by highest parental education – 2017-2020

	low (primary and lower secondary)	medium (upper secondary and post-secondary)	high (tertiary academic)	total	Inequality of Opportunity in enrolment (tertiary/ secondary)
Nordic	0.071	0.147	0.224	0.179	**1.52**
Continental	0.140	0.200	0.362	0.257	**1.82**
Mediterranean	0.124	0.274	0.487	0.268	**1.77**
Anglo-Saxon	0.100	0.156	0.227	0.177	**1.45**
Post-Communist	0.043	0.173	0.363	0.193	**2.10**
Total	*0.115*	*0.202*	*0.362*	*0.236*	**1.80**

Figure 19 – Enrolment in tertiary education by parental education – SILC 2019



Enrolment rates by highest educational attainment among parents relative to the age cohort, using sample weights

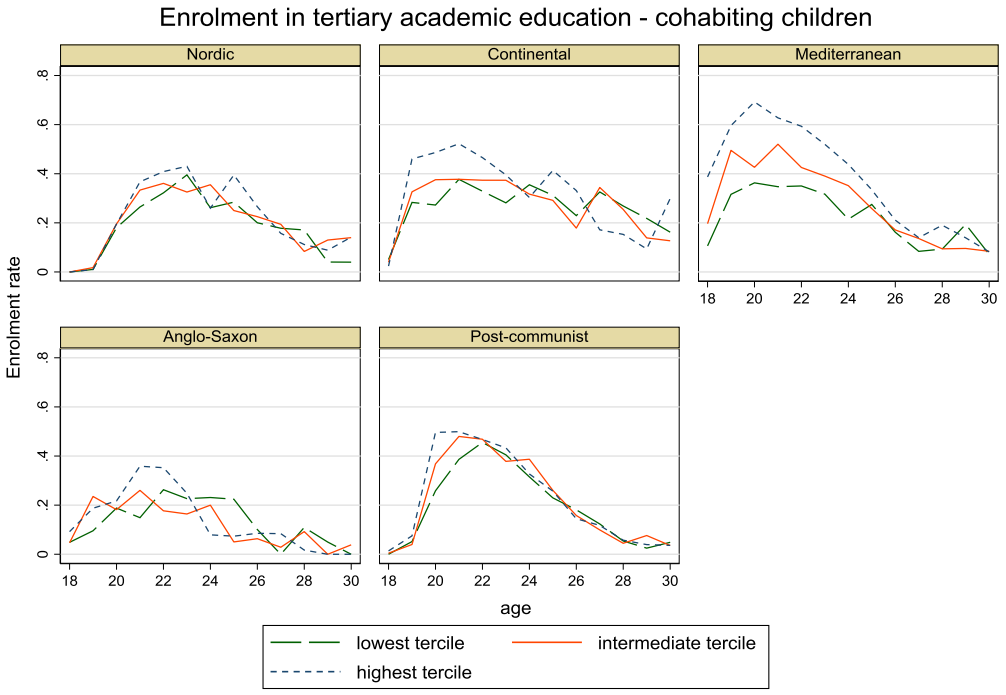
Family Income and Educational Choice

[24] The ratio is 1.45 for Anglo-Saxon countries, but the UK measure is only partial because we do not have information on parental education for children living outside the family of origin.

The other dimension that is crucial for educational choices is family income. SILC collects information on all working members of each family. We use household gross income (variable HY010), which includes all sources of income, equivalised with the square root of the number of cohabiting members of the family. For children cohabiting this measure is referred to parental incomes, while for those living alone it corresponds to their own incomes. Since we are interested in the different odds of tertiary education enrolment, we summarise the income distribution by partitioning it into three terciles, each corresponding to one third of the relevant population (aged between 18 and 30 year old) at country level. For children cohabiting with their family, the income tercile corresponds to the distribution of parents' incomes, while for children living alone the tercile is computed over the distribution of their own incomes.

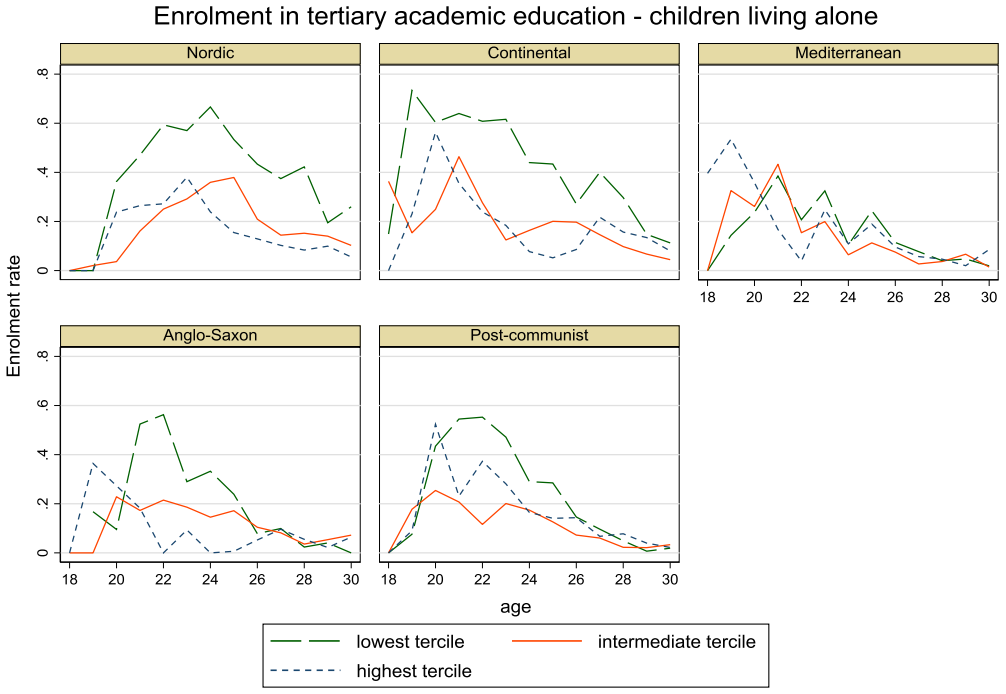
Looking at figure 20 referred to children cohabiting with their parents, there is limited evidence of "money matters" in tertiary education, except in the case of Mediterranean countries, where children of richer families outperform those from poorer families. On the contrary in the case of children living alone the evidence is reversed (see figure 21): there are no income differences in the odds of enrolment in the Mediterranean cluster, but poorer students have greater chance to enrol in all other clusters. We take this as possible evidence of financial aid to students available in these countries. In addition, if we compare the enrolment rates among cohabiting children and living alone ones (see country data in table A9 in the Appendix) we notice that living alone children experience lower enrolment in tertiary education, for they are likely to self-sustain themselves. On the contrary, their enrolment rate is higher in Nordic countries, where it is most frequent the case of attending universities in different cities from their parent ones.

Figure 20 – Enrolment in tertiary education by family income position and age – SILC 2019



Enrolment rates by family of origin income position relative to the age cohort, using sample weights

Figure 21 – Enrolment in tertiary education by own income position and age – SILC 2019



Enrolment rates by own income position relative to the age cohort, using sample weights

Completion Rates

What said so far concerns the transition from secondary to tertiary (the β coefficient). If we now move to completion rate, we would need a longitudinal dataset, in order to estimate the dropout rate at tertiary level (the δ coefficient). Following a panel approach, the OECD has recently published

data on completion rates in (academic) tertiary education (see table 15). Despite not all countries being available, it is interesting to notice that Anglo-Saxon countries have the highest completion rates, even at the end of official duration of courses. They are followed by the Continental countries, even though they are preceded by the Nordic countries at the official end of course duration. Mediterranean countries come last in the ranking based on completion, due to an impressive dropout rate close to 50% in the case of Italy. These differences may be due to the course official duration, to entry selection, to exam taking organization, to student aid policies, but unfortunately we do not have detailed measures of these dimensions to be included in a proper statistical analysis. We have, however, reviewed a wide range of primary sources and reports that allowed us to identify the effects of some of these institutional variables on different youth transition regimes (see section 1 of the paper).

Table 15 – Tertiary education: Completion rates – 2017-2020

		Completion rates of students who entered a bachelor's (or equivalent) programme and completed any tertiary level					
		By the end of the theoretical duration of the programme			By the end of the theoretical duration of the programme plus three years		
	theoretical duration	men	women	total	men	women	total
Estonia	3 - 4	31	52	43	53	73	64
Finland	4	32	56	46	66	80	74
Iceland	3 - 4	36	41	39	64	73	69
Lithuania	3 - 4	49	67	59	56	73	65
Norway	3 - 4	44	53	49	67	79	74
Sweden	3	28	37	33	49	69	61
Slovenia	4 - 5	30	44	38	47	64	56
Nordic	**3.6**	**36**	**50**	**44**	**57**	**73**	**66**
Austria	3	21	29	26	54	65	60
France	3	31	40	36	67	74	71
Netherlands	3 - 4	22	36	29	64	78	71
Switzerland	3	36	42	39	78	84	81
Continental	**3.1**	**28**	**37**	**33**	**66**	**75**	**71**
Italy	3	19	22	21	50	56	53
Portugal	3	32	43	38	63	79	72
Spain	4	27	46	37	64	79	72
Mediterranean	**3.3**	**26**	**37**	**32**	**59**	**71**	**66**
Belgium	3 - 4	26	37	32	62	72	68
Great Britain	3 - 4	67	71	69	82	87	85
Anglo-Saxon	**3.5**	**47**	**54**	**51**	**72**	**80**	**77**
Poland	3 - 4	39	58	50	60	77	69

Source: table B-5.1 in OECD 2022, Education at a glance

Statistics from table 15 suggest two aspects: first, tertiary education completion lasts longer than official duration; second, there are non-negligible dropout rates in tertiary education, given by the complement to 100 of the final column of table 15. We can explore these phenomena also using SILC data, under the (admittedly strong) assumption that our cross-section can be read as a pseudo-panel, namely that each birth cohort is considered as equivalent to the preceding (or subsequent) one. If we consider that enrolment is a flow that (when successful) contributes to augmenting the attainment, we

can estimate the dropout rate as the difference between the expected share of graduates from cumulated enrolment and the actual share of graduates. The difference between the two provides an estimate of the dropout rate. Using previous symbols, if β_t is the transition rate to tertiary of cohort of secondary school graduates g_{st} born in year t and the population size is normalized to one, then enrolment today $g_{st}\beta_t$ corresponds to the graduate share g_{tt} recorded for the same birth cohort after a number of years corresponding to the actual duration of a course of study (which is typically longer than the theoretical duration). In symbols

$$g_{st}\beta_t(1-\delta) = g_{tt}$$

Then the dropout rate for the birth cohort t can be estimated by

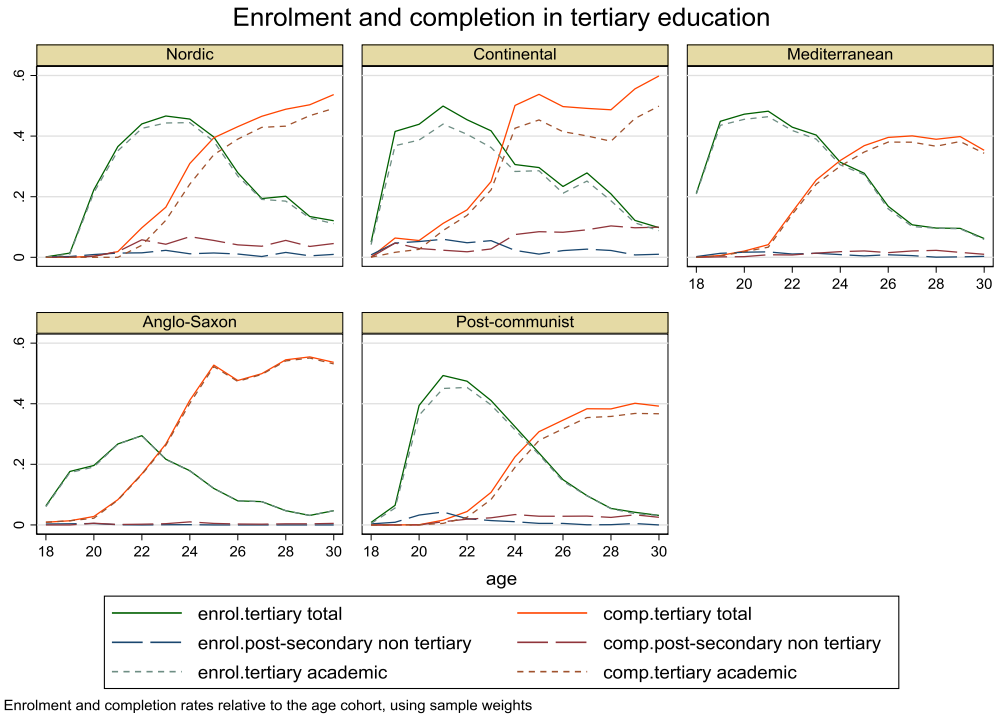
$$\hat{\delta}_t = 1 - \frac{g_{tt}}{g_{st}\beta_t}$$

which can be averaged over adjacent cohorts in order to reduce sampling variability. In table 16 we follow this approach to provide an estimate of the dropout rate in the final column. However countries differ in terms of modal age of completing secondary education, as well as in the effective duration of tertiary education. We assume an effective duration of 4 years, that fits better the value reported in table 15. Country level statistics are available in table A10 in the Appendix. The estimated dropout rate seems consistent with those reported in table 15 in most cases except that in British data, where the enrolment rates in tertiary education are unreasonably low compared to the attainment data for the same country. For all the other countries it provides an order of magnitude of the possibility of improving tertiary education attainment in the adult population. When we plot the same variable by age cohort (as we do in figure 22) we highlight the dynamics of this process.

Table 16 – Vocational and academic tertiary education: attendance and attainment – SILC 2019

	tertiary enrolment 18-25	tertiary enrolment 26-30	tertiary attainment 30-35	estimated dropout rate
Nordic	0.295	0.186	0.533	**0.288**
Continental	0.369	0.184	0.575	**0.343**
Mediterranean	0.381	0.105	0.377	**0.528**
Anglo-Saxon	0.191	0.056	0.540	**-0.336**
Post-communist	0.310	0.073	0.398	**0.372**
Total	*0.333*	*0.126*	*0.485*	**0.345**

Figure 22 – Enrolment and completion in tertiary education by age – SILC 2019



Enrolment and completion rates relative to the age cohort, using sample weights

Figure 22 suggests that country clusters experience similar enrolment rates (with the exception of UK), exceeding 40% of the relevant age cohorts at the beginning of the relevant period; however in Nordic and Continental groups the enrolment period remains high over a longer age span, as if attending college remained an open option even during adulthood in these countries (Ballarino 2023). Tertiary enrolment is also sustained by postsecondary vocational education within the same groups of countries. As a consequence of both phenomena, the share of tertiary graduate continues to increase in the population aged thirty or more. On the contrary, Mediterranean and post-Communist countries do not pass the threshold of 40% of adults with a tertiary degree despite higher enrolment rates, confirming their lower rates of completion. One could think of higher opportunity cost created by buoyant labour market for youth, but unfortunately this is not the case. Looking at table A6 in the Appendix, one can notice that the same clusters also record the larger fraction of youth out of education and labour market.

It is likely that dropout rates be higher for children from disadvantaged background (poorly educated parents, lower family incomes) but we do not have sufficient observation to obtain reliable estimation of completion rates by social background. However, we can propose an indirect check of the issue by comparing the *Inequality of Opportunity* in enrolment (introduced in table 14 and reproduced in the final column of table 17 for ease of comparison) and a corresponding measure for attainment in the

adult population (reported in table 17 – corresponding country level indicators are reported in table A11 in the Appendix).

We do not find a clear pattern: the *Inequality of Opportunity* in attainment is higher than in enrolment in the Nordic cluster (suggesting a socially determined dropout rate), but is lower elsewhere. However the differences between the two odds ratio falls into the confidence interval, making it impossible to reject the hypothesis that the two measures of inequality of opportunity are distinguishable from a statistical point of view. In other words, based only on this evidence it is impossible to claim that tertiary completion rates in tertiary education are socially differentiated.

Table 17 – Tertiary academic graduation rates by parental education – Population aged 30-35

	low (primary and lower secondary)	medium (upper secondary and post-secondary)	high (tertiary academic)	total	Inequality of Opportunity in attainment (tertiary/ secondary)	Inequality of Opportunity in enrolment (tertiary/ secondary)
Nordic	0.251	0.382	0.668	0.501	**1.75**	**1.52**
Continental	0.355	0.424	0.676	0.496	**1.59**	**1.82**
Mediterranean	0.233	0.441	0.737	0.374	**1.67**	**1.77**
Anglo-Saxon	0.262	0.445	0.703	0.480	**1.58**	**1.45**
Post-communist	0.105	0.368	0.749	0.377	**2.04**	**2.10**
Total	*0.255*	*0.405*	*0.698*	*0.435*	**1.72**	**1.80**

Previous analysis made use of descriptive cross tabulations, which prevents conditioning on more than one variable at a time. If we want to take into account all potential correlations net of the individual contribution of each regressor, we need to resort to multivariate regressions. In table 18 we have introduced several dimensions that may be associated to the decision to enrol in tertiary education. In addition to gender, age and birth place, we have introduced several measures of the family of origin: in addition to parental education, we consider occupational prestige (captured by the lowest ISCO code associated to father and mother occupation), family (log)income, two proxies for the financial situation of the household (the household subjective assessment of the ability to make ends meet[25] and the home ownership), the foreign origin of at least one parent and the absence of father or mother. The enrolment decision is conditional on having obtained a secondary degree, and we control for individuals exiting a vocational track. Finally we control for children living alone and

[25] We refer to the variable HS120 asking "*A household may have different sources of income and more than one household member may contribute to it. Thinking of your household's total income, is your household able to make ends meet, namely, to pay for its usual necessary expenses?* " with possible answer ranging from 1 (With great difficulty) to 6 (Very easily).

for working students. In table 18 we show the probit estimates for the entire sample and for each cluster, while in table A12 in the Appendix we use a linear probability model.

Women are more likely to enrol tertiary education in all countries, especially in Mediterranean and post-Communist countries, while age makes it less and less likely on an age range between 18 and 30. Students living alone are penalised in terms of tertiary enrolment, possibly because they have to self-sustain through working.[26] Student born outside Europe are in a disadvantaged position in Nordic and Mediterranean countries; nonetheless this contrasts with the positive correlation with having at least one parent born outside Europe.

Table 18 - Tertiary enrolment conditional on possessing a secondary degree – people aged 18-30 – probit model – SILC 2019

	1	2	3	4	5	6
VARIABLES	SILC	Nordic	Continental	Mediterranean	AngloSaxon	Post-communist
dep.variable: tertiary enrolment	37.8%	34.2%	42.8%	43.4%	22.0%	31.9%
female	0.202***	0.153**	0.188***	0.201***	0.152	0.347***
age	-0.112***	-0.051	-0.080**	-0.157***	-0.077*	-0.148***
born outside EU	-0.2	-0.536***	-0.001	-0.433***	0.440*	0.316
secondary vocational degree	-1.062***	-0.986***	-1.712***	-1.147***	-0.653***	-0.559*
working student	1.550***	0.945***	1.670***	1.744***	1.302***	2.125***
living alone	-0.501***	-0.032	-0.683***	-0.914***	-1.185***	-0.789***
(log) household income equiv.	-0.235***	-0.288***	-0.503***	-0.094***	-0.153*	-0.249***
ability to make ends meet	0.044***	-0.008	0.108***	0.086***	0.056*	0.012
home ownership	0.07	-0.208***	0.1	0.282***	0.011	0.117
HPO: Managers	0.582***	0.488**	0.398*	0.425***	0.278***	1.027***
HPO: Professionals	0.625***	0.331	0.306**	0.651***	0.368***	0.905***
HPO: Technicians and Associate Professionals	0.457***	0.375	0.062	0.358***	0.115	0.772***
HPO: Clerical Support Workers	0.264	0.287**	-0.009	0.459***	-0.370**	0.745***
HPO: Services and Sales Workers	0.146	0.212	-0.232**	0.304***	0.021	0.516***
HPO: Skilled Agricultural, Forestry and Fish	-0.104	0.052	-0.334*	-0.015	-1.165**	0.102
HPO: Craft and Related Trades Workers	0.178**	0.058	0.189**	0.131*	0.179	0.392***
HPO: Plant and Machine Operators and Assemblers	0.073	0.346	-0.212**	-0.056	0.192	0.303***
HPE: secondary or postsecondary	0.366***	0.336**	0.242**	0.330***	0.113**	0.390***
HPE: tertiary degree	0.670***	0.597***	0.505***	0.763***	0.187*	0.966***
parent born outside EU	0.206**	0.237**	0.415***	-0.04	0.246***	0.042
absent father	-0.02	-0.097*	0.006	-0.063	0.001	-0.011
absent mother	0.089	0.122	0.18	-0.156***	0.319***	0.072
Observations	38 431	8 268	6 920	10 288	2 174	10 781
Pseudo R^2	0.342	0.262	0.431	0.370	0.268	0.351

Robust standard errors in brackets - *** p<0.01, ** p<0.05, * p<0.1 – Constant and country fixed effects included – errors clustered at country level – weighed using sample weights - controls for imputed parental variables – HPO: highest parental occupation – HPE: highest parental education

[26] Causality if likely to be beunivocal, since yougsters finidng a job are more likely to leave parental home and live alone. The problem here is the lack of appropriate information allowing the correct identification. Family information (parental presence, birthplace, education and occupation, home ownership, household income, and ability to make ends meet) are referred to cohabiting parents when the child is still living within the family, while for children living outside the family they are referred to the family of origin when the child was 14 year old. In this second case, the family income is referred to the present income of the child and their potential cohabitants. Given a consistent fraction of missing answers to retrospective questions, in order not to lose observations we have replaced missing cases with sample means (country×age) of the corresponding variable. A dummy controlling for imputed values is included in the estimation.

Family matters in several respects: parental education raises the chance of enrolling, as well as having a parent in one of the top occupations (the first three groups in the 1-digit ISCO coding). When grouping the first three ISCO group, the associate coefficient is highest for post-Communist countries, and statistically significant for Continental and Mediterranean countries, while irrelevant for the remaining two clusters. The correlation with family income is negative and statistically significant, even when proxying it with income terciles.[27] Conversely, we do not find consistent results when using the proxies for the financial situation: home ownership is mostly non-significant, while ability to make ends meet is positive and significant in half of the cases.

We can summarise our results by claiming that *tertiary enrolment is socially conditioned* by three order of factors:
i) the *institutional design of secondary education*, for those with a vocational degree are in a disadvantaged position;
ii) the *cultural capital of the student*[28], proxied by parental education, that does not vanish even after 11-13 years of compulsory education (not to speak of the one fifth who did not complete secondary education);
iii) *aspirations* induced by parental social status, proxied by parental occupations incorporating greater availability of financial resources.[29]

Taken at face value, our results also indicate that beyond previous factors *financial resources seem irrelevant*: family income is negatively correlated, but the order of magnitude is small (using the coefficients of the linear probability model in table A12, doubling family income reduces the probability of enrolment by 5.6 percentage points); real wealth is uncorrelated; financial easiness is positively correlated, but again the order of magnitude is low (moving from "*with great difficulty*" to "*very easily*" increases the probability of enrolment by 6.5 percentage points).

These conclusions can be reproduced when studying the overall distribution of educational attainment in an adult population who has just completed their educational career. In table 19 we estimate an ordered probit model of the educational attainment of people aged 30-35, three fourth of which has already left their family of origin. We are now forced to drop financial measure, since they are in

[27] We have also interacted family income with foreign origin, without finding statistically significant effects.
[28] According to Bourdieu (1977), children from middle class families are advantaged in educational attainment due to the possession of cultural capital which is unequally distributed according to social classes and education. In our analysis, we have operationalized cultural capital as proxied by parental education (and not social class).
[29] See the Breen and Goldthorpe 1997 model of educational choice. The debate on the role of aspirations has been revisited by Trebbels 2014.

most cases referred to the interviewees themselves: finding positive correlation between educational attainment and family income could reflect the correlation between education and earnings, associated to the accumulation of greater human capital.

Women end up more educated, while foreign-born students still experience a disadvantage in Nordic and Mediterranean countries. The stronger probability contribution emerges from parental education: using the coefficient estimated in a linear probability model in table A13 in the Appendix, having a tertiary educated parent raises the probability of completing tertiary education by 27 percentage points![30] Social origin is also captured by parental occupation: children from service classes (the first three ISCO category) are also likely to be more educated. Finally, our proxy for family wealth (parental home ownership) is now positively associated to educational attainment in almost all clusters.

Table 19 – Educational attainment – people aged 30-35 – ordered probit model – SILC 2019

VARIABLES	SILC	Nordic	Continental	Mediterranean	AngloSaxon	Post-communist
dep.variable: educationa attainment						
Pre-primary	0.91	1.24	0.8	1.34	0.29	0.83
Primary	2.12	1.31	1.57	4.11	0.43	2.09
Lower secondary	12.05	11.16	7.77	21.9	12.85	8.35
Upper secondary (vocational)	17.82	23.2	15.2	6.05	17.75	34.36
Upper Secondary (general)	18.58	9.78	17.13	28.92	14.67	14.6
Post-secondary non-tertiary	4.78	4.41	9.78	1.43	0.3	2.21
1st & 2nd tertiary	43.73	48.9	47.75	36.26	53.71	37.55
female	0.274***	0.438***	0.177***	0.296***	0.292***	0.344***
age	-0.002	0.019	-0.013	0.008	-0.018***	-0.007
born outside EU	-0.083	-0.348***	0.12	-0.328***	0.072	0.044
home ownership	0.385***	0.304***	0.348***	0.424***	0.538***	0.296***
HPO: Managers	0.671***	0.588***	0.603**	0.571***	0.460**	0.862***
HPO: Professionals	0.824***	0.567***	0.817***	0.717***	0.426*	0.915***
HPO: Technicians and Associate Professionals	0.588***	0.311*	0.590***	0.576***	0.242	0.875***
HPO: Clerical Support Workers	0.643***	0.320**	0.563***	0.464***	0.436	0.701***
HPO: Services and Sales Workers	0.291***	0.127	0.189*	0.299***	0.187	0.420***
HPO: Skilled Agricultural, Forestry and Fish	0.044	-0.178*	0.37	0.107	-0.524***	0.06
HPO: Craft and Related Trades Workers	0.218***	-0.075	0.243**	0.200***	0.041	0.271**
HPO: Plant and Machine Operators and Assembl	0.226***	-0.139	0.164	0.287***	0.031	0.277**
HPE: secondary or postsecondary	0.395***	0.317**	0.342***	0.559***	0.163	0.636***
HPE: tertiary degree	0.825***	0.791***	0.708***	0.990***	0.801***	1.262***
parent born outside EU	-0.128	0.114	-0.216	-0.036	0.043	0.184**
Observations	36 713	8 196	7 058	9 138	2 699	9 622
R^2	0.08	0.0716	0.0678	0.0995	0.0534	0.114

Robust standard errors in brackets - *** p<0.01, ** p<0.05, * p<0.1 – Constant and country fixed effects included – errors clustered at country level – weighed using sample weights - controls for imputed parental variables – HPO: highest parental occupation – HPE: highest parental education

[30] In table A13 in the Appendix we estimate a linear probability model of attained tertiary education, in order to make it comparable with the linear probability model of tertiary enrolment in table A12.

* * *

In this section of the paper, we have analysed the transition from secondary to tertiary education in a cross-country sample of European countries. Exploiting micro-data from the SILC survey conducted in 2019, we have shown that patterns of transition are rather different due to differences in home leaving ages. Given the completion of secondary education (which is not compulsory in all countries of our sample), the transition is driven by three order of factors: the existence of tracking, which translates into different probabilities in progressing toward tertiary education; the students' parental cultural capital, as proxied by the relevance of parental education in the probability of transition; the aspirations originating from the social environment where the children were raised, as proxied by parental occupation. Since parental social status, education and income tend to move together, there is correlation between family financial resources and educational choices, but once one controls for these factors, financial resources seem irrelevant or even negatively associated to educational choices.

We have also highlighted the existence of significant dropout rates in tertiary education, but cross-sectional data are unfit to study this problem. The limited evidence from our data suggests that lack of completion seems not affected by social factors.

As already discussed in this contribution, country patterns reveal significant differences: Nordic and Continental countries are characterised by a significant fraction of children attending vocational tracks, but at the same time the inequality of opportunity in enrolment (measured by the different enrolment rates by parental education) is lower, thus obtaining a higher fraction of tertiary graduate adults. On the other hand, Mediterranean countries suffer greater dropout rates both at secondary and tertiary education, and they are also characterised by a relevant impact of social origins: as a result they obtain a lower fraction of tertiary graduates. Conversely, the post-Communist countries follow the model of secondary tracked education, undergo a limited impact of social origin, but achieve a graduation rate quite similar to the Mediterranean cluster. Finally, the Anglo-Saxon are represented by only two countries (Belgium and the UK), with large missing information for the UK, and therefore are more difficult to characterise.

5. Case studies

The purpose of the case studies is to explore the dynamics of the theoretical lenses developed in the previous sections of this paper. First, we will set out the key features of each educational system and draw attention on the governance dimensions, such as school autonomy and accountability mechanisms. Second, we will trace the policy changes to secondary education in the last few decades in order to identify key policy reforms that may have effects on the education outcomes. Third, we will present the results of the qualitative data analysis in a comparative summary table.

We have retrieved and analyzed the individual country profiles from the following on-line sources: Eurydice (https://eurydice.eacea.ec.europa.eu/national-education-systems), Unesco (http://sdg4-data.uis.unesco.org/) and Education at a Glance from the OECD (https://www.oecd-ilibrary.org/education/education-at-a-glance-2023_5f0c6c28-en). We have also analyzed relevant policy reports from the European Commission, OECD PISA reports, and other reports available on-line and retrieved from the European Education Area (https://education.ec.europa.eu/). Additional sources are listed in table A.3

5.1. Sweden

Tracking and Schooling system

Sweden's education system starts with a compulsory preschool class (*förskoleklass*) for children from the age they turn six, followed by nine years of compulsory school (*grundskola*), beginning at seven and concluding at sixteen. Preschool (*förskola*), for children as young as one, is highly subsidized and utilized by more than 90 percent of children in that age group.

After **nine years of compulsory education (6890 hours)** in *grundskola*, students progress to upper secondary school (*gymnasieskola*) for three years. Upper secondary education typically spans from age 16 to 19. [31] It offers 18 national programmes and five introductory programmes (*introduktionsprogram*) for those not immediately qualifying for a national programme (e.g., immigrants learning Swedish). These 18 national programmes include 12 vocational programmes (*yrkesprogram*) and 6 higher education preparatory programmes (*högskoleförberedande* program). There is **no formal tracking** system in Sweden until the beginning of upper secondary. Graduates of *gymnasieskola* may proceed to higher education, such as universities (*universitet*), university colleges (*högskola*), or higher vocational education (*yrkeshögskola*), depending on their program and course choices. The education system is comprehensive until the beginning of upper secondary, when

[31] https://eurydice.eacea.ec.europa.eu/national-education-systems/sweden/organisation-education-system-and-its-structure

students choose between vocational education, which is weakly connected to workplaces and firms, and academic education. Both vocational and academic tracks give access to tertiary education in Sweden. Thus, there are no dead ends in the system which remains stratified to a limited extent (primarily by the academic-vocational divide in upper secondary) and selection is delayed.

National exams

Mandatory national tests (*nationella prov*) are administered to students in grade three, six, and nine to evaluate their knowledge in relation to the knowledge requirements expressed in the syllabus:[32]

Grade 3: Swedish/Swedish as a second language and mathematics.

Grade 6: Swedish/Swedish as a second language, mathematics, and English.

Grade 9: Swedish/Swedish as a second language, mathematics, English, one of the social science subjects (geography, history, religious studies, or social science), and in one of the natural science subjects (physics, chemistry, or biology)

In upper secondary education, students take national tests in one or more subjects, including English, mathematics, Swedish/Swedish as a second language, depending on the program they are studying.[33] However, in 2018, the Swedish government removed a large part of the national tests in upper secondary school to reduce the workload and stress of teachers and students.[34]

Instead, each pupil receives the *Gymnasieexamen* (upper secondary school certificate) at the end of upper secondary school education. However, there are mandatory national subject tests to assess student progress during their time in *gymnasieskola*.[35]

School autonomy and financing[36]

Sweden's education system is characterized by decentralization, where the government establishes overall goals and learning outcomes. Education from preschool to upper secondary school, along with adult education and special programs for immigrants, is managed by local municipalities (*kommuner*). The funding for these educational levels, which includes both municipal schools and grant-aided independent schools (*fristående skolor*), is primarily derived from municipal taxes. Independent schools are subject to the same curricula as public schools and are open to all students. The Swedish government sources account for 91% of total expenditure on educational institutions at all levels, from primary to tertiary education. Private funding in Sweden accounted for less than 1% of expenditure at primary, secondary, and post-secondary non-tertiary levels.

[32] https://eurydice.eacea.ec.europa.eu/national-education-systems/sweden/assessment-single-structure-education
[33] https://www.skolverket.se/download/18.49f081e1610d887500b9b/1516724888514/information-np-gy-engelska.pdf
[34] https://www.vilarare.se/nyheter/nationella-prov/lararna-fortsatter-anvanda-nationella-prov-som-inte-ar-obligatoriska
[35] https://www.schooleducationgateway.eu/downloads/files/recognition/infopack_sweden-rev.pdf
[36] See Eurydice report on Sweden. https://eurydice.eacea.ec.europa.eu/national-education-systems/sweden/overview

Sweden's secondary education reforms in the last two decades

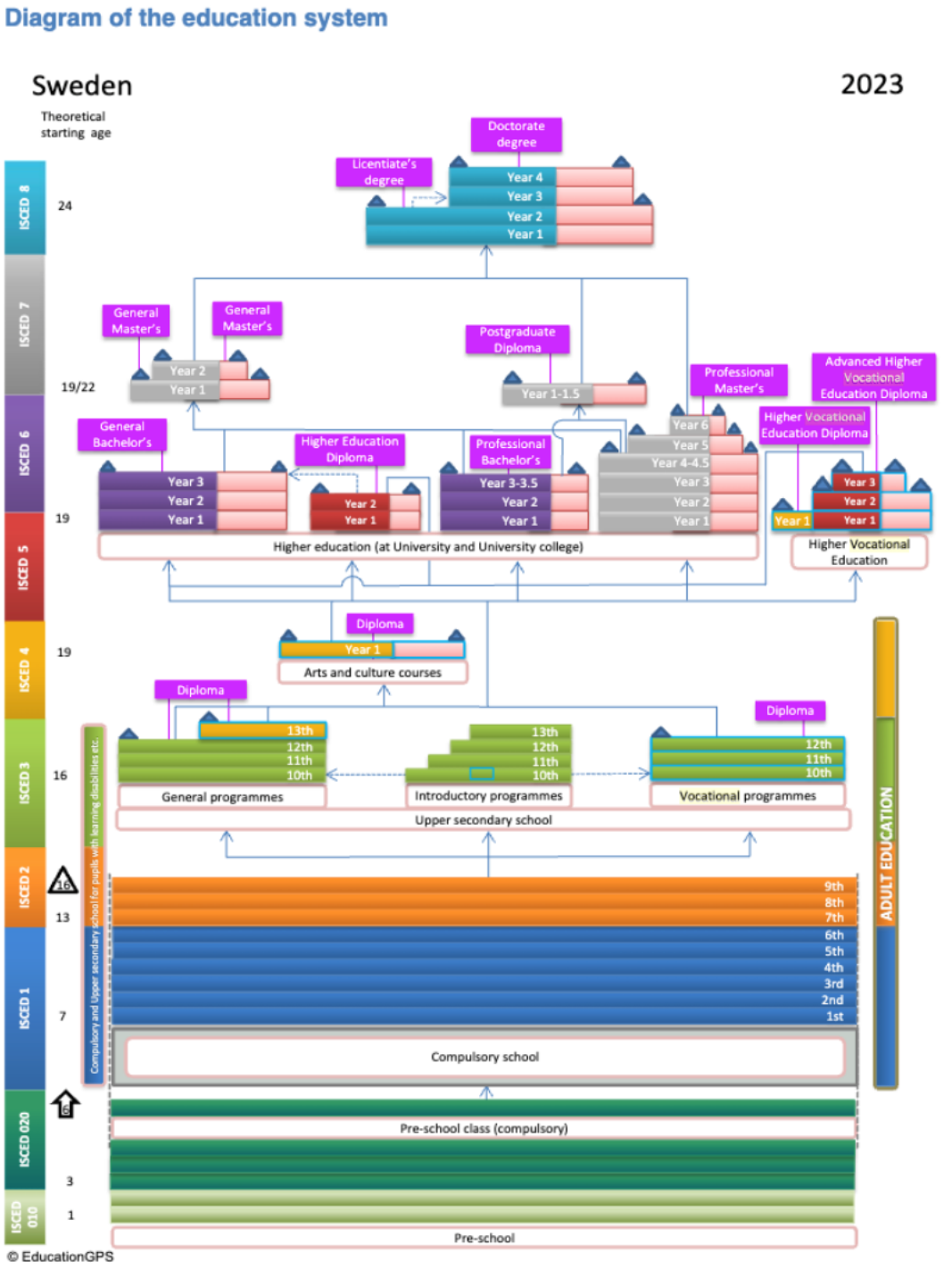
In 1992, Sweden embarked on a radical education reform program in expanding "private schools", which increased school choice through a universal voucher program.[37] The Swedish Parliament has been a key actor in implementing education reforms, and the 1992 education reform program was initiated by a center-right government. The primary objectives of implementing independent schools (*friskolor*) were to provide parents with the option to choose (Ask 1992), to enhance the quality of education through heightened competition among schools, and to achieve better value for money (West and Nikolai 2017). In 1995, the upper secondary curriculum was broadened, and the academic content of vocational tracks was increased, making them provide eligibility for university studies.[38] Before the reform, the upper secondary tracks were strongly vocationally focused, and only academic tracks provided eligibility for university studies. The reform aimed to increase the academic content of vocational tracks and make them more attractive to students. It also aimed to provide all upper secondary education with basic eligibility for university studies. This reform was part of a broader effort to increase the quality of education in Sweden and to make it more relevant to the needs of the labor market. The vocational tracks were extended by adding more academic subjects to the curriculum, such as mathematics, natural sciences, and social sciences. The academic content of the vocational tracks was increased by making them more theoretical and less practical. The reform also introduced a new grading system, which made it easier for students to transfer between different tracks and programs. In 2011, the distinctions between vocational and academic programs were reinstated.[39]

[37]https://www.iea.org.uk/sites/default/files/publications/files/Schooling%20for%20money%20-%20web%20version_0.pdf

[38] https://royalsociety.org/-/media/policy/topics/education-skills/Broadening-the-curriculum/sweden-case-study.pdf; https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1465-3435.2009.01414.x

[39] https://bera-journals.onlinelibrary.wiley.com/doi/full/10.1002/rev3.3262; https://www.tandfonline.com/doi/full/10.1080/02660830.2021.1984060

Figure 23 – Swedish educational system



Source: OECD (2023), "Sweden: Diagram of education system", OECD Education GPS, http://gpseducation.oecd.org/Content/MapOfEducationSystem/SWE/SWE_2011_EN.pdf
Please refer to "Sweden: Diagram of education system" for information on the keys.

This occurred after a liberal and right-wing coalition took office in 2006, ending a decade of social democrat leadership. The coalition initiated a public investigation into upper secondary education in February 2007, which led to a legislative proposal in 2008. By 2011, this proposal was realized as a new curriculum, reflecting partial ideological influences from the governing body, which did not

support the notion that all upper secondary programs should automatically qualify students for university entry. The 2011 educational reform introduced a more focused curriculum than the one in place from 1995 to 2010. A key aspect of this reform was that not all upper secondary programs would grant basic eligibility for university studies. Although vocational programs lost direct university eligibility, this was somewhat mitigated by expanding vocational tertiary education options accessible to all students who completed their upper secondary education. Furthermore, the reform accentuated the distinction between academic and vocational education by creating two separate upper secondary diploma types: one for vocational studies and another for university preparatory studies. This is a sort of restratification.

5.2. Germany

Tracking and Schooling system

After completing **nine years of compulsory education (7376 hours)**, which includes primary school and lower secondary school, students can choose to continue their studies in upper secondary education, which is divided into three types of schools. Early formal tracking system in Germany, which separates children by ability level starting at an early age, usually around age 10. This German education system can be partitioned into two main tracks: the general education track and the vocational education track.

The *Hauptschule* is the lowest level of the vocational education track, and it prepares students for vocational training or apprenticeships (Vocational). The *Realschule* is the intermediate level of the vocational education track, and it prepares students for vocational training or further education at a university of applied sciences (Vocational). The *Gymnasium* is the highest level of the academic education track, and it prepares students for university education (General).

In Germany, there are at least two national/central assessments at primary level, and at least two at lower secondary level. At upper secondary level, there is one national/central examination that each student may be expected to take.

School autonomy and financing

The federal government is responsible for setting the overall framework for education policy, while the 16 *Länder* (federal states) are responsible for implementing and managing education policies within their respective territories. The *Länder* have a high degree of autonomy in shaping their education systems, including curriculum development, teacher training, and school management. Regarding funding, 5% of the public funding for primary to post-secondary non-tertiary education comes from the federal government, after transfers between government levels, 70% from the

regional level, and 24% from the local level. Private funding in Germany accounted for 11% of expenditure at primary, secondary, and post-secondary non-tertiary levels.

Germany's secondary education reforms in the last two decades

After reunification in 1990, there were no significant reforms in German secondary education between 1990 and 2000. What happened in Eastern German states was less considered a reform; instead, it was a restoration of the educational structures that had been in place for so long in the Western federal states.[40] In 1992, all five East German states abandoned the previous unified education system and adopted models similar to those used in West Germany. Extensive in-service training was provided to existing teachers to familiarize them with new curricula, textbooks, and more student-centered teaching methods. Although an enormous amount of upward 'movement' between the different school types in Germany has taken place during the 1990s and 2000s, social inequalities in access to different kinds of upper secondary careers have not changed.[41] In 2000, to delay early tracking, different *Länder* have adopted one or a combination of the following strategies:

a) postponing tracking from the age of 10 to 12 (e.g. Berlin, Brandenburg);

b) merging the two lower-level tracks (*Realschule* and *Hauptschule*) into one school and improving the quality of education in these tracks;

c) facilitating transitions between different tracks, including between academic and vocational tracks.

In 2004, the National Pact for Career Training and Skilled Manpower Development in Germany, which was extended until 2014, was initiated to offer in-company training and additional efforts from the public sector in vocational education and training. This initiative expanded by involving new partners, including the Standing Conference of Ministers of Education and Cultural Affairs (*Kultusministerkonferenz*, KMK), and the Federal Government Commissioner for Migration, Refugees, and Integration. Objectives include enhancing the readiness of students in two streams of lower secondary schools (*Hauptschule* and *Realschule*) and providing young people in the transition system with qualification opportunities that lead to career prospects.In 2004, the 1981 Vocational Training Promotion Act and the 1969 Vocational Training Act were completely reformed and merged in the Vocational Training Reform Act entered into force on 1 April 2005. [42]

The reform seeks to protect and enhance training opportunities while maintaining a high standard of vocational training accessible to all young individuals, regardless of their social or regional circumstances. The updated vocational training legislation grants increased flexibility and authority

[40] https://www.tandfonline.com/doi/abs/10.1080/03054980120113625
[41] https://www.tandfonline.com/doi/full/10.1080/03054985.2011.559349?scroll=top&needAccess=true
[42] https://www.cedefop.europa.eu/files/5173_en.pdf

to the relevant federal, state, and local authorities. The functions of the Federal Institute for Vocational Education and Training have been re-defined accordingly.

In 2007, the National Integration Plan (2007) was created to improve equity and boost participation and success of students from disadvantaged backgrounds. This was in collaboration with civil society stakeholders, transformed into the National Action Plan on Integration (NAP-I) (2011). Germany's overarching Qualification Initiative "Getting ahead through education" (*Aufstieg durch Bildung*) operated from 2008 to 2015 and then was superseded by several programs on the federal and *Länder* levels.[43]

The objectives corresponding to upper secondary education and beyond include: 1) increasing the number of students in academic and vocational education; 2) making vocational education more attractive; 3) facilitating transfer opportunities between VET and academic education; and 4) improving equity and access to education, such as immigrants

According to the 2015 report on implementation of the Initiative, the targets were about to be reached or had already been surpassed.[44] For example, the target of increasing the participation rate in additional training to 43% from 2006 to 2015 was surpassed in 2014, with a record high of 51%. The number of young people without vocational education dropped to 13.8% in 2013, and the number of women in STEM careers is increasing.

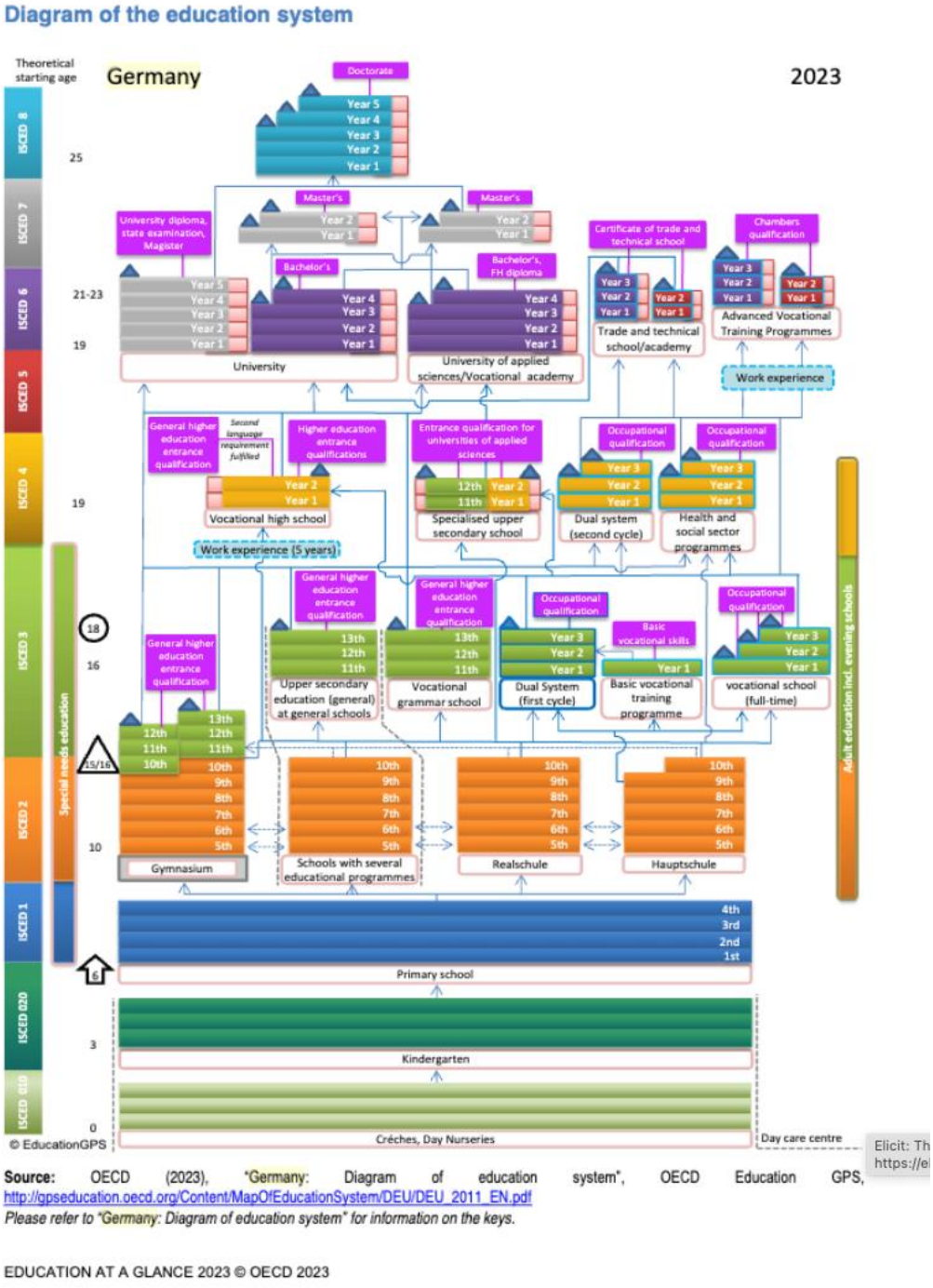
In 2010, the Education Chains initiative provides preventive support, starting at grade 7 with a vocational orientation program, to create job prospects, avoid early dropout and ensure a better transition into VET and into the labour market. VerA, a program within the framework of Education Chains, was created to prevent dropout in vocational education. The experienced older people are engaged to provide guidance to young people. Also in 2010, the Support Strategy for Low Achieving Students (*Förderstrategie für leistungsschwächere Schülerinnen und Schüler*, 2010) aims to increase the share of students reaching minimum proficiency by the end of secondary education.

The *Länder* implemented a range of initiatives focused, among others, on personalized support, facilitating transitions, collaboration with other actors, and quality assurance and research. In 2011, Germany allocated a total of EUR 250 million for the federal funding program, Advancement through Education: Open Universities (*Aufstieg durch Bildung: offene Hochschulen*, 2011) from 2011 to 2020. The program seeks to improve transfer opportunities between VET and academic education, and accelerate the transfer of new knowledge into practical applications.[45] Also, an information

[43] https://read.oecd-ilibrary.org/education/education-policy-outlook-2018/germany_9789264301528-20-en
[44] See www.kmk.org/fileadmin/Dateien/veroeffentlichungen_beschluesse/2015/2015_00_00-Bericht-Qualifizierungsinitiative.pdf; www.bmbf.de/de/fluechtlinge-durch-bildung-integrieren.html
[45] https://doi.org/10.1787/2b8ad56e-en

campaign (2011-13) was also launched to increase the attractiveness of dual VET and further occupational training.

Figure 24 – German educational system



Source: OECD (2023), "Germany: Diagram of education system", OECD Education GPS, http://gpseducation.oecd.org/Content/MapOfEducationSystem/DEU/DEU_2011_EN.pdf
Please refer to "Germany: Diagram of education system" for information on the keys.

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In 2014, the German federal government announced a new Education Offensive in the Digital Agenda (2014-17). [46] Within this strategy, the DigitalPact Schools (*DigitalPakt Schule*) was established to enhance digital education across all levels of schooling, preparing for future digital challenges and

[46] https://www.bmbf.de/bmbf/de/bildung/berufliche-bildung/berufliche-bildung_node.html; https://bwinf.de/jugendwettbewerb/

bolstering technical infrastructure interoperability. Additionally, the vocational training initiative (*Berufsbildung* 4.0) focuses on modernizing occupational profiles and promoting the use of digital media in vocational training. To foster student interest in programming, the Youth Informatics Competition (*Jugendwettbewerb Informatik*) was inaugurated in 2017. In 2017, Germany adopted the resolution titled 'Vocational Schools 4.0 - Advancing the Innovation and Integration Capabilities of Vocational Schools in Germany for the Next Decade. [47] The *Länder* have established an action framework aimed at equipping vocational schools for forthcoming challenges. This framework involves bolstering innovation through increased international and employer collaboration, promoting effective integration into vocational education and training (VET) for all demographic groups, and enhancing language training and personalized support.

5.3. Poland

Tracking and Schooling system

Compulsory education **(5245 hours)** starts at age 6 and continues until age 15. Students typically graduate at age 19 from general upper secondary programs. The age range for completing vocational programs is wider, typically between 19 and 20. Poland has a formal tracking system. After an 8-year primary school, students take a high-stake exam influencing students' educational and/or vocational paths. Students choose 4-year general secondary school (*liceum ogólnokształcące*) and 5-year technical secondary school (*technikum*). Poland also has sectoral vocational school track, 3-year Stage I (*Branżowa Szkoła I Stopnia*) and 2-year Stage (*Branżowa Szkoła II Stopnia*). Both general secondary schools and vocational schools end with a maturity exam, known as *matura*

School autonomy and financing

The Polish educational system funding is allocated between Primary Education (27%), Lower Secondary Education (24%), Upper Secondary Education (20%), Post-Secondary Non-Tertiary Education (1%) and Bachelor's, Master's, and Doctoral or Equivalent Programs (28%). In Poland, 4% of the public expenditure on primary to post-secondary non-tertiary education comes from the central government, 2% from the regional level, and 95% from the local level after transfers between government levels. Private funding accounted for 11% of expenditure at primary, secondary, and post-secondary non-tertiary levels.

Poland's secondary education reforms in the last two decades

[47] https://www.kmk.org/fileadmin/user_upload/Erklaerung_Berufliche_Schulen_4.0_-_Endfassung.pdf

In 1999, the Central Examination Board (CEB) and eight Regional Examination Boards (REBs) were established with the task of developing standards for examination requirements (in the case of the CEB) and to administer external examinations and tests (in the case of REBs) at the primary and secondary levels. In January 8th, the Act on the Implementation (and subsequent amendments) provided for the introduction of the new structure of the school system.

In 2008, the Ministry of National Education revised the national core curriculum for both general education and school vocational training programs.[48] The updated curriculum shifted from specific subject-related requirements to a greater emphasis on broader, cross-cutting skills. Accordingly, the focus of examinations shifted from assessing knowledge to evaluating more generalized skills. Notably, the new curriculum framework for general education established uniform program requirements for the first year of all upper secondary schools, whether vocational or general (ISCED 3). The 2008 reform also granted schools increased autonomy in designing their programs instead of solely relying on programs and textbooks approved by the ministry. School principals were given flexibility in managing the allotted instructional time for subjects within the curriculum framework, provided that they ensure the achievement of the outcomes specified in the national curriculum.

In 2009, the entry age to primary education was lowered from 7 to 6. In 2011, with the Amendment to the School Education Act (*Ustawa o systemie oświaty*), early childhood education became compulsory for 5-year-olds. Also in 2011, substantial expansions were made to the scholarship system with the goal of boosting tertiary enrolment among students from low-income backgrounds. The distribution between merit-based and income-based grants shifted in favour of income-based grants, and the income threshold for eligibility to receive a maintenance grant was raised by 30%.

In 2014, the Minister of National Education designated the 2014/15 school year as the 'Year of VET Professionals' (*Rok Szkoły Zawodowców*). Key aspects of the program encompass:[49]

a) Advance vocational education and training (VET) through strategic media campaigns aimed at changing the perception of VET from a 'secondary choice' to a valued education pathway.

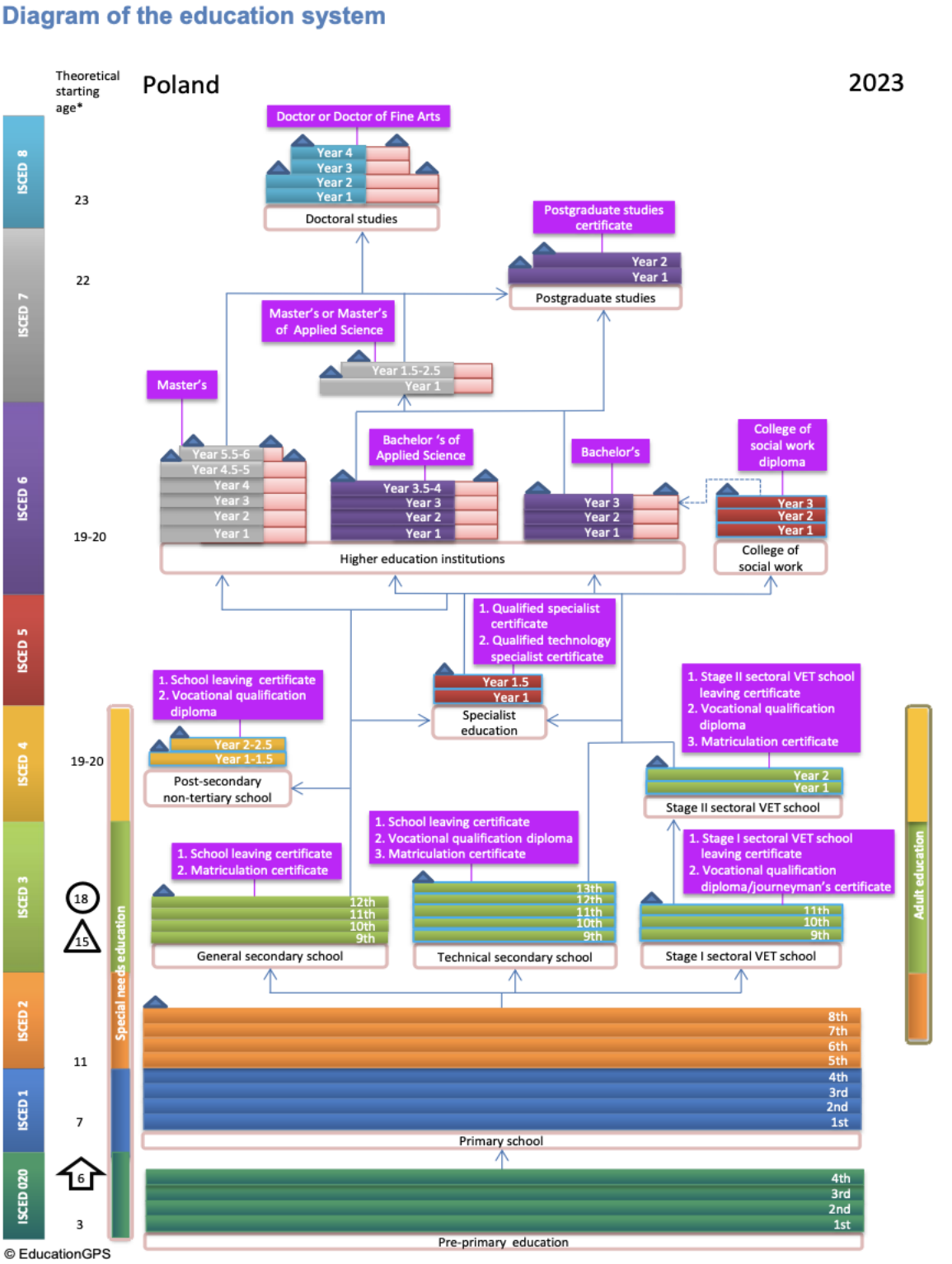
b) Facilitate collaboration between employers and the Ministry of Education to enhance professional opportunities and align skill offerings with labour market demands.

c) Establish a fund for employers to support the cost of vocational programs for young individuals and bolster career guidance and counselling services for VET students.

[48] https://doi.org/10.1787/9789264225442-en

[49] https://www.prawo.pl/kadry/rusza-rok-szkoly-zawodowcow,279798.html

Figure 25 – Polish educational system



Source: OECD (2023), "Poland: Diagram of education system", OECD Education GPS, http://gpseducation.oecd.org/Content/MapOfEducationSystem/POL/POL_2011_EN.pdf
Please refer to "Poland: Diagram of education system" for information on the keys.

In 2015, there was the Four-Party Agreement between the Ministries of Economy, Education, Treasury, and Labour to promote VET and provide support, including measures for employers

involved in VET within special economic zones.[50] In 2016, Poland enacted a major education reform despite opposition from teachers, pupils, and parents.[51] The Polish Teachers' Union opposed the reforms, and tens of thousands of teachers, pupils, and parents rallied in Warsaw against them. The protestors were concerned about the proposed changes to the school curriculum, including the inclusion of "patriotic values" espoused by the ruling Law and Justice (PiS) party. Critics said the government proposal was drafted in haste and had many flaws that would result in a poorly devised new curriculum. The 2016 reform saw a return to the former two-tier system, with a focus on vocational training (re-stratification).[52] The length of compulsory comprehensive education was expanded from 8 to 10 years, and general education started at the age of 7.

The 1999 three-level system of compulsory education was organized on the basis of five years of primary school, three years of middle school and three to four years at high school, technical high school or general vocational school. The two-level system that will replace it comprises:

1) eight years at primary school. Primary school education was extended from 6 to 8 years, and there was an external examination after primary school;

2) four to five years at high school, technical high school or vocational school.

Learning in general secondary schools (*licea ogólnokształcące*) lasted 4 instead of 3 years, and upper secondary technical schools had a 5-year curriculum instead of 4 years

A student's time at vocational school will be subdivided into two stages of three years and a further two years. The new style vocational school (*szkoła branżowa*) is intended to emulate the German dual education system. This will combine students' classroom study with a minimum 50% of hands-on learning.

5.4. Italy

Tracking and Schooling System

Education at all levels is in Italy a public state system. **Compulsory education starts at 6 and lasts for 10 years**. Everyone in Italy has the right to receive at least 12 years of education or until they have obtained a three-years vocational qualification by the age of 18. The first cycle includes primary education and lower secondary (that starts at 11 years old). There is no exam to transition from primary to lower secondary. The second cycle of education starts at the age of 14 and is divided in two tracks: upper secondary education and the regional vocational training system.

[50] https://www.pcen.gda.pl/serwisy-tematyczne/szkolnictwo-zawodowe-6/wiadomosci-szkolnictwo-zawodowe/rok-szkoly-zawodowcow-wiadomosci/

[51] See https://www.dw.com/en/thousands-of-teachers-in-poland-protest-government-education-reforms/a-36452228

[52] See the ESPN Flash Report “Changes in the education system in Poland) https://ec.europa.eu/social/BlobServlet?docId=17891&langId=en

Upper secondary education lasts for 5 years and is divided in three different streams: the general academic stream (*liceo*), technical education (*istituti tecnici*), and the vocational stream (*istituti professionali*). All the different streams give access to higher education. The regional vocational training system (*istruzione professionale*) provides three or four years vocational programmes. At the end of these programmes, students achieve a qualification that does not give them access to universities, but only in few cases after competence-levelling courses to ITS Academies (Higher technological institutes).

Tertiary education in Italy comprises three main groups of educational institutions: universities, institutes of the higher education for fine arts and music, Higher Technological Institutes. Vocational and Training programmes are popular in Italy, but educational outcomes remain below the OECD average (OECD, Education at a Glance, Italy Country Report, 2023). The share of students in the age group 15-19 years old, enrolled in upper secondary education VET programmes, in Italy is 40%. The share of students in the same age groups enrolled in general upper secondary education is 37% (Education at a Glance, 2023)

Employment rates of VET programmes are the lowest across Europe. In Italy, these programmes face significant challenges in facilitating the transition of students into the labour market. Employment rates of VET graduates one to two years after graduation are the lowest across the OECD with 55%. Similarly, NEET rates of 15-34 year-olds with a vocational attainment are 28.1%, well above the rate of 12.0% for their peers with general upper secondary or post-secondary non-tertiary attainment and also substantially above the OECD average of 15.2%. In Italy, 79% of general upper secondary students, but only 55% of vocational upper secondary students complete their programme on time.

School autonomy and financing

Public funding of education in Italy, primary to tertiary, amounts to 4,2% of GDP, which is below the OECD average (5,1%). The majority of primary and secondary schools are directly financed by the state. There are also government-dependent private schools (*scuole paritarie*) that receive state contributions. The State has the legislative competence to decide on minimum standards of education, school staffing, quality assurance and financial resources. The Ministry of Education and Merit is the central executive department based in Rome. The Italian education system is centralised, though the Ministry has filed regional offices (*Uffici scolastici regionali).* Italian regions have exclusive responsibility in the organisation of regional vocational education and training system.

Schools in Italy have a high degree of autonomy in so far as they can decide upon fraction of curricula, the organisation of teaching and school times. Every three years, schools have to draw up a 3-year educational offer plan.

Italy's secondary education reforms in the last two decades

The OECD Education Policy Outlook for Italy (2017) identifies three major policy challenges for the education system. They are: High drop out rates; Marked regional differences in educational outcomes; Teachers do not have career prospects because career progression is based on seniority. The teaching career system offers only a single career pathway, with fixed salary increases based solely on seniority. Italian teachers' statutory salary levels are lower than the OECD average at every career stage. It remains quite difficult in Italy to attract the best-qualified graduates into the teaching profession.

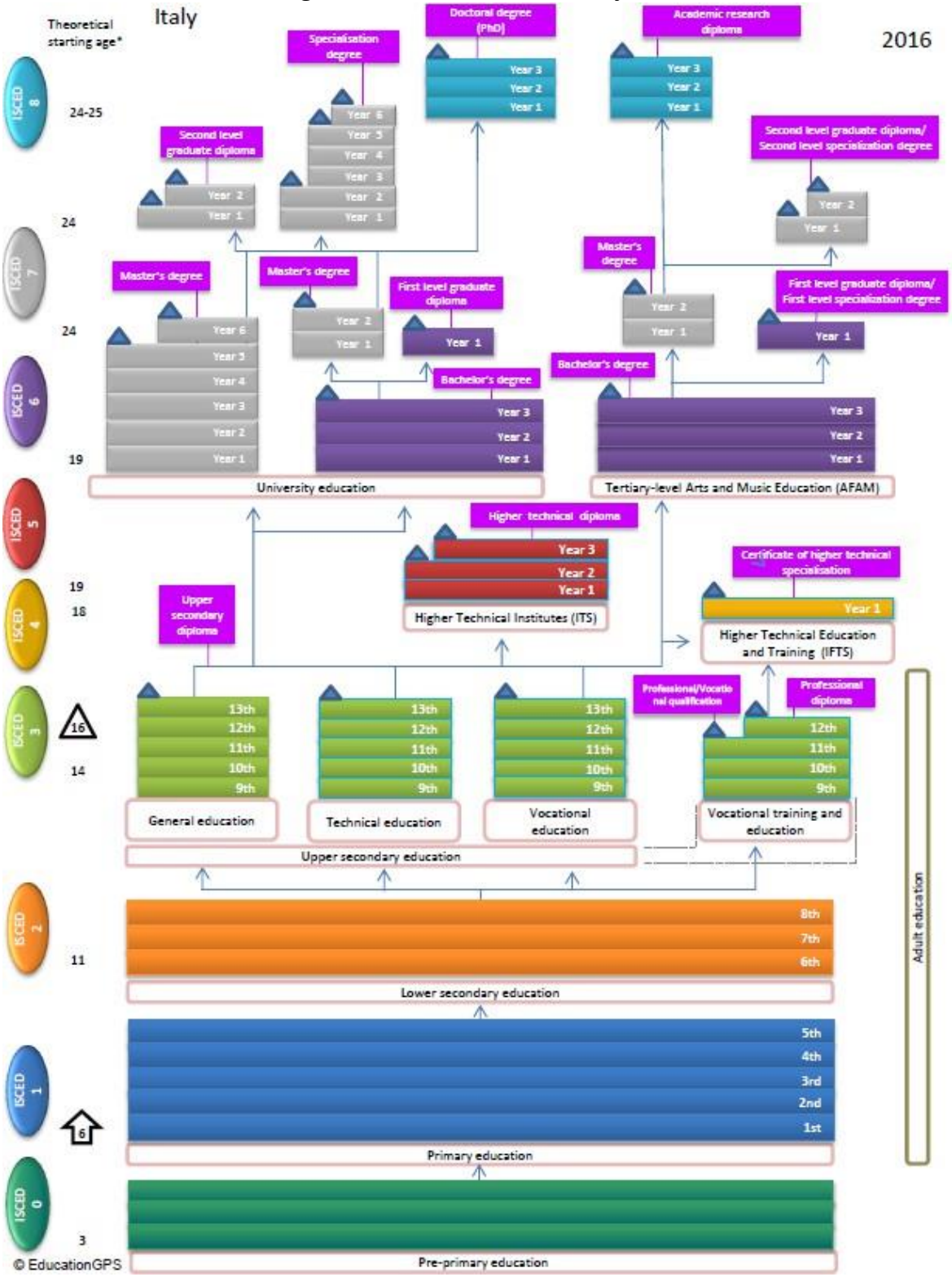
Education attainment rates in Italy are below the EU average. The tertiary education attainment rate for the age group 30-34 year-olds is the lowest in the EU (25.3% in 2014). The early school-leaving rate (14.7% in 2015) remains well above the EU average (11%).

Italy invests 4.2% of its GDP into education from primary to tertiary level. General government expenditure on tertiary education in Italy was among the lowest in the European Union, at only 0.4% of GDP and 0.7% of total general government expenditure in 2013 (2016 European Semester Country Report: Italy). Major cuts to overall public funding for higher education took place between 2009 and 2013. The framework for allocating public funding has significantly improved over the last few years. The share of performance-related funding to tertiary education institutions is on an increasing trend and reached 20% of total funding in 2015. In 2021, the share of public expenditure on tertiary education institutions is 1.5% of GDP, still one of the smallest among OECD countries (rank 43/46).

Recent key policy reforms include *The Good School Reform* (*La Buona Scuola* - Law 107/2015). This is a broad ranging reform adopted by the Renzi Government in 2015. It includes measures to increase school autonomy, and it introduces a merit-based component to teachers' salaries. The aim was to improve schools' accountability mechanisms. The school reform also strengthened vocational education and training in upper secondary schools and vocationally-oriented tertiary education. Traineeships became compulsory for students in the last three years of upper secondary education.

One of the most innovative parts of the reform was the merit-based component of teacher salaries and associated evaluation (Checchi and Mattei, 2021). A minimal part of teachers' salaries was based on performance criteria to be established by school-level teacher evaluation committees.

Figure 26 – Italian educational system



Source: OECD (2012-13), "Italy: Overview of the education system*", OECD Education GPS,* http://gpseducation.oecd.org/Content/MapOfEducationSystem/ITA/ITA_2011_EN.pdf.

The reform included financial resources for teachers' development**.** A national plan with a financial resource package of well over EUR 1.5 billion was launched for 2016-19, with the following national priorities: development of system skills (in school autonomy, evaluation and innovative teaching);

21st century skills (such as foreign languages, digital skills and school-work schemes); and skills for inclusive schooling. With regards to school autonomy, the Good School Reform gave school leaders greater freedom to manage their financial, technological and human resources. School heads were expected to be evaluated *every year* during their three-year contract, but this provision has not yet been implemented.

The National Agency for the Evaluation of the University and Research system *(Agenzia Nazionale della Valutazione della Ricerca*) was established in 2011. It introduced research assessment exercises of higher education institutions and it has increased the meritocracy in Italian research. The 2014 EU-funded National Operational Programme (PON 2014-2020), *Per la Scuola: competenze e ambienti per l'apprendimento,* introduced measures to improve education equity, quality, lifelong learning and other broad ranging aspects of education in Italy.

5.5. United Kingdom

Tracking and Schooling system

In the United Kingdom, compulsory school age ranges from 5 to 16 years, although children often enter the school system at the age of 4. In England, young people between 16 and 18 are obligated to either be in full-time education, apprenticeship or training, or engage in a minimum of 20 weekly hours of work or volunteering if in part-time education or training. In the entire United Kingdom, post-16 secondary education is guaranteed but not mandatory.

The stages of the education system in the four countries of the United Kingdom (England, Northern Ireland, Scotland, and Wales) are essentially the same until the end of the lower secondary cycle. In the primary education cycle, which spans from 5 to 10/11 years (11/12 in Scotland), students are grouped based on their age, and progression is generally automatic. Pupils with lower performance are not required to repeat the year; instead, additional support is offered. In England and Wales, pupils undergo statutory tests, but the results do not affect their access to secondary education.

In England, Wales, and Northern Ireland, the lower secondary education cycle begins at the age of 11 and lasts for 5 years, divided into Key Stage 3 (from 11 to 14 years) and Key Stage 4 (from 14 to 16 years). Generally, there are no restrictions on admission to lower secondary education institutions, with the exception of grammar schools in England and Northern Ireland and some secondary schools in England, which apply selection criteria based on students' abilities. Similar to primary education, pupils progress according to their age. At the end of Key Stage 4 (at the age of 16), students take a series of tests to obtain: GCSE qualifications; vocational and professional non-GCSE qualifications, as well as entry-level qualifications less demanding than GCSE, are also available. At this point, students can decide whether to pursue a path of general or vocational education. Admission criteria

for the two paths are defined by the school institutions and are generally expressed in terms of GCSE qualifications. The path of general upper secondary education can last one or two years, at the end of which students take tests to obtain AS and A-level qualifications for individual subjects. The vocational upper secondary education path typically lasts two years, after which students receive recognized technical qualifications. Qualifications from both paths allow access to higher education, both university and technical or short-cycle, provided candidates meet the admission requirements set by Higher Education Institutions.

In Scotland, the secondary education cycle begins at the age of 12. Secondary education institutions generally do not impose admission restrictions based on abilities. In the fourth year, students can decide whether to follow a path of general or vocational education in the next two years. At the end of the general education path, lasting one or two years, students take the test to obtain qualifications, Higher and Advanced Higher, which allow access to university. At the end of the vocational education path, also lasting one or two years, students obtain qualifications that do not allow them to access university but to higher technical or professional education courses lasting one or two years. The two-year Higher National Diploma technical qualification allows access to university.

School autonomy and financing

In Northern Ireland, Wales, and Scotland, education policy competencies lie with the devolved government. England, however, does not have a devolved government and the central government has competence over education policies. In summary, in England, there are essentially two types of state-funded secondary education institutions (some of which, like grammar schools or faith schools, have specific characteristics). Maintained schools are funded by the central government through local authorities and are required to follow the National curriculum, which outlines a series of minimum requirements that must be included in the educational offering. Academies, on the other hand, are funded directly by the central government, have complete financial and curriculum autonomy, and are not required to adhere to the national curriculum. In Northern Ireland, Wales, and Scotland, primary and secondary education institutions enjoy broad autonomy, within the framework of their respective national curricula.

In the United Kingdom, universities are private institutions, albeit government-dependent, and historically maintain a high degree of autonomy regarding financial management, admission criteria, and curriculum definition. University funding occurs through separate lines for teaching and research by the central government in England and by local governments in Scotland and Wales; in Northern Ireland, local government finances both research and teaching. In the United Kingdom, but to a lesser

extent in Scotland, student tuition fees are playing an increasingly significant role as a source of university funding.

Qualifications, certificates, and degrees

In the United Kingdom, qualifications, certificates, and degrees are not awarded by the state but by independent authorities called awarding organizations. The state plays a regulatory role, recognizing bodies capable of awarding these titles. At the lower secondary education level, and thus at the age of 16, in England, Northern Ireland, and Wales, there are three main types of qualifications:

- **General Certificate of Secondary Education (GCSE)**, single-subject qualifications that include mandatory subjects like English, Math, or science, and other optional subjects.
- **Non-GCSE qualifications**, covering technical, professional, practical, and vocational subjects.
- **Entry-level qualifications**, which are less demanding and are meant to encourage students to progress to higher-level awards.

At the general upper secondary education level, in England, Northern Ireland, and Wales, there are **AS and A qualifications**, equivalent to the Scottish **Higher and Advanced Higher**, respectively. These qualifications are made comparable through equivalence scales such as the UCAS Tariff, which assigns a point value to the qualification of each subject, depending on the type and grade; these scores are often used to determine university access. Many upper vocational secondary education courses are recognized for calculating the score. The state grants universities and other higher education institutions the degree-awarding power. There are four types of degree-awarding power. From the lowest, they allow: 1) recognition of short-cycle higher education qualifications (ISCED 5); 2) recognition up to a bachelor's degree (up to ISCED 6); 3) recognition up to master's degree and postgraduate diplomas and certificates (up to ISCED 7); 4) recognition of research doctorates or equivalent (ISCED 8).

United Kingdom's education reforms in the last two decades

Reforms of the English education system have been numerous and profound. Among the most significant are:

- The 1998 devolution, which recognized the national parliaments and governments of Scotland, Northern Ireland, and Wales to legislate on education matters.

- The reform of the national curriculum in England (2014), the introduction of Scotland's Curriculum for Excellence (2004), Curriculum for Wales (2022), and the review of the Northern Ireland Curriculum (2010).
- Some reforms that led to the creation of Academies (2000) and Free Schools (2010) in England.
- The 2015 reform of the GCSE.

The reforms of post-16 qualifications in the 2010s.

Figure 27 – England educational system

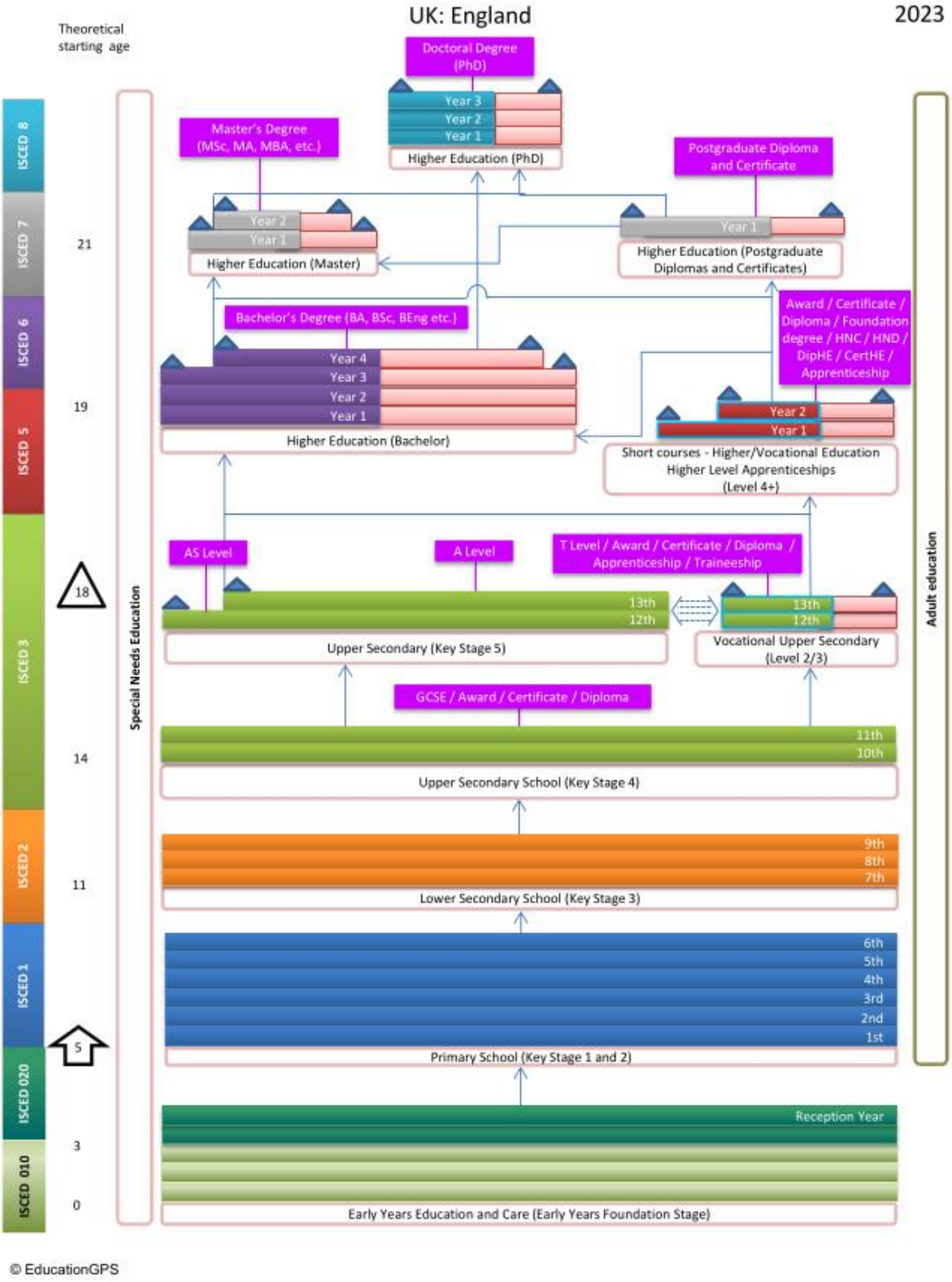


Figure 28 – Northern Ireland educational system

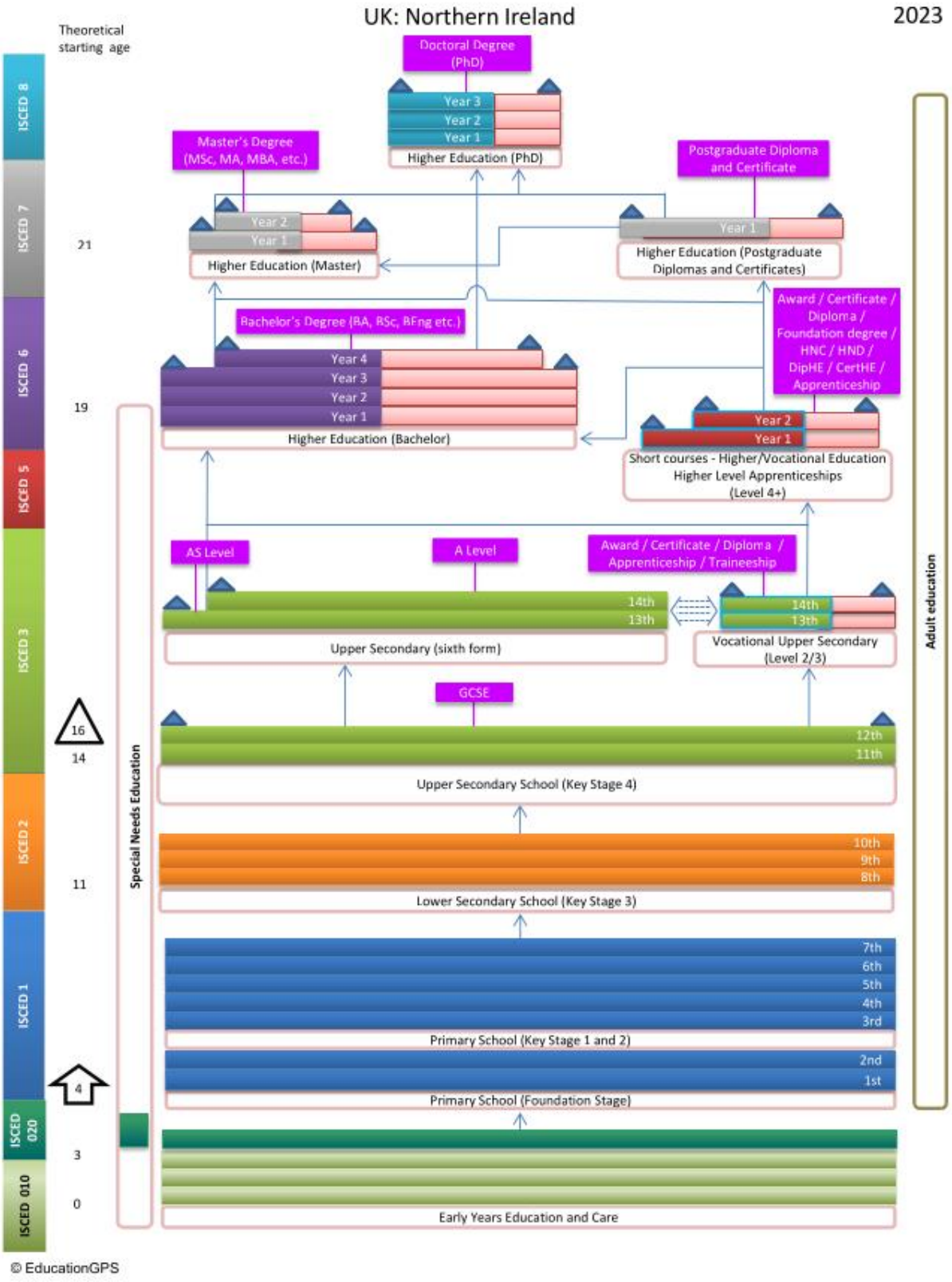


Figure 29 – Scotland educational system

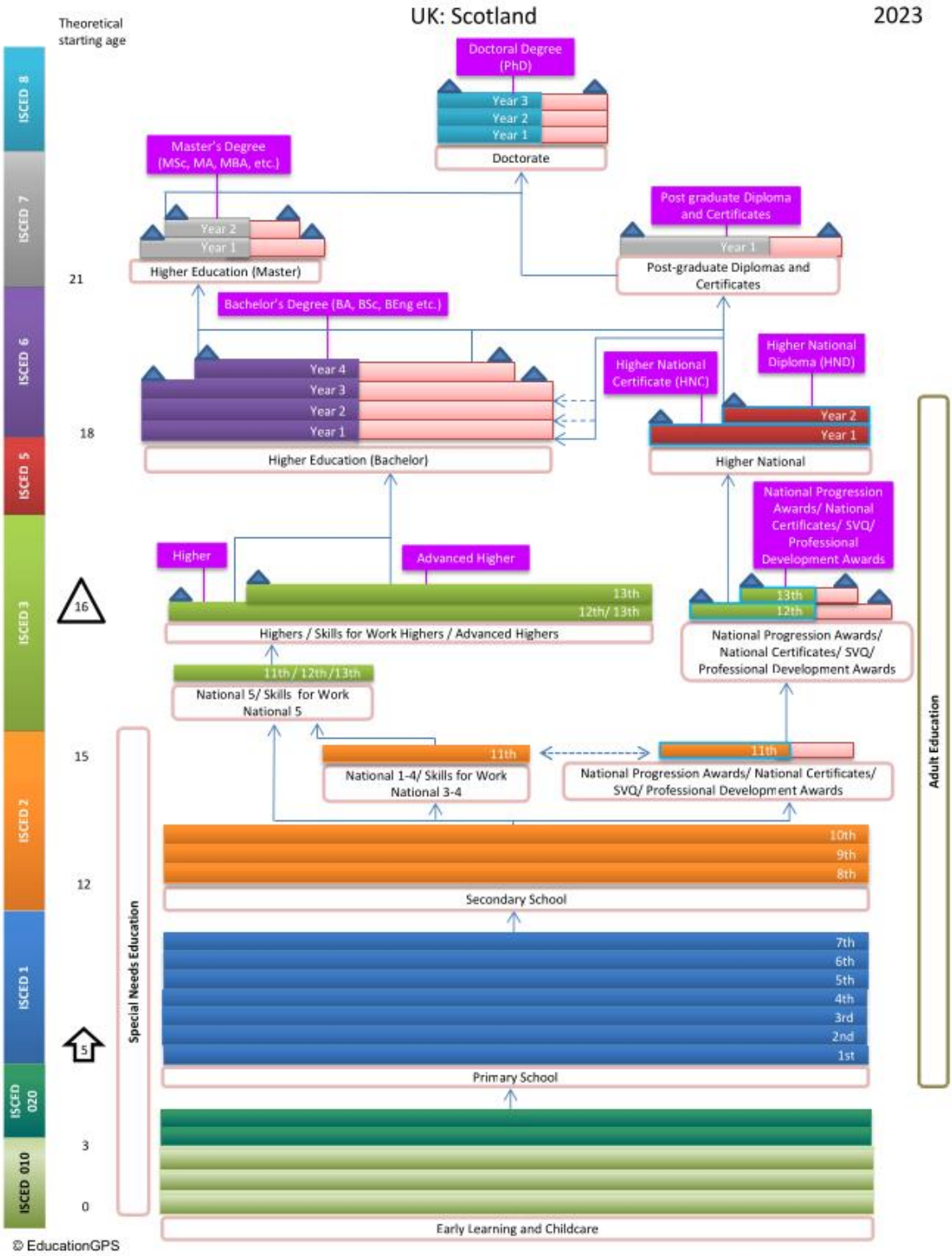
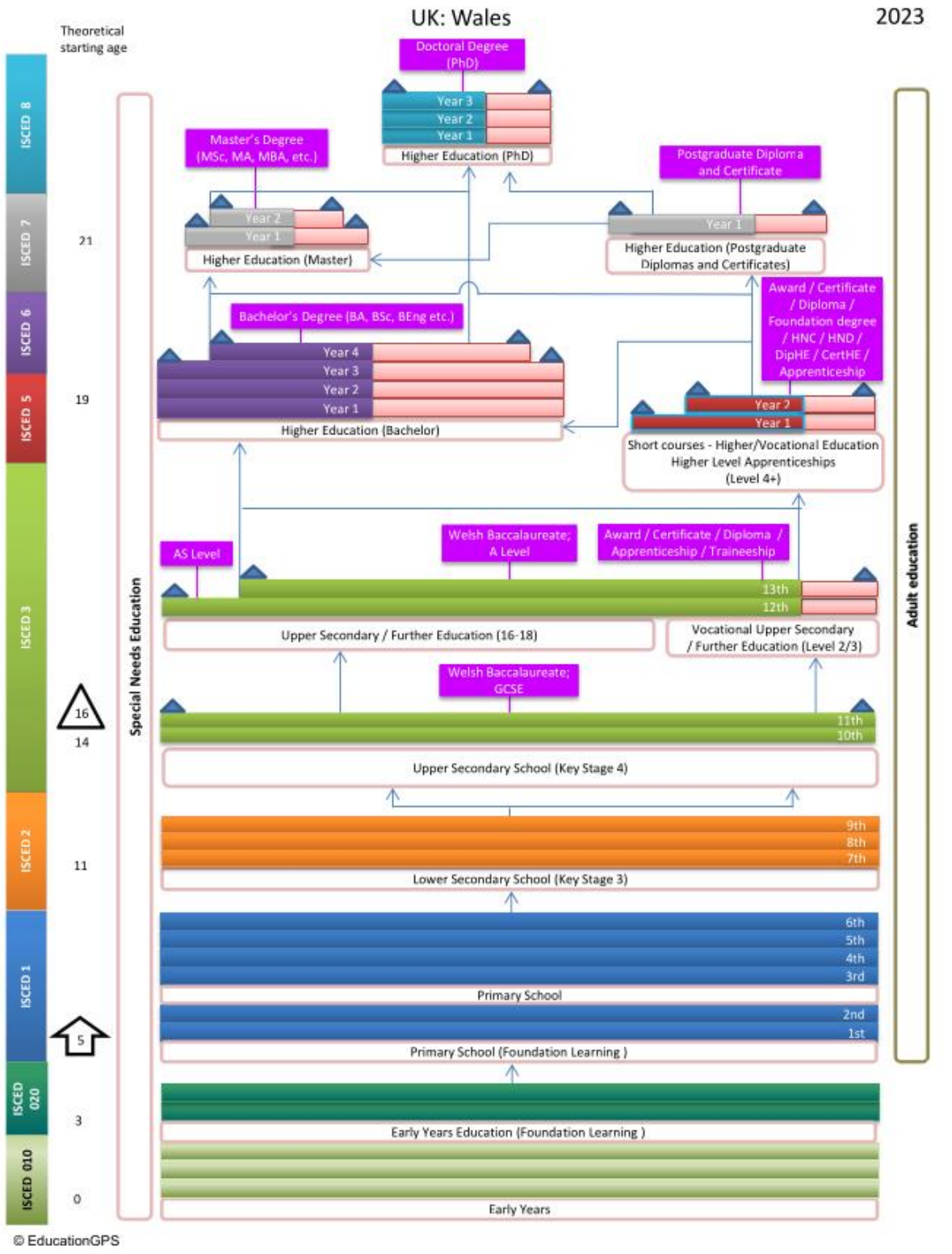


Figure 30 – Wales educational system



Source: OECD (2023), "United Kingdom: Diagram of education system", OECD Education GPS, http://gpseducation.oecd.org/Content/MapOfEducationSystem/GBR/GBR_2011_EN.pdf
Please refer to "United Kingdom: Diagram of education system" for information on the keys.

The Table 20 summarizes the key differences across the five case studies along selected key dimensions:

Table 20 – School system indicators

	GERMANY	POLAND	SWEDEN	ITALY	UK
SCHOOL SYSTEM					
Education spending per student (USD)[a]	Primary: 11.587 Secondary: 15.614 Tertiary: 20.760	Primary: 11.872 Secondary: 8.485 Tertiary: 14.488	Primary: 13.997 Secondary: 13.902 Tertiary: 26.215	Primary: 12.008 Secondary: 10.569 Tertiary: 12.663	Primary: 12.513 Secondary:13.695 Tertiary: 29.534
Private spending on education (as % of GDP)[b]	Primary to post-secondary non tertiary: 0,39 Tertiary: 0,18	Primary to post-secondary non tertiary: 0,28 Tertiary:0,25	Primary to post-secondary non tertiary: 0,01 Tertiary:0,18	Primary to post-secondary non tertiary : 0,16 Tertiary: 0,32	Primary to post-secondary non tertiary: 0,55 Tertiary: 1,48
Skills specificity (share of students enrolled in general vs vocational programmes)[c]	Lower secondary: Gen 97% Voc 3% Upper secondary: Gen 51% Voc 49% Post-secondary Non tertiary: Gen 6% Voc 94%	Lower secondary: Gen 99,55 Voc 0,45 Upper secondary: Gen 47 Voc. 53 Post-secondary Non tertiary: Gen 0,0 Voc 100	Lower secondary: Gen 100 Voc 0,0 Upper secondary: Gen 64 Voc. 36 Post-secondary Non tertiary: Gen 26 Voc 74	Lower secondary: Gen 100 Voc 0,00 Upper secondary: Gen 47 Voc 53 Post-secondary Non tertiary: Gen 0.0 Voc 100	Lower secondary: Gen 87 Voc 13 Upper secondary: Gen 60 Voc 40 Post-secondary Non tertiary: Not applicable.
Institutional stratification and age at which decisions are made[d]	Early formal tracking at the age of 10	Formal tracking system at the age of 16	Formal tracking at the age of 16	Formal tracking at the age of 14	Formal tracking at the age of 16
Student enrolment in public and private schools (by School Types)[e]	Enrolment by type of school: State: 96,1% State-dependent private: 3,4% Private: 0,6%	Enrolment by type of school: State: 95,5% State-dependent private: 3,6% Private: 0,9%	Enrolment by type of school: State: 80,7% State-dependent private: 19,2% Private: 0,1%	Enrolment by type of school: State: 96,4 State-dependent private: 1,7 Private: 1,9	Enrolment by type of school: State: 34,0 State-dependent private: 59,8 Private: 6,2
Frequency of using standardized tests[f]	Share of students assessed through mandatory standardized tests at least once a year: 60,3%	Share of students assessed through mandatory standardized tests at least once a year: 55,6%	Share of students assessed through mandatory standardized tests at least once a year: 100%	Share of students assessed through mandatory standardized tests at least once a year: 95,7%	Share of students assessed through mandatory standardized tests at least once a year: 95,4%
School autonomy (Index for Curriculum and Resources)[g]	Index value of school responsibility for:	Index value of school responsibility for:	Index value of school responsibility for:	Index value of school responsibility for:	Index value of school responsibility for:
	Curriculum: - Public schools: 1,36 - Private schools: 1,83	Curriculum: - Public schools: 2,12 - Private schools: 3,33	Curriculum: - Public schools: 1,77 - Private schools: 2,64	Curriculum: - Public schools: 3,47 - Private schools: 3,88	Curriculum: - Public schools: 4,10 - Private schools: 4,38
	Resources: - Public schools: 0,47 - Private schools: 0,52	Resources: - Public schools: 1,36 - Private schools: 5,32	Resources: - Public schools: 3,16 - Private schools: 6,90	Resources: - Public schools: 0,80 - Private schools: 6,38	Resources: - Public schools: 3,47 - Private schools: 4,56

Data source: Authors' elaboration based on: [a] OECD (2023), Education at a glance, indicator FIN_PERSTUD, year 2020. [b] OECD (2024), Private spending on education (indicator) doi: 10.1787/6e70bede-en (Accessed on 16 February 2024), year 2020. [c] OECD (2023), Education at a glance, indicator Share of students enrolled by ISCED category, year 2020. The UK does not provide Post-secondary non-tertiary programmes. [d] OECD (2020), PISA 2018 Results (Volume I), Annex B3, table B3.3.3, year 2018. [e] OECD (2020), PISA 2018 Results (Volume V), Annex B1.7, table V.B1.7.1, year 2018. [f] OECD (2020), PISA 2018 Results (Volume V), Annex B1, table V.B1.7.1. [g] OECD (2023), PISA 2022 Results (Volume II), Annex B1, tables II.B1.6.2 and II.B1.6.3; higher values correspond to higher autonomy; explanation for the construction of the schools' responsibility for curriculum index can be found here:

https://www.oecd-ilibrary.org/sites/1e412e2e-en/index.html?itemId=/content/component/1e412e2e-en#section-d1e19516-71ac67bf62. Explanation for the construction of the schools' responsibility index for resources can be found here:https://www.oecd-ilibrary.org/sites/1e412e2e-en/index.html?itemId=/content/component/1e412e2e-en#section-d1e19525-71ac67bf62.

6. Concluding discussion

In this contribution, we have investigated the relationship between the political rhetoric of setting ambitious policy objectives, and related targets, with the empirical observations that the most effective policy solutions are rarely one-size-fits-all. The European Higher Education Area is an innovative policy frame and political project, launched in 2010 by the Council of Europe that encourages harmonization of higher education systems in Europe, sustained by the common promotion of the European dimension and values in higher education. Among these priorities, widening participation in higher education has been a major policy concern, as well as promotion of European cooperation in quality assurance, student mobility and the exercise of free movement by students, teachers, researchers. The Lisbon strategy of the European Commission has also emphasised investment in higher education among its policy objectives, by setting targets to increase the participation rate to tertiary education. By 2030, member states should adopt reform measures so that at least 45% of 25-34 year-olds have a higher education qualification. The OECD average is 41%. One could argue that the highest level of educational attainment, the more democratic countries are in so far as the electorate has acquired knowledge and skills to critically assess the quality of democratic institutions, and express their electoral choices accordingly. .

Against the backdrop of European policy targets and narratives, our paper has shown that marked national patterns of participation to tertiary education persist in Europe, both in terms of equity and efficiency. National governments respond to supranational and global pressures in their own way, with a larger reform autonomy than expected. Our case study analysis of selected countries (Sweden, Germany, Poland, Italy and the United Kingdom) illustrates the significant variations in terms of educational and training systems. As we discuss in great details in the paper, countries vary with regards to the level of centralisation and decentralisation of their educational systems, the financing arrangements and the distribution between public and private expenditure, the importance of vocational relative to academic generalist education, and the institutional stratification in secondary education. Countries also vary significantly in terms of access mechanisms to higher education, and government-regulated admissions policies. In some countries, individual universities have a large autonomy in setting up selection criteria, whilst in others these aspects are centrally determined by

ministries. In short, national contexts and institutional structures, politically and historically determined, still matter a lot in the study of comparative education.

In the comparative political economy and social policy literature, in order to reduce such empirical complexity, scholars have tried to investigate the effects of different national institutional structures on policy outcomes by clustering countries in groups sharing similar characteristics - so called education regimes. We have used transition regimes in Europe as a heuristic tool to explain the distance of national educational systems from ideal types (or regime types). We are fully aware that regime types will never fit the complexity and richness of empirical observations, but they are useful in establishing comparative patterns. We have developed a new typology of transition regimes from secondary to tertiary education, building upon existing regime classifications, noticeably welfare state regimes (Esping-Andersen, 1990). Transition regimes are conceptualised as a structural configuration of four institutional domains, namely school system features, state governance measures, individual characteristics (socio-economic background, household income, immigrant background, and gender), and higher education system characteristics (admissions policies, financing and vocational tertiary education). Our findings suggests that existing regime theories are useful in our analysis in identifying institutional structures and barriers that play against a smooth transition from secondary to tertiary education.

Our clustering analysis shows that educational attainment in the adult population is lowest in Mediterranean regimes and post-communist ones, and higher elsewhere (in the Nordic, Continental and Anglo-Saxon clusters). In our data, there are a few countries that do not fit any clusters (Belgium and Switzerland). One of the reasons might be the huge regional variations within each country, and the existence of regional units with separate and very different education systems.

Educational systems are complex institutions, that exhibit historical path dependence (just think of the different design of Humboldian universities versus Napoleonic grand écoles) and that are molded by conflicting interests between the élites and the middle classes. For this reason we have searched in the literature for patterns of institutional design, without finding widely accepted schemes. Higher education is hard to classify, since it lies at the intersection of welfare regimes (because it affects the ability of individuals to self-support) and educational patterns (that are mostly concerned with the design of secondary school systems, with the discussion of pros and cons of tracking, streaming or generalist approaches). We propose five youth transition regimes, taking into account the presence/absence of tracking, the role of family resources, the pattern of home leaving, the admission policy of higher education institutions and the lifelong learning attitudes in different countries.

In the policy literature, secondary and tertiary education policies are not fully integrated. They are separate "policy sectors". This separation probably originates by the different degree of compulsoriness (that concerns secondary education in almost all countries, without affecting higher education) as well as by the limited fraction of population involved. In addition, higher education is not (and in our opinion should not be) considered as a universal social right, as it is compulsory education. Therefore, the transition to higher education remains a free individual choice responding to incentives (additional earnings, job quality, social prestige) and constraints (past achievements, liquidity constraints, cultural capital). Despite this individual choice, European institutions have put pressure onto national governments in order to include higher educational attainment among the policy goals. This would require the adoption of global norms which would transform the sector in a convergent way to the extent that national variations do not matter any longer. The accepted argument in the existing scholarship is that the global scale dissipates the regional and national ones. On the contrary the present section argues that we do not see convergence across country clusters, since individual behavior of national citizenship remain distinct.

If higher education has to retain its "freedom of choice" nature, since no one advocates extending the compulsoriness to this stage of education, still one may want to consider the possibility of guaranteeing equality of opportunity in accessing. This accounts for smoothing and/or removing barriers at the point of entry to higher education (broadly defined to include both academic and vocational institutions). The first obstacle is generated by *previous achievements* of students, which reflect educational resources of families (think of the number of books at home) as well as the institutional design of secondary schooling. It is widely recognized that tracking into generalist or vocational curricula increase the variability of achievements, thus undermining the equity in accessing higher education institutions. Without necessarily reforming secondary education in a comprehensive direction, differences in past achievements could be (at least partially) compensated by bridging interventions in the final years of secondary education.

A second dimension that should be considered is *admission policies* of HE institutions. As long as universities are competing to attract best students, they have incentives to cream-skimming of talents and not to increasing equity in access. The introduction of quotas for underrepresented minorities may correct this bias. A third dimension that matters for HE enrolment is funding. As we have seen, country clusters widely differ in terms of private involvement in funding, which creates a barrier for liquidity constrained families. Here public policies become relevant because they can provide

universal free access or require partial or full repayment of educational cost, possibly thorough a scheme of public loans. Finally, one has to account for individual incentives to postpone the entry in the labour market in expectation of future returns. Labour markets are imperfect and not necessarily offer adequate rewards to acquired skills (think of gender or race gaps). Public policies are less effective in this respect, but these potential biases may explain part of the differences in transitions to HE. The actual contradiction is that all these policies are clearly costly to the taxpayers. In this paper we have accounted for education policy preferences by tax payers and citizens in order to assess feasibility of policy intervention, without recording direct support to expanding higher education access.

Looking at the actual behavior of European youth, early home leaving and subsidized college attendance (Nordic pattern) seems one of the most equitable solution. Late home leaving and low cost of attendance, presumably in the same city (Mediterranean pattern) reinforces intergenerational persistence. High costs of enrolment/attendance and high rewards (Anglo-Saxon pattern) offer the (right) market incentive to pursue a degree. The post-Communist pattern still is in transition among alternative models, and it is difficult to identify a clear-cut proposal, since they share common elements with the Continental model (tracked secondary schooling) without the associated advantage of low cost of attendance. Having said that, we are aware that the Nordic cluster is not and cannot be treated as an ideal type, given remarkable institutional constraints associated with political determinants and social pressures, which vary across countries. Late home leaving in Mediterranean cluster may also be related to the familistic nature of the welfare state (safety nets provided by the family network) and cultural predispositions, that are hard to change with economic incentives only. The National Plans for Recovery and Resilience in Italy has devoted significant resources to the creation of new accommodation facilities for students, in order to incentivise their mobility among cities and universities. The study of the impact of such policy may provide clues to better understanding the possibility of altering the current status quo.

Governments around the world have been concerned with inequalities in participation rate to tertiary education. Certainly, this policy problem has not been ignored and government reforms have been adopted to increase the participation rate of under-represented groups, such as poor students, ethnic minorities, non-traditional students and learners, disabled students. One of the greatest limitations of policy interventions is the lack of integration between different sectors of the education system; secondary and tertiary education policies are not sufficiently integrated, in our view. Policy measures

to tackle inequalities of opportunities are normally designed to provide financial aid to poor students, without considering that social inequalities emerge much earlier in the education pathway.

Assuming that social justice should be a policy goal in education, policy makers intending to widen participation to include under-represented groups in higher education should consider previously indicated obstacles and propose solutions capable to smooth the transition from secondary to tertiary education. Possible measures to consider are:

i) increase the generalist curriculum of professional training schools, raising the cultural capital of children enrolled in these tracks (courses should include generalist theory and not just practical subjects);

ii) introduce incentives to secondary schools in order to ease the transition to HE by means of information provision, guidance, preparatory courses. This should be accompanied by delegating greater autonomy to schools to develop extra tutoring for disadvantaged students, because contexts vary greatly (urban/rural, demographics of cities, etc);

iii) expand the available pathways from secondary vocational to postsecondary non tertiary vocational, and from there to tertiary academic. This requires integrating secondary and postsecondary education and not treat them as separate and disconnected sectors of policy interventions. To facilitate this, in our study we have conceptualized a smooth transition as a pathway from one education stage to the next one, with multiple mechanisms and entry points that students face in their educational career.

iv) create bridging programmes from vocational tracks to academic education, introducing additional terms of study, summer courses, postponed admission tests.

v) encourage home leaving in order to reduce the impact of family customs and financially support students attending higher education courses. We are aware that the existing literature warns against late interventions due to the cumulative nature of disadvantages. However one cannot neglect the generations currently attending compulsory education. Encouraging student mobility nationally and internationally requires financial support for students from families without resources; the financial aid could be conditional on targeted enrolment in best universities outside one's region. But this requires cooperation and partnerships by the same universities designing correlated admission policies.

v) design carefully bursaries to disadvantaged students not only based on low income students (our data show that financial resources do not strongly correlate with household incomes once controlling for parental education and occupation), but also underrepresented and socially discriminated groups in society (ethnic minorities, women from ethnically discriminated groups, non-traditional students).

vi) support students during their higher education experience with tutoring, optimal course design, ECTS recognition. HE institutions should create additional tutoring for disadvantaged students, and they should gain recognition from the central government in terms of extra funding.

Some of the policy measures advocated here have risks, and we are aware that we should monitor the possibility of negative side effects and unintended consequences. First, and foremost, government programmes aimed at widening participation are expensive and an increase in government expenditure is necessary. Admissions policies that favor an uncapped demand driven system, lifting all limits on numbers of students who enroll in undergraduate programmes at universities, will raise costs for the public purse. Secondly, if we decide to increase the participation rate to tertiary, *at all costs,* there is a very high risk that the quality of students might fall and those who would have excelled in vocational education are now deemed to fail in higher education. In order to ensure quality, we recommend that universities publish student's progression rates, because we think transparency of information is essential to design effective policy measures. Thirdly, one should consider the political feasibility of any policy reforms, and the extent to which policy makers need to assess trade-offs. Increasing government expenditure in education might imply decreasing investment in other areas of social policy, such as pensions or health care.

In our study, all the education and training systems are in democratic regimes, and we have not included authoritarian regimes. In democratic systems, the policy cycle requires the assessment of policy solutions against a set of politically determined criteria, among which we find political legitimacy. In order for a policy intervention to be legitimate, thus politically feasible, politicians need to gain political support by tax payers. Thus, we have explored survey data in order to understand the likelihood of citizens supporting an increase in public investment in education. The data shows two interesting patterns; first, the relationship between individual income and support for education is less pronounced than expected for other social policies. Second, support for expansion varies from clusters to clusters, but generally is the highest for early childhood and schooling. Generally speaking the potential support for higher education expansion is weak (here we find clusters differences though) and mostly based on middle classes. This means that policymakers will need to convince the middle classes about the benefits of widening participation to underprivileged groups in society. The social elites send their children in high status institutions abroad, and dislike national competitors, so they are also against further expansion. Low class people consider higher eduction a waste of resources (populist governments are against experts).

Will politicians do that? Politicians may not have incentives to support further investment in programmes that increase participation to tertiary education since this is a long run investment and politicians are typically short sighted. Will it work? Probably not, as middle classes are fiscally conservative and favor a small state. Public opinion surveys suggest that further investing in early childhood education, good schools and vocational training is going to be more popular, among citizens and taxpayers in the Nordic and Continental clusters. In this respect, the Mediterranean cluster differs because people are most supportive of higher education expansion. In short, what works in one place might just not be feasible elsewhere.

On one hand, public opinion data suggests that an expansion in higher education might be desirable in Mediterranean countries for reasons that we have explained thus far. Yet, investment in education is not a proxy for government commitment to embark upon effective policy reforms. Populist movements and radical Right parties in Europe have been electorally successful at mobilizing the working classes against "bureaucracies", "experts", "technocrats", and those policymakers who normally have the skills and capacities to carry out cost-benefit analysis and assess the effectiveness of public policies. Populism is a highly contested concept in political science. A limited agreement has been reached on how populism should be interpreted (as an ideology, a political style or a discursive practice). In the empirical manifestations of populism, the opposition between the people and the elite is centred on the exaltation of the in-group and the exclusion of the out-group. The defence of the community is built based on the exclusion of the bearer of diversity. In such contexts, advocating for widening participation to under represented groups of society might not be politically feasible. Education lends itself to becoming a polemical target in right-wing populist mobilisation. Alongside the populist criticism of political elites' wasteful management of the education system, one can find the traditional populist opposition to the intellectual elites, considered responsible for imposing a "single way of thinking" (*pensiero unico*) and a standardisation in the learning process of citizens. Identity has also always been a key issue in the analysis of the ideology of far-right parties and movements. The call for a return to traditional values, which accounts for a very large part of the programme platforms of populist parties in relation to family policies, also fits well with populist proposals on education.

The policy design of effective and equitable policy interventions to tackle educational inequalities of opportunities, which this paper is concerned with, will need to be accompanied by a critical assessment of the potential risks of adopting reforms that are highly desirable to mitigate socio-economic inequalities of opportunity, but politically unattractive and thus difficult to implement.

References

Almendinger, J. (1989). Educational systems and labor market outcomes, European Sociological Review, 5(3), 231-250.

Anderson, E. (2007). Fair opportunity in education: A democratic equality perspective. Ethics, 117(4), 595–622.

Anderson-Levitt, K.M., Sirota, R. and Mazurier, M. (1991). Elementary education in France, The Elementary School journal, 92(1), 79-95.

Ansell, B. W. (2008). University challenges: Explaining institutional change in higher education, World Politics, 60(2), 189-230.

Ansell, B. W. (2010). From the ballot to the blackboard. The redistributive political economy of education. Cambridge University Press.

Archer, M. (1979). Social origins of educational systems. London: Sage Publications.

Ask, B. (1992). Freedom of choice and independent schools. In Miron, G. (ed.) Choice and the use of market forces in schooling: Swedish education reforms in the 1990s. Stockholm: Stockholm University, 101-105.

Baker, J., Lynch, K., Cantillon, S., & Walsh, J. (2006). Equality: Putting the theory into action. Res Publica, 12, 411–433.

Baldi, G. (2012). Schools with a difference: Policy discourses on education reform in Britain and Germany. West European Politics, 35(5), 999–1023.

Ball, S. J. (2008). The education debate. Policy Press.

Ballarino, G. (2023). The school-to-work transition. in Fondazione GiGroup (Milan). Youth and work, a comparative study, 38-64

Barr, N. (2009). Financing higher education: Lessons from economic theory and reform in England, Higher Education in Europe, 32(2), 201-209.

Barr, N. (2012). The Higher Education White Paper: The good, the bad, the unspeakable – and the next White Paper, Social Policy & Administration, 46(5), 483-508.

Barr, N. and Crawford, I. (1998). The Dearing Report and the government's response: A critique, Political Quarterly, 69(1), 72-84.

Barzelay, M. (1993). The single case study as intellectually ambitious inquiry, Journal of Public Administration Research and Theory, 3(3), 305-318.

Bennett, A. (2015). Disciplining our conjectures. In Bennett, A. and Checkel, J.T. (eds) Process tracing: From metaphor to analytic tool. Cambridge: Cambridge University Press, 276-298.

Bell, D. (1972). On meritocracy and equality. The Public Interest, 29, 29–68.

Boudon, R. (1974). Education, opportunity, and social inequality. Wiley.

Bourdieu, P. (1977). Cultural reproduction and social reproduction. In Karabel, J. and Halsey, A.H. (eds) Power and Ideology in Education. Oxford: Oxford University Press.

Braun, D. (2001). Regulierungsmodelle und Machtstrukturen an Universitäten. In Stölting, E. and Schimank, U. (eds) Die Krise der Universitäten. Wiesbaden: VS Verlag für Sozialwissenschaften, 243-262.

Breen, R. and J.Goldthorpe (1997). Explaining educational differentials: towards a formal rational action theory. Rationality and Society 9: 275–305.

Brighouse, H., Ladd, H. F., Loeb, S., & Swift, A. (2018). Educational goods: Values, evidence, and decision-making. University of Chicago Press.

Brunello, G. and Checchi, D. (2007). Does School Tracking Affect Equality of Opportunity? New International Evidence, Economic Policy, 22: 781-861

Busemeyer, M, J. Garritzmann and E. Neimanns (2020), A Loud but Noisy Signal? Public opinion and education reforms in Western Europe. New York: Cambridge University Press.

Busemeyer, M. R. (2014). Skills and inequality. Cambridge University Press.

Busemeyer, Marius R., Garritzmann, Julian L., Neimanns, Erik and Nezi, Roula, 2018. Investing in Education in Europe: Evidence from a New Survey of Public Opinion, Journal of European Social Policy 28(1): 34-54. https://doi.org/10.1177/0958928717700562

Busemeyer, M.R. and Nikolai, R. (2010). Education. In Obinger, H., Pierson, C., Castles, F.G., Leibfried, S. and Lewis, J. (eds) The Oxford Handbook of the Welfare State. Oxford: Oxford University Press, 494-508.

Busemeyer, M.R. and Nikolai, R. (2021). Education. In Béland, D., Morgan, K.J., Obinger, H. and Pierson (eds) The Oxford Handbook of the Welfare State. Second edition. Oxford: Oxford University Press, 679-698.

Checchi, D and M. Mattei (2021) Merit pay for schoolteachers in Italy, 2015-2016: a new regime of education accountability?" Comparative Education Review, 65, 3, 445-466, 2021.

Checchi, D., and Flabbi, L. (2007), Intergenerational Mobility and Schooling Decisions in Germany and Italy: The Impact of Secondary School Track, IZA Discussion Paper No. 2876, Institute for the Study of Labour (IZA)

Chitty, C. (2014). Education policy in Britain. Palgrave Macmillan.

Christensen, T. and Laegreid, P. (eds) (2006). Autonomy and Regulation: Coping with agencies in the modern state. Cheltenham: Edward Elgar.

Clark, B.R. (1983). The Higher Education System: Academic organization in cross-national perspective. Berkeley: University of California Press.

Collier, D. (1993). The comparative method. In Finifter, A.W. (ed.) Political Science: The state of the discipline II. Washington, DC: American Political Science Association, 105-119.

Council of the European Union (2021). Council Resolution on a strategic framework for European cooperation in education and training towards the European Education Area and beyond (2021-2030).

Culpepper, P. (2011), Quiet politics and business power. Corporate control in Europe and Japan. New York: Cambridge University Press.

Dale, R. (2000). Globalization and education: Demonstrating a "common world educational culture" or locating a "globally structured educational agenda"? Educational Theory, 50(4), 427–448.

Darling-Hammond, L. (2010). The flat world and education: How America's commitment to equity will determine our future. New York: Teachers College Press.

Department for Business, Innovation and Skills (2016). Success as a knowledge economy: teaching excellence, social mobility and student choice. London: Department for Business, innovation and Skills.

Dobbins, M. (2011). Higher education policies in Central and Eastern Europe. Convergence towards a common model? London: Palgrave Macmillan.

Dorling, D. (2014). Inequality and the 1%. London: Verso.

Durkheim, É. (1938). L'évolution pédagogique en France. Paris: Alcan.

Durkheim, É. (1956). Education and sociology. London: Coller Macmillan

Durkheim, E. (2013). Education et sociologie (10th ed.). Presses Universitaires de France.

EBRD 2018. Life in transition. London

Erikson, R., & Jonsson, J. O. (Eds.). (1996). Can education be equalised? Boulder: Westview Press.

Esping-Andersen, G. (1990). The three worlds of welfare capitalism. Princeton University Press. 186

European Commission (2017). Communication from the European Commission to the European Parliament, the European Economic and Social Committee and the Committee of the Regions on a renewed EU agenda for higher education. Brussels, 30.05.2016

European Commission (2017b), Directorate-General for Education, Youth, Sport and Culture, Haj, C., Usher, A., Geanta, I. et al., Study on the impact of admission systems on higher education outcomes – Volume I – Comparative report, Publications Office, https://data.europa.eu/doi/10.2766/943076

European Commission. (2006). Communication from the Commission to the Council and the European Parliament. Brussels.

European Social Survey European Research Infrastructure (ESS ERIC). (2023). ESS9 - integrated file, edition 3.2 [Data set]. Sikt - Norwegian Agency for Shared Services in Education and Research. https://doi.org/10.21338/ess9e03_2

Ferrera (2013), Verso un modello UE del capitale umano?, in "Scuola democratica, Learning for Democracy" 3/2013, pp. 725-732,

Ferrera, M. (1996). The "Southern Model" of Welfare in Social Europe. Journal of European Social Policy, 6(1), 17-37.

Furuta, J. (2020). Liberal individualism and the globalization of education as a human right: The worldwide decline of early tracking 1960–2010. Sociology of Education, 93(1), 1–19.

Garritzman, J.L. (2016). The political economy of higher education finance. The politics of tuition fees and subsidies in OECD countries, 1945-2015. Cham: Palgrave Macmillan.

Garritzmann, J., Häusermann, S., & Palier, B. (2022). The world of politics of social investment (Vol. 1). Oxford University Press.

Garritzmann, J.L. and Garritzmann, S. (2023). Why globalization hardly affects education systems. In Mattei, P., Dumay, X., Mangez, E. and Behrend, J. (eds) Oxford Handbook of Globalization and Education. Oxford: Oxford University Press.

Gerring, J. (2007a). Case study research: Principles and practices. Cambridge: Cambridge University Press.

Gerring, J. (2007b). Is there a (viable) crucial-case method? Comparative Political Studies, 40(3), 231-253.

Gingrich, J., & Häusermann, S. (2015). The decline of the working-class vote, the reconfiguration of the welfare support coalition and consequences for the welfare state. Journal of European Social Policy, 25(1), 50–75.

Gingrich, J. and Giudici, A. (2023). Education as a tool of social equality? Social policy & Administration, 57(2), 172-188.

Glennerster, Howard (1998). Education: reaping the harvest, in H.Glennerster and J.Hills (eds.). The State of Welfare. Oxford: Oxford University Press, pp. 27-74

Goertz, G. (2006). Social science concepts: A user's guide. Princeton, NJ: Princeton University Press.

Goodman, R. (2001). Higher education reform in East Asia: A comparative perspective. Beppu Oita, Japan: Ritsumeikan Asia Pacific University Press.

Goodman, R. (2005). The why, what and how of educational reform in Japan. In Eades, J., Goodman, R. and Hada, Y. (eds) The 'Big Bang' in Japanese higher education. Melbourne: Trans Pacific Press, 7-30.

Green, A. (1990). Education and state formation. St. Martin's Press.

Green, A., Preston, J. and Janmaat, J.G. (2006). Education, equality and social cohesion. A comparative analysis. London: Palgrave Macmillan.

Haerpfer, C., Inglehart, R., Moreno, A., Welzel, C., Kizilova, K., Diez-Medrano J., M. Lagos, P. Norris, E. Ponarin & B. Puranen (eds.). 2022. World Values Survey: Round Seven - Country-

Pooled Datafile Version 5.0. Madrid, Spain & Vienna, Austria: JD Systems Institute & WVSA Secretariat. doi:10.14281/18241.20

Hall, P. A., & Soskice, D. (2001). An introduction to varieties of capitalism. In P. A. Hall & D. Soskice (Eds.), Varieties of capitalism (pp. 1–69). Oxford: Oxford University Press.

Halsey, A.H (1997). Education: culture, economy and society. Oxford: Oxford University Press.

Hanushek, E.A. and Woessmann, L. (2006): "Does Educational Tracking Affect Performance and Inequality? Differences- in-Differences Evidence Across Countries," Economic Journal, vol. 116(510): C63-C76

Head, B.W. (2019). Forty years of wicked problems literature: Forging closer links to policy studies, Policy and Society, 38(2), 180-197.

Heidenheimer, Arnold J., 1996. Throwing money and heaving bodies: Heuristic callisthenics for comparative policy buffs, in Comparing government activity, ed. Louis M. Imbeau and Robert D.

Hemerijck, A. (2018). Social investment as a policy paradigm. Journal of European Public Policy, 25(6), 810–827.

Hur, J.Y. and Bessey, D. (2013). A comparison of higher education reform in South Korea and Germany, Asia Pacific Education Review, 14(2), 113-123.

Ischinger, B. (2009). Foreword. In: OECD, Higher education to 2030, Volume 2, Globalisation. Paris: Educational Research and Innovation, OECD Publishing, 3.

ISSP Research Group (2022). International Social Survey Programme: Social Inequality V - ISSP 2019. GESIS, Cologne. ZA7600 Data file Version 3.0.0, https://doi.org/10.4232/1.14009.

Iversen, T., & Stephens, J. D. (2008). Partisan politics, the welfare state, and three worlds of human capital formation. Comparative Political Studies, 41(4–5), 600–637.

Jacobs, B. and Frederick van der Ploeg. (2006). Guide to reform of higher education: a European perspective, Economic Policy, Volume 21(7) Pages 536–592, https://doi.org/10.1111/j.1468-0327.2006.00166.x

Kauder, B. and Potrafke, N. (2013). Government ideology and tuition fee policy: Evidence from the German states, CESifo Economic Studies, 59(4), 628-649.

King, G., Keohane, R.O. and Verba, S. (1994). Designing social inquiry: Scientific inference in qualitative research. Princeton, NJ: Princeton University Press.

Kogan, I. (2008). Education systems of Central and Eastern European countries. In: Kogan, I., Gebel, M. and Noelke, C. (eds) Europe enlarged: A handbook of education, labour and welfare refimes in Central and Eastern Europe. Bristol: Policy Press, 6-34.

Kogan, M., M. Bauer, et al. (Eds.). (2006). Transforming higher education: The 2004 Reforms and Dynamics of Change. Dordrecht, The Netherlands: Springer.

Lauder, H. & Ken Mayhew (2020) Higher education and the labour market: an introduction, Oxford Review of Education,46:1, 1-9, DOI:10.1080/03054985.2019.1699714

Le Grand, J., (1982). The strategy of equality. Redistribution and the social services. London: Routledge.

Lipset, S. M. (1972). Social mobility and equal opportunity. The Public Interest, 29, 90–108.

Lundahl, L. (1990). New variations on old themes: The Swedish conservative party and the battle over comprehensive education 1900–1985. Journal of Education Policy, 5(2), 157–166.

Maassen, P., & Olsen, J. (Eds.). (2007). University dynamics and European integration. Dordrecht, The Netherlands: Springer.

Marginson, S. (2016). The worldwide trend to high participation higher education: dynamics of social stratification in inclusive systems, Higher Education, 72, 413-434.

Marginson, S. (2023). Limitations of the leading definition of 'internationalisation' of higher education: is the idea wrong or is the fault in reality?, Globalisation, Societies and Education, https://doi.org/10.1080/14767724.2023.2264223

Marginson, S. and van der Wende, M. (2009). Europeanisation, international rankings and faculty mobility: three cases in higher education globalisation. In: OECD, Higher education to 2030, Volume 2, Globalisation. Paris: Educational Research and Innovation, OECD Publishing, 109-144.

Marshall, T. H. (1950) Class, citizenship, and social development. Cambridge, Cambridge University Press.Mayer, P. and Ziegele, F. (2009). Competition, autonomy and new thinking: Transformation of higher education in Federal Germany, Higher Education Management and Policy, 21(2).

Mattei, P. (2009). Restructuring welfare organizations in Europe. Basingstoke, UK: Palgrave.

Mattei, P. (2012). Market accountability in schools: policy reforms in England, Germany, France and Italy. Oxford Review of Education, 38(2).

Mattei, P. (2014). University adaptation in difficult economic times. New York: Oxford University Press.

Mattei, P. (2023). Democratizing science. The political roots of the public engagement agenda. Bristol: Bristol University Press.

Mattei, P. and A.Aguilar (2014). Secular Institutions, Islam and Education Policy. France and the U.S. in Comparative Perspective (Basingstoke: Palgrave, 2016). ISB

Milner, A. , P.Mattei and C. Ydesen. Governing education in times of crisis: state interventions and school accountabilities during the COVID-19 pandemic. European Educational Research Journal, 20, 4, 520-539, 2021. Mattei, P., Dumay, X., Mangez, E. and Behrend, J. (eds) 2023. The Oxford Handbook of education and globalization. New York: Oxford University Press.

Morel, N., Palier, B., & Palme, J. (2012). Towards a social investment welfare state? Ideas, policies and challenges. Policy Press.

National Action Plan on Integration (NAP-I) (2011), German Federal Government, Berlin.

National Integration Plan (2007), German Federal Government. Berlin.

OECD. (2013). Education at a glance 2013: OECD Indicators. Paris: OECD Publishing.

OECD. (2016). Education at a glance 2016: OECD Indicators. Paris: OECD Publishing.

OECD. (2018). Education at a glance 2018: OECD Indicators. Paris: OECD Publishing.

Olsen, J. (2005). The institutional dynamics of the European University. Oslo, Norway: Arena.

Paglayan, A. S. (2021). The non-democratic roots of mass education: Evidence from 200 years. American Political Science Review, 115(1), 179–198.

Paradeise, C., C. Reale, et al. (Eds.). (2009). University governance. Dordrecht,The Netherlands: Springer.

Patten, A. (2014). Equal Recognition. Princeton University Press.

Paulston, R. G. (1968). Educational change in Sweden. Teachers College Press.

Peters, G. (1992). Government reorganisation: A theoretical analysis. International Political Science Review, 13(2), 199–217.

Pfeffer, F.T. (2008). Persistent inequality in educational attainment and its institutional context, European Sociological Review, 24(5), 543-565.

PISA (2018). Private schools and schools choice, ch.7. In PISA 2018 Results (vol II). Paris. OECD.

PISA (2023). Governing education systems, ch 6. In PISA 2022 Results, (vol II). Paris : OECD.

Prost, A. (1968). Histoire du l'enseignement en France 1800-1967. Paris : Colin.

Ragin, C.C. and Becker, H.S. (eds). (1992). What is a case? Exploring the foundations of social inquiry. Reprint, Cambridge: Cambridge University Press, 2010.

Ravitch, D. and Viteritti, J.P. (eds). (2001). Making good citizens: Education and civil society. New Haven: Yale University Press.

Rhoads, R.A and Torres, C.A. (eds). (2006). The university, state, and market. The political economy of globalization in the Americas. Stanford, CA: Stanford University Press.

Rhodes, R. A. W. (1997). Understanding governance: Policy networks, governance, reflexivity, and accountability. Buckingham, UK: Open University Press.

Sandel, M. J. (2020). The tyranny of merit. Penguin.

Schmidt, M.G. (2002). Warum Mittelmaß? Deutschlands Bildungsausgaben im internationalen Vergleich, Politische Vierteljahresschrift, 43(1), 3-19.

Scott, P. (2022). Sagas of contemporary higher education: Foreground and hinterland, Centre for Global Higher Education working paper series, 81. https://www.researchcghe.org/perch/resources/publications/working-paper-81may-2022.pdf

Shavit, Y., Arum, R. and Gamoran, A. (eds). (2007). Stratification in higher education. Palo Alto, CA: Stanford University Press.

Shofer, E. and Meyer, J.W. (2005). The worldwide expansion of higher education in the Tewntieth Century, American Sociological Review, 70(6), 898-920.

Solga, H., Protsch, P., Ebner, C. and Brzinsky-Fay, C. (2014). The German vocational education and training system: Its institutional configuration, strengths, and challenges, WZB Discussion Paper, SP I 2014-502.

Teichler, U. (2016). The professional relevance of study: Disputes, widely shared approaches, and future perspectives, International Journal of Chinese Education, 5(2), 135-161.

Teichler, U. and Bürger, S. (2009). Student enrolments and graduation trends in the OECD area: What can we learn from international statistics? In: OECD, Higher education to 2030, Volume 2, Globalisation. Paris: Educational Research and Innovation, OECD Publishing, 151-172.

Telhaug, A.O. (2006). The Nordic model in education: education as part of the political system in the last 50 years. Scandinavian Journal of Educational Research. 50(3), 245-283.

Trebbels, M. (2015). Models of educational aspirations and choice. In: The transition at the end of compulsory full-time education. Springer VS, Wiesbaden.

Triventi, M. (2014). Le disuguaglianze di istruzione secondo l'origine sociale. Una rassegna della letteratura sul caso italiano, Scuola democratica, Learning for Democracy, 2, 321-342.

UNESCO. (2015). UNESCO Institute for Statistics data on education. http://data.uis.unesco.org/.

Valero, A. and Van Reenen, J. (2016). The economic impact of universities: Evidence from across the globe, NBER Working Paper Series 22501. http://www.nber.org/papers/w22501

van Evera, S. (1997). Guide to methods for students of political science. Ithaca, NY: Cornell University Press.

van Vught, F. (1995). Policy models and policy instruments in higher education. The effects of governmental policy-making on the innovative behaviour of higher education institutions. Vienna: Institut für Höhere Studien (HIS).

Verger, A., C. Fontdevila, and A. Zancajo.(2016) The Privitization of Education. Amsterdam: Teachers College Press.

Verhoest, K., MacCarthaigh, M., et al. (2010). Autonomy and Control of State Agencies: Comparing States and Agencies. Houndmills, Palgrave Macmillan.

West, A. and Nikolai, R. (2017). The expansion of 'private' schools in England, Sweden and Eastern Germany: A comparative perspective on policy development, regulation, policy goals and ideas, Journal of Comparative Policy Analysis, 19(5), 452-469.

Wilensky, H. L. (1975). The welfare state and equality: structural and ideological roots of public expenditureBerkeley: University of California Press.

World Bank. (2015). Data and statistics. http://data.worldbank.org.

Yin, R.K. (2014). Case Study Research: Design and Methods. Los Angeles, CA: Sage.

Young, M. (1958). The rise of the meritocracy. Thames and Huchson.

Appendix

Table A.1 – Data sources and descriptive statistics

name	description	source	countries	mean	sd.dev	min	max
primtosec_exp~p	Education spending - Primary to post-secondary non-tertiary, % of GDP, 2011 – 2020	OECD https://data.oecd.org/eduresource/education-spending.htm#indicator-chart	29	3.237	0.772	1.714	4.657
privexp1	Private spending on education - Primary to post-secondary non-tertiary, % of GDP, 2011-2020	OECD Education at a glance: Educational finance indicators	29	0.217	0.158	0.005	0.652
prim_exp_gdp	Education spending - Primary, % of GDP, 2011 – 2020	OECD https://data.oecd.org/eduresource/education-spending.htm#indicator-chart	29	1.426	0.529	0.431	2.464
sec_exp_gdp	Education spending - Secondary, % of GDP, 2011 – 2020	OECD https://data.oecd.org/eduresource/education-spending.htm#indicator-chart	29	1.903	0.466	0.921	2.825
tert_exp_gdp	Education spending - Tertiary, % of GDP, 2011 – 2020	OECD https://data.oecd.org/eduresource/education-spending.htm#indicator-chart	29	1.309	0.344	0.465	1.910
dur_comp	Duration of compulsory education (years)	Unesco OPRI	29	10.624	1.250	8.000	13.000
hours	weekly learning hours (2018)	OECD Education at a glance (2018)	29	26.983	1.343	24.70	29.30
inst_time_prim	Students' instruction time in compulsory education - primary - 2021	OECD Dataset: Students' instruction time in compulsory education	28	740.286	130.972	473.00	1000.00
stud_teach_prim	Students per teaching staff - Primary, Ratio, 2013 – 2020	OECD Education at a glance: Student-teacher ratio and average class size	29	13.661	2.972	9.040	19.276
stud_teach_sec	Students per teaching staff - Secondary, Ratio, 2013 – 2020	OECD Education at a glance: Student-teacher ratio and average class size	27	11.343	2.225	8.117	16.884
stud_teach_tert	Students per teaching staff - Tertiary, Ratio, 2013 – 2020	OECD Education at a glance: Student-teacher ratio and average class size	28	15.822	6.622	6.192	44.517
childhood1	Gross enrolment ratio, early childhood education, both sexes (%)	Unesco SDG	26	76.241	18.484	36.471	106.960
childhood2	Gross enrolment ratio, early childhood educational development programmes, both sexes (%)	Unesco SDG	26	22.181	23.182	0.000	69.516
childhood3	Gross enrolment ratio, pre-primary, both sexes (%)	Unesco SDG	29	93.472	10.530	65.946	116.601
tracking_age	First age of selection in the education system	OECD Education at a glance (2018)	29	13.828	2.139	10.000	16.000
housexp	Spending on tertiary education Household, % of education spending, 2011 – 2020	OECD Education at a glance: Educational finance indicators	27	15.435	13.079	0.015	46.514
sh_priv_pri	Percentage of enrolment in primary education in private institutions (%)	Unesco OPRI	29	8.633	11.258	0.347	54.095
sh_priv_sec	Percentage of enrolment in secondary education in private institutions (%)	Unesco OPRI	29	13.738	15.022	0.487	63.952
sh_priv_post	Percentage of enrolment in post-secondary non-tertiary education in private institutions (%)	Unesco OPRI	29	32.655	31.254	0.000	95.158
sh_priv_ter	Percentage of enrolment in tertiary education in private institutions (%)	Unesco OPRI	29	23.195	23.975	0.000	100.000
off_ent_age_pre	Official entrance age to pre-primary education (years)	Unesco OPRI	29	3.121	0.415	3.000	5.000
off_ent_age_pri	Official entrance age to primary education (years)	Unesco OPRI	29	6.282	0.589	5.000	7.000
rep_pri	Repetition rate in primary education (all grades), both sexes (%)	Unesco OPRI	28	1.071	1.080	0.000	3.710
rep_low	Repetition rate in lower secondary general education (all grades), both sexes (%	Unesco OPRI	28	2.218	2.282	0.000	9.304
sh_sec_gen	Share of all students in secondary education enrolled in general programmes (%)	Unesco OPRI	29	72.150	9.903	52.719	90.301
sh_sec_voc	Share of all students in secondary education enrolled in vocational programmes (%)	Unesco OPRI	29	27.850	9.903	9.699	47.281
sh_post_gen	Share of all students in post-secondary non-tertiary education enrolled in general programmes (%)	Unesco OPRI	29	7.528	15.631	0.000	62.700
sh_post_voc	Share of all students in post-secondary non-tertiary education enrolled in vocational programmes (%)	Unesco OPRI	29	76.438	35.500	0.000	100.000

test_gr2o3_r	Administration of a nationally representative learning assessment in Grade 2 or 3 in reading (number)	Unesco SDG	29	0.617	0.454	0.000	1.000
test_gr2o3_m	Administration of a nationally representative learning assessment in Grade 2 or 3 in mathematics (number)	Unesco SDG	29	0.602	0.467	0.000	1.000
enrol_17	Enrolment rate in secondary and tertiary education 17 year-olds, % in same age group, 2013 – 2020	OECD Education Database: Enrolment by age	29	92.545	5.039	77.751	98.730
enrol_18	Enrolment rate in secondary and tertiary education 18 year-olds, % in same age group, 2013 – 2020	OECD Education Database: Enrolment by age	29	83.551	8.439	67.134	96.676
enrol_19	Enrolment rate in secondary and tertiary education 19 year-olds, % in same age group, 2013 – 2020	OECD Education Database: Enrolment by age	29	64.133	11.789	43.778	83.124
pop_tert_25_34	Population with tertiary education25-34 year-olds, % in same age group, 2011 – 2022	OECD Education at a glance: Educational attainment and labour-force status	28	41.396	8.197	24.514	54.462
pop_tert_25_64	Adult education level Tertiary, % of 25-64 year-olds, 2011 – 2022	OECD Education at a glance: Educational attainment and labour-force status	28	34.119	8.163	18.095	45.512
pop_belowsec~64	Adult education level Below upper secondary, % of 25-64 year-olds, 2011 – 2022	OECD Education at a glance: Educational attainment and labour-force status	28	19.493	10.669	6.525	52.237
pop_upsec_25_64	Adult education level Upper secondary, % of 25-64 year-olds, 2011 – 2022	OECD Education at a glance: Educational attainment and labour-force status	28	46.387	12.020	22.541	70.549
att_voc	Educational attainment rate, completed short-cycle tertiary education or higher, population 25+	Unesco SDG	29	26.587	9.592	0.000	39.697
att_ba	Educational attainment rate, completed Bachelor's or equivalent education or higher, population 25+	Unesco SDG	26	24.479	6.277	13.014	36.381
att_ma	Educational attainment rate, completed Master's or equivalent education or higher, population 25+	Unesco SDG	26	12.939	3.832	3.455	21.241
att_phd	Educational attainment rate, completed Doctoral or equivalent education, population 25+	Unesco SDG	26	0.924	0.593	0.081	2.936
neet_15_19	Youth not in employment, education or training (NEET)15-19 year-olds, % in same age group, 2011 – 2022	OECD Education at a glance: Transition from school to work	28	5.911	2.550	2.584	12.313
neet_20_24	Youth not in employment, education or training (NEET)20-24 year-olds, % in same age group, 2011 – 2022	OECD Education at a glance: Transition from school to work	28	15.791	5.761	6.818	30.454

Table A.2 – Descriptive statistics by clusters

Nordic	Obs	Mean	Std. dev.	Min	Max
Education spending - Primary to post-secondary non-tertiary, % of GDP, 2011 – 2020	9	3.67	0.71	2.58	4.66
Private spending on education - Primary to post-secondary non-tertiary, % of GDP, 2011-2020	9	0.11	0.09	0.01	0.31
Education spending - Primary, % of GDP, 2011 – 2020	9	1.80	0.54	0.76	2.46
Education spending - Secondary, % of GDP, 2011 – 2020	9	1.97	0.38	1.43	2.46
Education spending - Tertiary, % of GDP, 2011 – 2020	9	1.52	0.26	1.12	1.86
Duration of compulsory education (years)	9	9.83	0.67	9.00	11.00
weekly learning hours (2018)	9	26.41	1.18	24.70	28.10
Students' instruction time in compulsory education - primary - 2021	9	714.11	118.37	584.00	1000.00
Students per teaching staff - Primary, Ratio, 2013 – 2020	9	12.11	1.18	10.23	13.46
Students per teaching staff - Secondary, Ratio, 2013 – 2020	8	10.89	1.78	8.12	13.06
Students per teaching staff - Tertiary, Ratio, 2013 – 2020	8	14.18	2.86	9.61	17.70
Gross enrolment ratio, early childhood education, both sexes (%)	8	75.29	8.02	60.09	87.55
Gross enrolment ratio, early childhood educational development programmes, both sexes (%)	8	50.19	13.80	25.04	69.52
Gross enrolment ratio, pre-primary, both sexes (%)	9	92.00	6.08	80.69	98.68
First age of selection in the education system	9	15.56	0.88	14.00	16.00
Spending on tertiary education Household, % of education spending, 2011 – 2020	9	8.34	9.03	0.02	25.92
Percentage of enrolment in primary education in private institutions (%)	9	4.98	5.03	0.80	16.03
Percentage of enrolment in secondary education in private institutions (%)	9	8.86	6.11	2.76	18.07
Percentage of enrolment in post-secondary non-tertiary education in private institutions (%)	9	24.13	29.19	0.00	65.91
Percentage of enrolment in tertiary education in private institutions (%)	9	28.41	28.87	1.57	92.28
Official entrance age to pre-primary education (years)	9	3.00	0.00	3.00	3.00
Official entrance age to primary education (years)	9	6.56	0.53	6.00	7.00
Repetition rate in primary education (all grades), both sexes (%)	9	0.43	0.38	0.00	0.90
Repetition rate in lower secondary general education (all grades), both sexes (%	9	0.77	0.78	0.00	2.21
Share of all students in secondary education enrolled in general programmes (%)	9	25.97	10.75	9.70	43.63
Share of all students in secondary education enrolled in vocational programmes (%)	9	74.03	10.75	56.37	90.30
Share of all students in post-secondary non-tertiary education enrolled in general programmes (%)	9	73.17	40.89	0.00	100.00
Share of all students in post-secondary non-tertiary education enrolled in vocational programmes (%)	9	6.83	9.70	0.00	23.73
Administration of a nationally representative learning assessment in Grade 2 or 3 in reading (number)	9	0.85	0.25	0.33	1.00
Administration of a nationally representative learning assessment in Grade 2 or 3 in mathematics (number)	9	0.85	0.25	0.33	1.00
Enrolment rate in secondary and tertiary education 17 year-olds, % in same age group, 2013 – 2020	9	94.96	3.21	89.54	98.73
Enrolment rate in secondary and tertiary education 18 year-olds, % in same age group, 2013 – 2020	9	91.21	4.65	82.30	96.68
Enrolment rate in secondary and tertiary education 19 year-olds, % in same age group, 2013 – 2020	9	64.87	13.02	44.46	83.12
Population with tertiary education25-34 year-olds, % in same age group, 2011 – 2022	9	44.43	4.75	39.69	53.98
Adult education level Tertiary, % of 25-64 year-olds, 2011 – 2022	9	38.73	3.81	32.10	42.99
Adult education level Below upper secondary, % of 25-64 year-olds, 2011 – 2022	9	14.75	5.62	7.20	25.86
Adult education level Upper secondary, % of 25-64 year-olds, 2011 – 2022	9	46.52	7.07	35.89	55.56
Educational attainment rate, completed short-cycle tertiary education or higher, population 25+	9	31.04	8.52	11.06	38.54
Educational attainment rate, completed Bachelor's or equivalent education or higher, population 25+	9	28.18	5.32	19.77	36.38
Educational attainment rate, completed Master's or equivalent education or higher, population 25+	9	13.78	3.40	10.54	21.24
Educational attainment rate, completed Doctoral or equivalent education, population 25+	9	1.12	0.55	0.60	2.41
Youth not in employment, education or training (NEET)15-19 year-olds, % in same age group, 2011 – 2022	9	4.38	0.82	3.23	5.91
Youth not in employment, education or training (NEET)20-24 year-olds, % in same age group, 2011 – 2022	9	13.14	2.96	8.46	17.26

Continental	Obs	Mean	Std. dev.	Min	Max
Education spending - Primary to post-secondary non-tertiary, % of GDP, 2011 – 2020	7	3.03	0.66	1.71	3.76
Private spending on education - Primary to post-secondary non-tertiary, % of GDP, 2011-2020	7	0.29	0.15	0.07	0.46
Education spending - Primary, % of GDP, 2011 – 2020	7	1.22	0.35	0.67	1.75
Education spending - Secondary, % of GDP, 2011 – 2020	7	1.95	0.49	1.29	2.54
Education spending - Tertiary, % of GDP, 2011 – 2020	7	1.27	0.44	0.47	1.74
Duration of compulsory education (years)	7	11.61	1.14	10.00	13.00
weekly learning hours (2018)	7	27.49	1.01	26.10	28.80
Students' instruction time in compulsory education - primary - 2021	7	837.00	95.66	705.00	940.00
Students per teaching staff - Primary, Ratio, 2013 – 2020	7	14.67	3.21	9.37	19.28
Students per teaching staff - Secondary, Ratio, 2013 – 2020	6	12.26	2.80	9.23	16.88
Students per teaching staff - Tertiary, Ratio, 2013 – 2020	7	14.14	4.65	6.19	21.69
Gross enrolment ratio, early childhood education, both sexes (%)	7	86.94	16.12	60.90	105.47
Gross enrolment ratio, early childhood educational development programmes, both sexes (%)	7	9.34	14.53	0.00	37.68
Gross enrolment ratio, pre-primary, both sexes (%)	7	100.74	6.29	92.09	108.51
First age of selection in the education system	7	12.14	2.12	10.00	15.00
Spending on tertiary education Household, % of education spending, 2011 – 2020	5	11.54	9.60	2.30	25.41
Percentage of enrolment in primary education in private institutions (%)	7	6.15	5.23	0.35	14.85
Percentage of enrolment in secondary education in private institutions (%)	7	11.62	8.26	0.49	25.60
Percentage of enrolment in post-secondary non-tertiary education in private institutions (%)	7	23.39	25.59	0.00	68.46
Percentage of enrolment in tertiary education in private institutions (%)	7	14.29	5.83	3.56	21.72
Official entrance age to pre-primary education (years)	7	3.36	0.75	3.00	5.00
Official entrance age to primary education (years)	7	6.00	0.58	5.00	7.00
Repetition rate in primary education (all grades), both sexes (%)	6	1.59	1.36	0.41	3.71
Repetition rate in lower secondary general education (all grades), both sexes (%	6	2.54	2.31	0.17	6.94
Share of all students in secondary education enrolled in general programmes (%)	7	27.60	11.37	10.75	40.21
Share of all students in secondary education enrolled in vocational programmes (%)	7	72.40	11.37	59.79	89.25
Share of all students in post-secondary non-tertiary education enrolled in general programmes (%)	7	78.84	25.20	40.00	100.00
Share of all students in post-secondary non-tertiary education enrolled in vocational programmes (%)	7	12.59	19.30	0.00	45.63
Administration of a nationally representative learning assessment in Grade 2 or 3 in reading (number)	7	0.57	0.53	0.00	1.00
Administration of a nationally representative learning assessment in Grade 2 or 3 in mathematics (number)	7	0.57	0.53	0.00	1.00
Enrolment rate in secondary and tertiary education 17 year-olds, % in same age group, 2013 – 2020	7	91.76	5.30	82.52	98.19
Enrolment rate in secondary and tertiary education 18 year-olds, % in same age group, 2013 – 2020	7	80.58	6.45	71.10	88.01
Enrolment rate in secondary and tertiary education 19 year-olds, % in same age group, 2013 – 2020	7	63.84	11.60	45.98	79.84
Population with tertiary education25-34 year-olds, % in same age group, 2011 – 2022	7	45.82	7.95	31.67	54.46
Adult education level Tertiary, % of 25-64 year-olds, 2011 – 2022	7	37.96	6.21	29.13	45.51
Adult education level Below upper secondary, % of 25-64 year-olds, 2011 – 2022	7	18.10	4.06	12.76	22.00
Adult education level Upper secondary, % of 25-64 year-olds, 2011 – 2022	7	43.93	8.67	33.47	57.03
Educational attainment rate, completed short-cycle tertiary education or higher, population 25+	7	31.11	5.09	24.18	37.61
Educational attainment rate, completed Bachelor's or equivalent education or higher, population 25+	5	23.19	7.16	13.60	29.90
Educational attainment rate, completed Master's or equivalent education or higher, population 25+	6	12.09	3.60	9.25	19.25
Educational attainment rate, completed Doctoral or equivalent education, population 25+	6	1.24	0.86	0.60	2.94
Youth not in employment, education or training (NEET)15-19 year-olds, % in same age group, 2011 – 2022	7	5.38	2.47	2.58	8.46
Youth not in employment, education or training (NEET)20-24 year-olds, % in same age group, 2011 – 2022	7	12.21	4.62	6.82	19.68

Mediterranean	Obs	Mean	Std. dev.	Min	Max
Education spending - Primary to post-secondary non-tertiary, % of GDP, 2011 – 2020	4	3.24	0.54	2.84	4.04
Private spending on education - Primary to post-secondary non-tertiary, % of GDP, 2011-2020	4	0.30	0.15	0.16	0.46
Education spending - Primary, % of GDP, 2011 – 2020	4	1.42	0.26	1.24	1.80
Education spending - Secondary, % of GDP, 2011 – 2020	4	1.92	0.40	1.54	2.49
Education spending - Tertiary, % of GDP, 2011 – 2020	4	1.10	0.21	0.90	1.29
Duration of compulsory education (years)	4	11.00	1.15	10.00	12.00
weekly learning hours (2018)	4	28.75	0.71	27.70	29.30
Students' instruction time in compulsory education - primary - 2021	4	829.25	72.44	747.00	904.00
Students per teaching staff - Primary, Ratio, 2013 – 2020	4	11.84	2.01	9.04	13.58
Students per teaching staff - Secondary, Ratio, 2013 – 2020	4	9.86	1.22	8.42	11.23
Students per teaching staff - Tertiary, Ratio, 2013 – 2020	4	22.79	14.83	12.40	44.52
Gross enrolment ratio, early childhood education, both sexes (%)	3	66.74	29.88	36.47	96.21
Gross enrolment ratio, early childhood educational development programmes, both sexes (%)	3	17.18	18.22	0.00	36.29
Gross enrolment ratio, pre-primary, both sexes (%)	4	90.76	8.43	78.29	96.21
First age of selection in the education system	4	14.75	0.50	14.00	15.00
Spending on tertiary education Household, % of education spending, 2011 – 2020	4	24.64	7.93	12.77	29.14
Percentage of enrolment in primary education in private institutions (%)	4	14.16	12.09	6.05	31.75
Percentage of enrolment in secondary education in private institutions (%)	4	14.28	10.98	4.41	28.64
Percentage of enrolment in post-secondary non-tertiary education in private institutions (%)	4	55.12	37.30	7.47	95.16
Percentage of enrolment in tertiary education in private institutions (%)	4	11.98	8.55	0.00	18.91
Official entrance age to pre-primary education (years)	4	3.25	0.50	3.00	4.00
Official entrance age to primary education (years)	4	6.00	0.00	6.00	6.00
Repetition rate in primary education (all grades), both sexes (%)	4	1.63	1.32	0.31	3.04
Repetition rate in lower secondary general education (all grades), both sexes (%	4	5.10	2.92	2.82	9.30
Share of all students in secondary education enrolled in general programmes (%)	4	23.64	8.15	16.52	34.38
Share of all students in secondary education enrolled in vocational programmes (%)	4	76.36	8.15	65.62	83.48
Share of all students in post-secondary non-tertiary education enrolled in general programmes (%)	4	93.75	12.50	75.00	100.00
Share of all students in post-secondary non-tertiary education enrolled in vocational programmes (%)	4	0.00	0.00	0.00	0.00
Administration of a nationally representative learning assessment in Grade 2 or 3 in reading (number)	4	0.72	0.48	0.00	1.00
Administration of a nationally representative learning assessment in Grade 2 or 3 in mathematics (number)	4	0.72	0.48	0.00	1.00
Enrolment rate in secondary and tertiary education 17 year-olds, % in same age group, 2013 – 2020	4	93.63	3.10	90.20	97.57
Enrolment rate in secondary and tertiary education 18 year-olds, % in same age group, 2013 – 2020	4	79.04	3.64	73.66	81.40
Enrolment rate in secondary and tertiary education 19 year-olds, % in same age group, 2013 – 2020	4	64.06	13.88	43.78	73.50
Population with tertiary education25-34 year-olds, % in same age group, 2011 – 2022	4	36.35	7.84	25.80	43.77
Adult education level Tertiary, % of 25-64 year-olds, 2011 – 2022	4	27.27	7.92	18.10	36.45
Adult education level Below upper secondary, % of 25-64 year-olds, 2011 – 2022	4	40.26	9.86	28.12	52.24
Adult education level Upper secondary, % of 25-64 year-olds, 2011 – 2022	4	32.48	10.86	22.54	42.24
Educational attainment rate, completed short-cycle tertiary education or higher, population 25+	4	21.30	6.73	13.95	29.43
Educational attainment rate, completed Bachelor's or equivalent education or higher, population 25+	4	19.91	3.06	16.55	22.82
Educational attainment rate, completed Master's or equivalent education or higher, population 25+	4	11.01	5.08	3.46	14.42
Educational attainment rate, completed Doctoral or equivalent education, population 25+	4	0.57	0.14	0.40	0.74
Youth not in employment, education or training (NEET)15-19 year-olds, % in same age group, 2011 – 2022	4	8.57	2.27	5.88	11.27
Youth not in employment, education or training (NEET)20-24 year-olds, % in same age group, 2011 – 2022	4	24.92	4.85	18.63	30.45

Anglo-Saxon	Obs	Mean	Std. dev.	Min	Max
Education spending - Primary to post-secondary non-tertiary, % of GDP, 2011 – 2020	2	4.31	0.11	4.23	4.39
Private spending on education - Primary to post-secondary non-tertiary, % of GDP, 2011-2020	2	0.39	0.36	0.14	0.65
Education spending - Primary, % of GDP, 2011 – 2020	2	1.86	0.42	1.57	2.16
Education spending - Secondary, % of GDP, 2011 – 2020	2	2.65	0.25	2.47	2.83
Education spending - Tertiary, % of GDP, 2011 – 2020	2	1.71	0.29	1.50	1.91
Duration of compulsory education (years)	2	11.50	0.71	11.00	12.00
weekly learning hours (2018)	2	27.35	0.64	26.90	27.80
Students' instruction time in compulsory education - primary - 2021	1	824.00	.	824.00	824.00
Students per teaching staff - Primary, Ratio, 2013 – 2020	2	15.86	4.42	12.73	18.99
Students per teaching staff - Secondary, Ratio, 2013 – 2020	2	13.15	5.22	9.46	16.85
Students per teaching staff - Tertiary, Ratio, 2013 – 2020	2	18.20	4.16	15.27	21.14
Gross enrolment ratio, early childhood education, both sexes (%)	1	54.30	.	54.30	54.30
Gross enrolment ratio, early childhood educational development programmes, both sexes (%)	1	18.06	.	18.06	18.06
Gross enrolment ratio, pre-primary, both sexes (%)	2	106.91	13.70	97.22	116.60
First age of selection in the education system	2	14.00	2.83	12.00	16.00
Spending on tertiary education Household, % of education spending, 2011 – 2020	2	27.12	27.43	7.72	46.51
Percentage of enrolment in primary education in private institutions (%)	2	36.73	24.56	19.36	54.09
Percentage of enrolment in secondary education in private institutions (%)	2	61.22	3.87	58.48	63.95
Percentage of enrolment in post-secondary non-tertiary education in private institutions (%)	2	38.99	55.14	0.00	77.97
Percentage of enrolment in tertiary education in private institutions (%)	2	78.93	29.80	57.86	100.00
Official entrance age to pre-primary education (years)	2	3.00	0.00	3.00	3.00
Official entrance age to primary education (years)	2	5.50	0.71	5.00	6.00
Repetition rate in primary education (all grades), both sexes (%)	2	1.22	1.73	0.00	2.44
Repetition rate in lower secondary general education (all grades), both sexes (%	2	3.31	4.68	0.00	6.62
Share of all students in secondary education enrolled in general programmes (%)	2	36.79	14.83	26.31	47.28
Share of all students in secondary education enrolled in vocational programmes (%)	2	63.21	14.83	52.72	73.69
Share of all students in post-secondary non-tertiary education enrolled in general programmes (%)	2	46.97	66.42	0.00	93.94
Share of all students in post-secondary non-tertiary education enrolled in vocational programmes (%)	2	3.03	4.29	0.00	6.06
Administration of a nationally representative learning assessment in Grade 2 or 3 in reading (number)	2	1.00	0.00	1.00	1.00
Administration of a nationally representative learning assessment in Grade 2 or 3 in mathematics (number)	2	1.00	0.00	1.00	1.00
Enrolment rate in secondary and tertiary education 17 year-olds, % in same age group, 2013 – 2020	2	95.01	4.22	92.03	97.99
Enrolment rate in secondary and tertiary education 18 year-olds, % in same age group, 2013 – 2020	2	78.40	15.93	67.13	89.66
Enrolment rate in secondary and tertiary education 19 year-olds, % in same age group, 2013 – 2020	2	71.11	15.08	60.45	81.77
Population with tertiary education25-34 year-olds, % in same age group, 2011 – 2022	2	48.76	4.02	45.91	51.60
Adult education level Tertiary, % of 25-64 year-olds, 2011 – 2022	2	42.31	4.28	39.28	45.34
Adult education level Below upper secondary, % of 25-64 year-olds, 2011 – 2022	2	21.86	2.50	20.09	23.63
Adult education level Upper secondary, % of 25-64 year-olds, 2011 – 2022	2	35.83	1.78	34.57	37.09
Educational attainment rate, completed short-cycle tertiary education or higher, population 25+	2	35.96	5.28	32.23	39.70
Educational attainment rate, completed Bachelor's or equivalent education or higher, population 25+	2	32.40	0.24	32.23	32.56
Educational attainment rate, completed Master's or equivalent education or higher, population 25+	2	12.33	2.26	10.73	13.94
Educational attainment rate, completed Doctoral or equivalent education, population 25+	2	0.78	0.27	0.58	0.97
Youth not in employment, education or training (NEET)15-19 year-olds, % in same age group, 2011 – 2022	2	6.90	2.64	5.03	8.76
Youth not in employment, education or training (NEET)20-24 year-olds, % in same age group, 2011 – 2022	2	15.63	0.06	15.59	15.67

post-Communist	Obs	Mean	Std. dev.	Min	Max
Education spending - Primary to post-secondary non-tertiary, % of GDP, 2011 – 2020	7	2.57	0.55	1.72	3.30
Private spending on education - Primary to post-secondary non-tertiary, % of GDP, 2011-2020	7	0.18	0.11	0.01	0.28
Education spending - Primary, % of GDP, 2011 – 2020	7	1.03	0.48	0.43	1.75
Education spending - Secondary, % of GDP, 2011 – 2020	7	1.55	0.38	0.92	1.96
Education spending - Tertiary, % of GDP, 2011 – 2020	7	1.09	0.17	0.76	1.29
Duration of compulsory education (years)	7	10.19	1.42	8.00	12.67
weekly learning hours (2018)	7	26.10	1.19	25.00	28.30
Students' instruction time in compulsory education - primary - 2021	7	614.43	99.35	473.00	720.00
Students per teaching staff - Primary, Ratio, 2013 – 2020	7	15.07	3.58	10.59	19.18
Students per teaching staff - Secondary, Ratio, 2013 – 2020	7	11.41	1.50	8.76	12.97
Students per teaching staff - Tertiary, Ratio, 2013 – 2020	7	14.71	3.27	12.15	19.65
Gross enrolment ratio, early childhood education, both sexes (%)	7	73.83	22.90	47.55	106.96
Gross enrolment ratio, early childhood educational development programmes, both sexes (%)	7	5.75	11.25	0.00	30.72
Gross enrolment ratio, pre-primary, both sexes (%)	7	85.80	12.77	65.95	106.96
First age of selection in the education system	7	12.71	2.14	10.00	16.00
Spending on tertiary education Household, % of education spending, 2011 – 2020	7	18.74	14.54	1.48	42.39
Percentage of enrolment in primary education in private institutions (%)	7	4.62	5.23	0.56	15.11
Percentage of enrolment in secondary education in private institutions (%)	7	8.26	6.68	1.36	20.45
Percentage of enrolment in post-secondary non-tertiary education in private institutions (%)	7	38.23	31.14	0.00	79.22
Percentage of enrolment in tertiary education in private institutions (%)	7	15.88	6.16	7.76	27.69
Official entrance age to pre-primary education (years)	7	3.00	0.00	3.00	3.00
Official entrance age to primary education (years)	7	6.60	0.51	6.00	7.00
Repetition rate in primary education (all grades), both sexes (%)	7	1.09	1.02	0.12	3.01
Repetition rate in lower secondary general education (all grades), both sexes (%	7	1.85	0.95	0.47	3.27
Share of all students in secondary education enrolled in general programmes (%)	7	30.37	7.29	16.50	38.75
Share of all students in secondary education enrolled in vocational programmes (%)	7	69.63	7.29	61.25	83.50
Share of all students in post-secondary non-tertiary education enrolled in general programmes (%)	7	76.76	41.13	0.00	100.00
Share of all students in post-secondary non-tertiary education enrolled in vocational programmes (%)	7	8.96	23.70	0.00	62.70
Administration of a nationally representative learning assessment in Grade 2 or 3 in reading (number)	7	0.19	0.35	0.00	0.89
Administration of a nationally representative learning assessment in Grade 2 or 3 in mathematics (number)	7	0.13	0.34	0.00	0.89
Enrolment rate in secondary and tertiary education 17 year-olds, % in same age group, 2013 – 2020	7	88.90	6.41	77.75	95.81
Enrolment rate in secondary and tertiary education 18 year-olds, % in same age group, 2013 – 2020	7	80.74	9.11	69.08	94.53
Enrolment rate in secondary and tertiary education 19 year-olds, % in same age group, 2013 – 2020	7	61.53	11.34	49.45	78.78
Population with tertiary education25-34 year-olds, % in same age group, 2011 – 2022	6	32.61	5.67	24.51	42.08
Adult education level Tertiary, % of 25-64 year-olds, 2011 – 2022	6	24.55	3.97	18.54	29.16
Adult education level Below upper secondary, % of 25-64 year-olds, 2011 – 2022	6	13.61	7.26	6.52	25.45
Adult education level Upper secondary, % of 25-64 year-olds, 2011 – 2022	6	61.85	6.63	54.29	70.55
Educational attainment rate, completed short-cycle tertiary education or higher, population 25+	7	16.68	7.95	0.00	23.81
Educational attainment rate, completed Bachelor's or equivalent education or higher, population 25+	6	20.41	4.13	13.01	24.82
Educational attainment rate, completed Master's or equivalent education or higher, population 25+	5	14.22	4.81	9.07	19.46
Educational attainment rate, completed Doctoral or equivalent education, population 25+	5	0.53	0.26	0.08	0.73
Youth not in employment, education or training (NEET)15-19 year-olds, % in same age group, 2011 – 2022	6	6.74	3.28	3.28	12.31
Youth not in employment, education or training (NEET)20-24 year-olds, % in same age group, 2011 – 2022	6	17.92	4.77	11.22	26.07

Table A.3 - Reports and primary sources for the case studies

https://eurydice.eacea.ec.europa.eu/national-education-systems/sweden/organisation-education-system-and-its-structure

https://eurydice.eacea.ec.europa.eu/national-education-systems/sweden/assessment-single-structure-education

https://www.skolverket.se/download/18.49f081e1610d887500b9b/1516724888514/information-np-gy-engelska.pdf

https://www.vilarare.se/nyheter/nationella-prov/lararna-fortsatter-anvanda-nationella-prov-som-inte-ar-obligatoriska

https://www.schooleducationgateway.eu/downloads/files/recognition/infopack_sweden-rev.pdf

https://eurydice.eacea.ec.europa.eu/national-education-systems/sweden/overview

https://www.iea.org.uk/sites/default/files/publications/files/Schooling%20for%20money%20-%20web%20version_0.pdf

https://royalsociety.org/-/media/policy/topics/education-skills/Broadening-the-curriculum/sweden-case-study.pdf;

https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1465-3435.2009.01414.x

https://bera-journals.onlinelibrary.wiley.com/doi/full/10.1002/rev3.3262

https://www.tandfonline.com/doi/full/10.1080/02660830.2021.1984060

https://www.tandfonline.com/doi/abs/10.1080/03054980120113625

https://www.tandfonline.com/doi/full/10.1080/03054985.2011.559349?scroll=top&needAccess=true

https://www.cedefop.europa.eu/files/5173_en.pdf

https://read.oecd-ilibrary.org/education/education-policy-outlook-2018/germany_9789264301528-20-en

www.kmk.org/fileadmin/Dateien/veroeffentlichungen_beschluesse/2015/2015_00_00-Bericht-Qualifizierungsinitiative.pdf

www.bmbf.de/de/fluechtlinge-durch-bildung-integrieren.html

https://doi.org/10.1787/2b8ad56e-en

https://www.bmbf.de/bmbf/de/bildung/berufliche-bildung/berufliche-bildung_node.html;

https://bwinf.de/jugendwettbewerb/

https://www.kmk.org/fileadmin/user_upload/Erklaerung_Berufliche_Schulen_4.0_-_Endfassung.pdf

https://doi.org/10.1787/9789264225442-en

https://www.prawo.pl/kadry/rusza-rok-szkoly-zawodowcow,279798.html

https://www.pcen.gda.pl/serwisy-tematyczne/szkolnictwo-zawodowe-6/wiadomosci-szkolnictwo-zawodowe/rok-szkoly-zawodowcow-wiadomosci/

https://www.dw.com/en/thousands-of-teachers-in-poland-protest-government-education-reforms/a-36452228

ESPN Flash Report “Changes in the education system in Poland

https://ec.europa.eu/social/BlobServlet?docId=17891&langId=en

Table A4 – Sample sizes – SILC 2019

		household file	respondent file					person file	
	country code	households	aged 0-18	aged 19-25 cohabiting	aged 19-25 living alone	coded as "children"	respondents	persons	% cohabiting
AT Österreich	AT	5983	2212	524	227	3084	12357	10351	69.8%
BE Belgique/Belgïe	BE	6787	3268	1058	193	4846	15516	12590	84.6%
BG Bulgaria	BG	7340	2310	701	116	5053	17012	14980	85.8%
CH Switzerland	CH	7341	3145	1022	180	4580	16662	13861	85.0%
CY Cyprus	CY	4211	1941	892	75	3634	10974	9295	92.2%
CZ Czech Republic	CZ	8707	3367	843	188	5241	19150	16127	81.8%
DE Deutschland	DE	12350	3216	996	280	4681	23925	20854	78.1%
DK Denmark	DK	5817	1996	386	362	2468	12038	10291	51.6%
EE Estonia	EE	6265	3114	905	272	4917	15126	12424	76.9%
EL Elláda	EL	17914	5522	1741	416	10649	39803	34836	80.7%
ES España	ES	15887	7338	2482	295	13106	39852	33376	89.4%
FI Suomi	FI	9646	5260	1119	609	6723	23164	18720	64.8%
FR France	FR	11737	5786	1487	480	7829	26484	21421	75.6%
HR Croatia	HR	7880	2835	1435	93	6428	19569	17121	93.9%
HU Hungary	HU	6911	2358	812	139	4339	15141	12980	85.4%
IE Ireland	IE	4183	2867	581	112	3902	10809	8217	83.8%
IS Iceland *	IS	2969	2023	871	186	3249	8652	6794	82.4%
IT Italia	IT	20831	5797	2295	186	11749	43400	38327	92.5%
LT Lithuania	LT	5131	1665	613	76	3281	11360	9906	89.0%
LU Luxembourg	LU	3842	2291	954	92	3717	10520	8505	91.2%
LV Latvia	LV	5279	2030	434	124	3374	11394	9578	77.8%
MT Malta	MT	3785	1348	751	29	3112	9557	8351	96.3%
NL Nederland	NL	13764	5466	1947	439	7934	29899	25378	81.6%
NO Norway	NO	6079	3426	894	440	4478	14715	11837	67.0%
PL Poland	PL	19874	9367	2910	669	16917	50788	42377	81.3%
PT Portugal	PT	13570	5016	2289	246	10223	33081	28783	90.3%
RO Romania	RO	7282	1736	948	169	4481	16791	15314	84.9%
RS Serbia	RS	5130	2776	1140	158	6777	16170	13733	87.8%
SE Sverige	SE	5621	3270	708	290	4126	13461	10660	70.9%
SI Slovenia	SI	8590	4484	2213	159	9586	25253	21370	93.3%
SK Slovak Republic	SK	5591	2208	1089	103	5190	14654	12719	91.4%
UK United Kingdom *	UK	17113	7743	1787	521	10800	38705	31559	77.4%
SILC		280441	115158	37956	7738	197225	657330	555841	83.1%

Note: * data referred to the 2018 survey - unweighed

Table A5 - Fraction of children cohabiting within the family, by age – SILC 2019

	17	18	19	20	21	22	23	24	25	26	27	28	29	30
DK	0.98	0.98	0.84	0.79	0.44	0.24	0.06	0.10	0.05	0.10	0.06	0.02	0.02	0.05
EE	0.98	0.98	0.97	0.84	0.78	0.62	0.65	0.45	0.49	0.32	0.29	0.15	0.19	0.11
FI	1.00	0.97	0.91	0.78	0.49	0.33	0.23	0.18	0.13	0.08	0.11	0.05	0.06	0.04
IS *		0.94	0.94	0.85	0.84	0.78	0.71	0.50	0.45	0.38	0.27	0.23	0.21	0.10
LT	1.00	0.99	0.86	0.92	0.95	0.89	0.69	0.69	0.64	0.49	0.46	0.33	0.24	0.21
LV	0.97	0.92	0.93	0.95	0.82	0.68	0.66	0.74	0.52	0.57	0.32	0.29	0.24	0.27
NO	0.97	0.91	0.81	0.68	0.53	0.36	0.32	0.22	0.19	0.12	0.11	0.06	0.06	0.07
SE	0.95	0.95	0.85	0.73	0.53	0.43	0.34	0.25	0.22	0.10	0.11	0.09	0.07	0.02
SI	1.00	0.97	0.99	0.93	0.94	0.90	0.87	0.87	0.74	0.64	0.63	0.54	0.52	0.37
Nordic	**0.97**	**0.96**	**0.87**	**0.78**	**0.59**	**0.45**	**0.35**	**0.29**	**0.25**	**0.18**	**0.18**	**0.12**	**0.10**	**0.09**
AT	0.99	0.99	0.99	0.92	0.93	0.80	0.70	0.71	0.53	0.40	0.23	0.23	0.22	0.14
CH	1.00	1.00	0.98	0.99	0.91	0.90	0.81	0.64	0.52	0.41	0.29	0.21	0.16	0.05
DE	0.98	0.99	0.84	0.92	0.86	0.90	0.90	0.45	0.37	0.49	0.42	0.40	0.06	0.12
FR	0.99	0.99	0.95	0.88	0.86	0.64	0.57	0.44	0.25	0.25	0.17	0.16	0.10	0.08
IE	1.00	0.98	0.93	0.92	0.99	0.86	0.86	0.69	0.67	0.56	0.50	0.33	0.39	0.22
LU	0.98	0.98	0.97	0.97	0.90	0.92	0.88	0.74	0.71	0.61	0.53	0.35	0.21	0.13
NL	0.99	0.98	0.97	0.87	0.85	0.74	0.55	0.47	0.32	0.27	0.19	0.11	0.09	0.09
Continental	**0.99**	**0.99**	**0.91**	**0.90**	**0.87**	**0.79**	**0.72**	**0.48**	**0.34**	**0.38**	**0.29**	**0.25**	**0.10**	**0.10**
CY	0.98	1.00	0.98	0.92	0.97	0.83	0.78	0.81	0.77	0.73	0.63	0.58	0.40	0.28
EL	1.00	0.99	0.96	0.90	0.84	0.88	0.82	0.87	0.78	0.76	0.79	0.69	0.67	0.64
ES	0.98	0.98	0.96	0.96	0.95	0.91	0.90	0.88	0.85	0.72	0.68	0.54	0.47	0.42
IT	0.98	1.00	0.98	0.96	0.94	0.93	0.90	0.90	0.86	0.73	0.72	0.67	0.55	0.41
MT	0.98	0.97	0.93	0.97	0.96	0.91	0.91	0.97	0.93	0.74	0.52	0.43	0.50	0.60
PT	0.97	0.99	0.97	0.95	0.96	0.94	0.87	0.84	0.79	0.71	0.68	0.55	0.59	0.43
Mediterranean	**0.98**	**0.99**	**0.97**	**0.95**	**0.94**	**0.92**	**0.89**	**0.88**	**0.85**	**0.73**	**0.71**	**0.61**	**0.53**	**0.43**
BE	1.00	0.99	0.97	0.97	0.91	0.90	0.83	0.76	0.64	0.53	0.32	0.26	0.18	0.14
UK *	0.96	0.98	0.96	0.93	0.82	0.69	0.57	0.56	0.49	0.46	0.34	0.25	0.21	0.16
Anglo-Saxon	**0.97**	**0.99**	**0.96**	**0.93**	**0.84**	**0.72**	**0.61**	**0.58**	**0.51**	**0.47**	**0.34**	**0.25**	**0.21**	**0.16**
CZ	1.00	1.00	0.98	0.95	0.90	0.84	0.77	0.69	0.63	0.47	0.42	0.36	0.38	0.27
HR	0.99	0.98	0.99	0.96	0.94	0.94	0.92	0.88	0.78	0.86	0.84	0.79	0.70	0.60
HU	0.99	0.93	0.95	0.94	0.93	0.88	0.76	0.78	0.68	0.64	0.56	0.62	0.34	0.39
PL	0.99	0.98	0.97	0.94	0.91	0.87	0.83	0.79	0.73	0.66	0.61	0.51	0.47	0.45
RO	0.95	0.93	0.93	0.89	0.82	0.83	0.81	0.62	0.70	0.63	0.51	0.52	0.49	0.39
RS	0.99	0.98	0.96	0.91	0.94	0.90	0.87	0.85	0.83	0.76	0.73	0.69	0.62	0.68
SK	0.96	0.98	0.96	0.96	0.95	0.89	0.90	0.90	0.88	0.84	0.68	0.64	0.60	0.55
Post-communist	**0.98**	**0.96**	**0.96**	**0.92**	**0.89**	**0.86**	**0.83**	**0.76**	**0.73**	**0.66**	**0.59**	**0.54**	**0.49**	**0.45**

Note: * data referred to 2018 survey – red indicates values below 0.80 – weighed

Table A6 – Population aged 17-30 by education and labour market condition – SILC 2019

	secondary vocational	secondary generalist	tertiary vocational	tertiary academic	labour market	out of education	Total	% working students	% missing
DK	8.56	15.03	0.00	32.49	34.41	9.50	100.00	9.91	4.48
EE	6.60	14.34	1.75	19.65	48.92	8.75	100.00	13.79	2.54
FI	16.04	13.08	0.32	20.69	39.81	10.05	100.00	8.89	0.00
IS *	5.82	24.57	0.63	20.66	42.58	5.74	100.00	9.93	5.07
LT	2.59	10.51	1.82	23.34	54.63	7.11	100.00	5.93	5.47
LV	9.49	11.15	0.12	18.14	51.53	9.57	100.00	8.93	2.49
NO	9.33	13.66	0.21	21.71	47.38	7.71	100.00	4.78	0.67
SE	8.72	17.91	2.38	16.46	53.14	1.38	100.00	4.07	7.25
SI	15.24	9.31	0.00	33.92	40.58	0.95	100.00	7.33	0.08
Nordic	**9.74**	**14.60**	**0.98**	**22.40**	**46.00**	**6.27**	**100.00**	**6.86**	**3.76**
AT	11.94	4.70	0.63	22.87	52.43	7.44	100.00	12.13	0.48
CH	11.79	9.06	0.00	28.52	44.22	6.41	100.00	17.15	1.30
DE	0.00	18.92	7.32	26.08	42.43	5.24	100.00	29.90	1.81
FR	12.06	5.82	0.04	23.36	53.41	5.29	100.00	5.09	0.23
IE	0.02	18.11	1.91	27.23	44.75	7.97	100.00	15.91	0.63
LU	14.15	10.91	0.34	22.47	43.40	8.73	100.00	1.60	3.41
NL	13.94	7.57	0.00	28.18	43.63	6.68	100.00	9.27	5.95
Continental	**7.26**	**11.51**	**2.92**	**25.23**	**47.41**	**5.67**	**100.00**	**16.33**	**1.54**
CY	1.92	8.78	0.20	25.44	55.35	8.32	100.00	4.68	0.02
EL	1.53	15.89	4.61	26.83	46.94	4.18	100.00	4.69	0.13
ES	8.06	7.29	0.04	27.95	50.33	6.34	100.00	3.98	0.90
IT	0.00	10.65	0.66	21.74	49.89	17.06	100.00	2.52	0.51
MT	6.85	0.07	0.25	15.85	63.42	13.56	100.00	6.84	0.12
PT	7.77	11.37	0.79	22.81	54.48	2.78	100.00	3.09	1.65
Mediterranean	**3.72**	**9.84**	**0.75**	**24.48**	**50.31**	**10.89**	**100.00**	**3.31**	**0.71**
BE	8.55	7.68	0.46	25.15	48.82	9.34	100.00	2.23	1.08
UK *	1.69	4.49	0.00	10.03	74.99	8.80	100.00	8.75	20.70
Anglo-Saxon	**2.89**	**5.05**	**0.08**	**12.67**	**70.42**	**8.89**	**100.00**	**7.80**	**17.85**
BG	9.81	8.79	0.00	19.39	53.32	8.70	100.00	5.80	0.60
CZ	19.00	7.31	0.00	18.20	48.98	6.52	100.00	4.21	0.58
HR	13.32	4.52	0.00	26.91	52.43	2.82	100.00	2.51	0.07
HU	9.81	10.56	4.24	21.70	45.12	8.57	100.00	3.27	0.75
PL	9.82	6.32	0.72	14.34	63.26	5.54	100.00	5.17	13.89
RO	0.36	18.59	1.55	21.46	46.95	11.10	100.00	1.32	0.38
RS	0.00	15.00	0.37	21.22	60.23	3.17	100.00	1.77	0.09
SK	12.54	5.37	0.19	15.72	57.81	8.37	100.00	0.51	0.26
Post-communist	**8.44**	**10.01**	**1.03**	**18.42**	**54.93**	**7.16**	**100.00**	**3.57**	**5.53**

Note: * data referred to 2018 survey – weighed

Table A7 – Population aged 20-25 by maximal educational attainment – SILC 2019

	Lower than secondary	Upper secondary (generalist)	Upper Secondary (vocational)	Post-secondary non-tertiary	1st & 2nd tertiary	Total
DK	21.71	58.53	9.44	0.00	10.33	100
EE	18.10	55.81	8.45	3.97	13.67	100
FI	16.43	34.66	40.45	0.00	8.46	100
IS *	54.97	38.48	3.79	0.58	2.18	100
LT	7.38	56.80	7.16	11.85	16.81	100
LV	19.61	48.24	14.24	4.45	13.46	100
NO	27.37	37.91	14.39	0.62	19.71	100
SE	16.74	37.41	23.75	10.71	11.39	100
SI	8.56	33.73	42.22	0.00	15.48	100
Nordic	**18.86**	**43.82**	**20.38**	**4.15**	**12.79**	**100**
AT	15.51	19.51	34.60	2.34	28.04	100
CH	14.00	37.46	33.36	0.00	15.19	100
DE	32.23	45.36	0.00	9.71	12.70	100
FR	11.79	29.82	28.38	0.00	30.02	100
IE	4.65	53.33	0.00	7.67	34.35	100
LU	30.14	21.65	30.61	0.44	17.17	100
NL	15.86	35.66	25.05	0.00	23.43	100
Continental	**20.47**	**37.10**	**16.50**	**4.18**	**21.74**	**100**
CY	7.89	59.95	9.62	1.63	20.91	100
EL	4.59	65.85	10.64	8.05	10.87	100
ES	24.49	36.82	9.45	0.14	29.11	100
IT	18.83	69.27	0.00	0.73	11.18	100
MT	21.76	37.90	8.94	8.71	22.70	100
PT	22.19	37.77	21.97	1.62	16.47	100
Mediterranean	**19.95**	**54.44**	**6.23**	**1.20**	**18.18**	**100**
BE	13.52	29.11	29.64	2.67	25.06	100
UK *	14.70	41.68	18.27	0.00	25.35	100
Anglo-Saxon	**14.48**	**39.35**	**20.38**	**0.49**	**25.29**	**100**
BG	23.80	40.28	29.40	0.47	6.04	100
CZ	18.50	22.56	50.85	0.00	8.08	100
HR	5.81	20.74	63.83	0.00	9.61	100
HU	17.16	31.55	32.13	9.85	9.31	100
PL	14.95	34.59	37.34	1.52	11.59	100
RO	16.91	20.13	55.21	0.64	7.11	100
RS	8.99	84.07	0.00	0.07	6.87	100
SK	18.09	17.44	49.54	0.54	14.39	100
Post-communist	**15.87**	**32.30**	**40.68**	**1.91**	**9.24**	**100**

Note: * data referred to 2018 survey – weighed – Type of secondary education is derived from the answer to the PE040 question (*Highest ISCED level attained*): "**Secondary generalist**" corresponds to the items 300 (*Upper secondary education, not further specified*) - 340 (*General education without distinction of direct access to tertiary education*) - 342 (*General education partial level completion and without direct access to tertiary education*) - 343 (*General education level completion, without direct access to tertiary education*) - 344 (*General education level completion, with direct access to tertiary education*) while "**Secondary vocational**" corresponds to the items 350 (*Vocational education without distinction of direct access to tertiary education*) - 352 (*Vocational education partial level completion and without direct access to tertiary education*) - 353 (*Vocational education level completion, without direct access to tertiary education*) - 354 (*Vocational education level completion, with direct access to tertiary education*)

Table A8 – Enrolment rates in tertiary academic by parental education – Population aged 18-30 – SILC 2019

	low (primary and lower secondary)	medium (upper secondary and post-secondary)	high (tertiary academic)	total	social gap (tertiary/ secondary)
DK	0.042	0.148	0.188	0.160	1.28
EE	0.035	0.130	0.241	0.186	1.85
FI	0.027	0.112	0.208	0.163	1.85
IS *	0.085	0.167	0.192	0.172	1.15
LT	0.006	0.198	0.342	0.248	1.73
LV	0.108	0.140	0.275	0.195	1.96
NO	0.079	0.130	0.180	0.148	1.39
SE	0.075	0.093	0.172	0.132	1.84
SI	0.192	0.316	0.508	0.382	1.61
Nordic	**0.071**	**0.147**	**0.224**	**0.179**	**1.52**
AT	0.050	0.164	0.382	0.235	2.32
CH	0.172	0.232	0.380	0.297	1.64
DE	0.222	0.184	0.337	0.252	1.83
FR	0.121	0.210	0.397	0.253	1.89
IE	0.160	0.218	0.389	0.287	1.79
LU	0.121	0.236	0.374	0.244	1.59
NL	0.169	0.264	0.333	0.277	1.26
Continental	**0.140**	**0.200**	**0.362**	**0.257**	**1.82**
CY	0.117	0.278	0.369	0.278	1.32
EL	0.097	0.226	0.443	0.263	1.96
ES	0.148	0.308	0.504	0.307	1.64
IT	0.098	0.264	0.488	0.242	1.85
MT	0.120	0.168	0.252	0.161	1.50
PT	0.154	0.340	0.446	0.253	1.31
Mediterranean	**0.124**	**0.274**	**0.487**	**0.268**	**1.77**
BE	0.116	0.224	0.372	0.275	1.66
UK *	0.093	0.123	0.146	0.127	1.19
Anglo-Saxon	**0.100**	**0.156**	**0.227**	**0.177**	**1.45**
BG	0.020	0.206	0.453	0.219	2.20
CZ	0.019	0.168	0.385	0.197	2.29
HR	0.107	0.262	0.439	0.289	1.67
HU	0.041	0.207	0.416	0.233	2.01
PL	0.034	0.116	0.271	0.139	2.33
RO	0.069	0.225	0.444	0.224	1.97
RS	0.043	0.216	0.413	0.237	1.91
SK	0.008	0.157	0.274	0.165	1.75
Post-communist	**0.043**	**0.173**	**0.363**	**0.193**	**2.10**
Total	*0.115*	*0.202*	*0.362*	*0.236*	*1.80*

Note: * data referred to 2018 survey – weighed

Table A9 – Enrolment rates in tertiary academic by income position – Population aged 18-30 – SILC 2019

	cohabiting children aged 18-30				children living alone aged 18-30			
	poor (1st tercile)	middle (2nd tercile)	rich (3rd tercile)	total	poor (1st tercile)	middle (2nd tercile)	rich (3rd tercile)	total
DK	0.073	0.033	0.051	0.056	0.596	0.385	0.158	0.431
EE	0.172	0.218	0.308	0.238	0.259	0.151	0.131	0.176
FI	0.026	0.068	0.099	0.058	0.438	0.281	0.143	0.299
IS *	0.129	0.151	0.231	0.171	0.378	0.124	0.199	0.248
LT	0.232	0.355	0.379	0.323	0.079	0.093	0.115	0.096
LV	0.214	0.269	0.212	0.231	0.140	0.121	0.161	0.142
NO	0.135	0.135	0.139	0.136	0.517	0.125	0.094	0.280
SE	0.101	0.106	0.118	0.107	0.394	0.114	0.067	0.213
SI	0.363	0.424	0.448	0.411	0.290	0.160	0.173	0.216
Nordic	**0.139**	**0.181**	**0.208**	**0.173**	**0.451**	**0.198**	**0.115**	**0.277**
AT	0.233	0.235	0.325	0.263	0.344	0.122	0.146	0.209
CH	0.306	0.352	0.403	0.348	0.295	0.200	0.220	0.241
DE	0.206	0.265	0.336	0.271	0.485	0.158	0.144	0.264
FR	0.329	0.338	0.409	0.359	0.261	0.089	0.097	0.145
IE	0.210	0.385	0.387	0.328	0.263	0.201	0.171	0.208
LU	0.238	0.334	0.371	0.312	0.181	0.041	0.039	0.088
NL	0.300	0.314	0.316	0.309	0.572	0.152	0.141	0.288
Continental	**0.265**	**0.302**	**0.364**	**0.310**	**0.385**	**0.128**	**0.127**	**0.212**
CY	0.274	0.377	0.370	0.336	0.142	0.078	0.045	0.091
EL	0.202	0.298	0.347	0.284	0.468	0.351	0.187	0.316
ES	0.278	0.345	0.463	0.361	0.071	0.066	0.089	0.075
IT	0.234	0.276	0.329	0.275	0.085	0.031	0.056	0.059
MT	0.172	0.152	0.210	0.178	0.000	0.141	0.158	0.109
PT	0.257	0.262	0.343	0.291	0.088	0.042	0.088	0.073
Mediterranean	**0.248**	**0.301**	**0.382**	**0.307**	**0.102**	**0.068**	**0.084**	**0.085**
BE	0.346	0.391	0.409	0.384	0.147	0.036	0.057	0.077
UK *	0.103	0.083	0.096	0.093	0.186	0.107	0.050	0.111
Anglo-Saxon	**0.153**	**0.142**	**0.156**	**0.150**	**0.181**	**0.097**	**0.051**	**0.106**
BG	0.134	0.251	0.383	0.261	0.069	0.068	0.102	0.079
CZ	0.233	0.254	0.259	0.249	0.139	0.089	0.086	0.104
HR	0.283	0.307	0.329	0.308	0.219	0.162	0.089	0.158
HU	0.261	0.274	0.265	0.267	0.231	0.099	0.124	0.148
PL	0.153	0.165	0.157	0.159	0.242	0.087	0.082	0.125
RO	0.234	0.322	0.274	0.275	0.262	0.033	0.098	0.128
RS	0.222	0.284	0.285	0.266	0.100	0.052	0.046	0.065
SK	0.232	0.209	0.140	0.192	0.107	0.022	0.030	0.050
Post-communist	**0.207**	**0.240**	**0.229**	**0.226**	**0.204**	**0.072**	**0.087**	**0.116**
Total	*0.230*	*0.263*	*0.305*	*0.266*	*0.303*	*0.116*	*0.100*	*0.173*

Note: * data referred to 2018 survey – weighed

Table A10 – Enrolment and attainment in tertiary (academic and vocational) education – SILC 2019

	enrolment 18-25	enrolment 26-30	attainment 30-35	estimated dropout rate
DK	0.37	0.28	0.56	0.447
EE	0.31	0.13	0.53	0.247
FI	0.22	0.24	0.47	0.314
IS *	0.19	0.25	0.46	0.278
LT	0.39	0.08	0.68	0.121
LV	0.28	0.10	0.56	0.086
NO	0.29	0.15	0.48	0.317
SE	0.23	0.17	0.56	0.092
SI	0.45	0.23	0.44	0.596
Nordic	**0.30**	**0.19**	**0.53**	**0.288**
AT	0.30	0.18	0.48	0.352
CH	0.36	0.22	0.56	0.379
DE	0.39	0.28	0.63	0.383
FR	0.36	0.08	0.49	0.330
IE	0.41	0.12	0.73	0.164
LU	0.31	0.15	0.59	0.195
NL	0.38	0.18	0.60	0.329
Continental	**0.37**	**0.18**	**0.58**	**0.343**
CY	0.40	0.10	0.60	0.276
EL	0.48	0.13	0.54	0.468
ES	0.43	0.11	0.45	0.490
IT	0.34	0.10	0.29	0.596
MT	0.23	0.10	0.41	0.220
PT	0.35	0.10	0.35	0.521
Mediterranean	**0.38**	**0.11**	**0.38**	**0.528**
BE	0.42	0.07	0.53	0.355
UK *	0.14	0.05	0.54	-0.725
Anglo-Saxon	**0.19**	**0.06**	**0.54**	**-0.336**
BG	0.32	0.08	0.30	0.538
CZ	0.29	0.09	0.34	0.450
HR	0.38	0.14	0.33	0.608
HU	0.38	0.09	0.46	0.410
PL	0.24	0.07	0.51	0.002
RO	0.37	0.06	0.31	0.566
RS	0.33	0.10	0.34	0.515
SK	0.27	0.03	0.36	0.307
Post-communist	**0.31**	**0.07**	**0.40**	**0.372**
Total	*0.33*	*0.13*	*0.26*	**0.653**

Note: * data referred to 2018 survey – weighed – the final column is estimated from

$$\delta = 1 - \frac{graduates_{30-35}}{enrolment_{18-25} \cdot \frac{7}{4} + enrolment_{26-30} \cdot \frac{5}{4}}$$

Table A11 – Tertiary academic graduation rates by parental education – Population aged 30-35 – SILC 2019

	low (primary and lower secondary)	medium (upper secondary and post-secondary)	high (tertiary academic)	total	social gap (tertiary/ secondary)
DK	0.386	0.430	0.712	0.554	1.66
EE	0.262	0.340	0.608	0.475	1.79
FI	0.256	0.361	0.574	0.470	1.59
IS *	0.000	0.214	0.395	0.231	1.85
LT	0.118	0.465	0.860	0.576	1.85
LV	0.074	0.402	0.695	0.495	1.73
NO	0.100	0.369	0.653	0.460	1.77
SE	0.344	0.315	0.667	0.512	2.12
SI	0.130	0.380	0.673	0.426	1.77
Nordic	**0.251**	**0.382**	**0.668**	**0.501**	**1.75**
AT	0.139	0.395	0.721	0.473	1.82
CH	0.276	0.495	0.779	0.574	1.58
DE	0.384	0.361	0.586	0.452	1.63
FR	0.356	0.521	0.780	0.507	1.50
IE	0.436	0.721	0.854	0.690	1.19
LU	0.269	0.537	0.889	0.585	1.66
NL	0.392	0.607	0.753	0.614	1.24
Continental	**0.355**	**0.424**	**0.676**	**0.496**	**1.59**
CY	0.298	0.594	0.803	0.566	1.35
EL	0.236	0.514	0.799	0.443	1.56
ES	0.306	0.548	0.761	0.450	1.39
IT	0.153	0.366	0.675	0.292	1.84
MT	0.239	0.460	0.627	0.385	1.36
PT	0.243	0.477	0.745	0.343	1.56
Mediterranean	**0.233**	**0.441**	**0.737**	**0.374**	**1.67**
BE	0.274	0.509	0.753	0.527	1.48
UK *	0.237	0.253	0.576	0.365	2.28
Anglo-Saxon	0.262	0.445	0.703	0.480	**1.58**
BG	0.021	0.297	0.694	0.308	2.33
CZ	0.144	0.318	0.706	0.345	2.22
HR	0.132	0.310	0.711	0.337	2.29
HU	0.111	0.344	0.764	0.366	2.22
PL	0.153	0.468	0.803	0.496	1.72
RO	0.084	0.279	0.867	0.277	3.11
RS	0.051	0.344	0.608	0.339	1.77
SK	0.120	0.350	0.646	0.341	1.84
Post-communist	**0.105**	**0.368**	**0.749**	**0.377**	**2.04**
Total	*0.255*	*0.405*	*0.698*	*0.435*	*1.72*

Note: * data referred to 2018 survey – weighed

Table A12 - Tertiary enrolment conditional on possessing a secondary degree – people aged 18-30 – linear probability model – SILC 2019

VARIABLES	SILC	Nordic	Continental	Mediterranean	Anglo Saxon	Post-communist
female	0.055***	0.038	0.047**	0.056***	0.032	0.085***
	[0.006]	[0.021]	[0.017]	[0.006]	[0.044]	[0.007]
age	-0.030***	-0.015	-0.021**	-0.045***	-0.015	-0.039***
	[0.005]	[0.009]	[0.006]	[0.002]	[0.012]	[0.005]
born outside EU	-0.065*	-0.162***	0.001	-0.082	0.12	0.08
	[0.037]	[0.026]	[0.025]	[0.059]	[0.091]	[0.062]
secondary vocational degree	-0.288***	-0.285***	-0.470***	-0.298***	-0.134	-0.159*
	[0.054]	[0.046]	[0.010]	[0.013]	[0.062]	[0.072]
working student	0.438***	0.293**	0.460***	0.432***	0.383*	0.556***
	[0.046]	[0.106]	[0.062]	[0.090]	[0.045]	[0.014]
living alone	-0.094***	0.007	-0.132***	-0.117***	-0.329	-0.100***
	[0.019]	[0.028]	[0.027]	[0.008]	[0.112]	[0.012]
(log) household income equiv.	-0.057***	-0.088***	-0.112**	-0.017**	-0.035	-0.058***
	[0.018]	[0.026]	[0.036]	[0.005]	[0.027]	[0.014]
ability to make ends meet	0.013***	-0.003	0.026**	0.019**	0.016	0.001
	[0.004]	[0.007]	[0.008]	[0.006]	[0.008]	[0.004]
home ownership	0.019*	-0.061**	0.025*	0.076***	0.01	0.019
	[0.010]	[0.024]	[0.012]	[0.014]	[0.023]	[0.017]
HPO: Managers	0.141***	0.128	0.08	0.106*	0.075	0.261***
	[0.042]	[0.071]	[0.054]	[0.047]	[0.035]	[0.017]
HPO: Professionals	0.164***	0.087	0.074*	0.156***	0.1	0.215***
	[0.035]	[0.077]	[0.033]	[0.022]	[0.052]	[0.034]
HPO: Technicians and Associate Professionals	0.112**	0.092	0.007	0.082***	0.035	0.181***
	[0.042]	[0.076]	[0.054]	[0.013]	[0.048]	[0.041]
HPO: Clerical Support Workers	0.066	0.070*	-0.012	0.113***	-0.051	0.166***
	[0.046]	[0.036]	[0.057]	[0.011]	[0.036]	[0.017]
HPO: Services and Sales Workers	0.026	0.061	-0.066**	0.070***	0.01	0.112***
	[0.030]	[0.060]	[0.024]	[0.014]	[0.005]	[0.027]
HPO: Skilled Agricultural, Forestry and Fish	-0.029	0.025	-0.082*	-0.017	-0.077*	0.021
	[0.036]	[0.049]	[0.033]	[0.035]	[0.011]	[0.034]
HPO: Craft and Related Trades Workers	0.026	0.03	0.011	0.024	0.025	0.081***
	[0.028]	[0.054]	[0.029]	[0.017]	[0.036]	[0.016]
HPO: Plant and Machine Operators and Assembl	0.002	0.077	-0.086**	-0.024	0.051	0.065***
	[0.037]	[0.058]	[0.028]	[0.031]	[0.053]	[0.017]
HPE: secondary or postsecondary	0.070***	0.038	0.018	0.087**	0.002	0.052**
	[0.025]	[0.027]	[0.014]	[0.031]	[0.020]	[0.016]
HPE: tertiary degree	0.168***	0.103*	0.093***	0.223**	0.025	0.238***
	[0.034]	[0.051]	[0.014]	[0.075]	[0.019]	[0.033]
parent born outside EU	0.052*	0.056**	0.106***	-0.035	0.052	0.001
	[0.026]	[0.022]	[0.019]	[0.034]	[0.037]	[0.022]
absent father	-0.005	-0.030**	-0.003	-0.02	0.007	-0.011
	[0.008]	[0.012]	[0.014]	[0.027]	[0.046]	[0.011]
absent mother	0.02	0.028	0.032	-0.046**	0.068**	0.003
	[0.022]	[0.031]	[0.030]	[0.012]	[0.003]	[0.022]
Observations	38 431	8 268	6 920	10 288	2 174	10 781
R^2	0.376	0.294	0.472	0.410	0.270	0.371

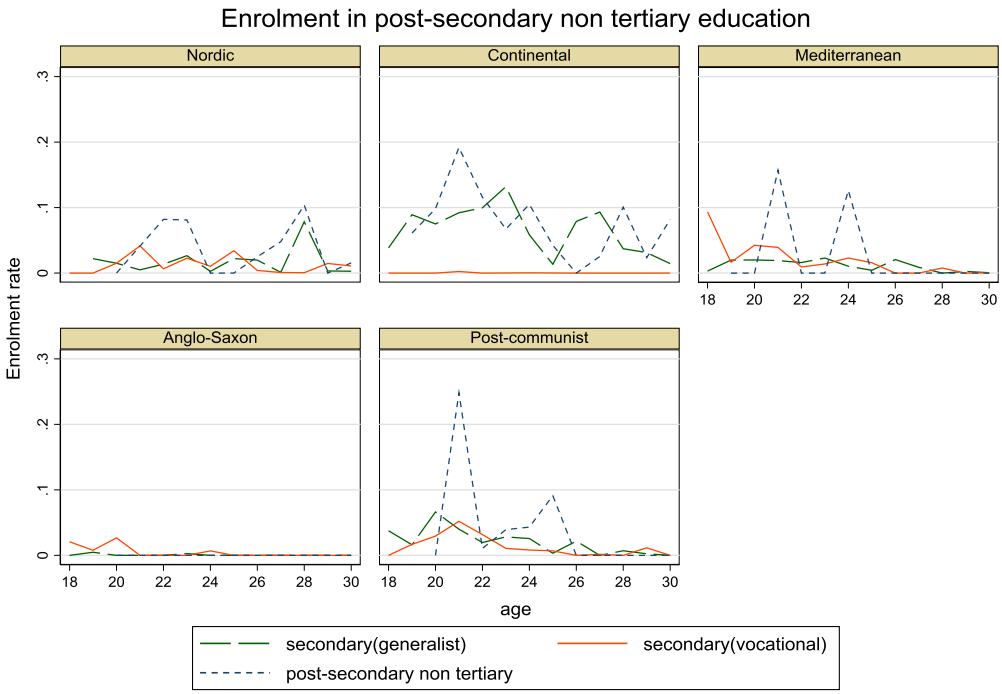
Robust standard errors in brackets - *** p<0.01, ** p<0.05, * p<0.1 – Constant and country fixed effects included – errors clustered at country level – weighed using sample weights - controls for imputed parental variables – HPO: highest parental occupation – HPE: highest parental education

Table A13 – Tertiary attainment – people aged 30-35 – linear probability model – SILC 2019

VARIABLES	SILC	Nordic	Continental	Mediterranean	AngloSaxon	Post-communist
female	0.117***	0.182***	0.083***	0.125***	0.098	0.143***
	[0.009]	[0.011]	[0.008]	[0.007]	[0.026]	[0.019]
age	-0.004	0.005	-0.011	0	-0.007***	-0.003
	[0.003]	[0.007]	[0.006]	[0.006]	[0.000]	[0.003]
born outside EU	0.014	-0.052*	0.078	-0.100***	0.082	0.063
	[0.049]	[0.025]	[0.063]	[0.013]	[0.104]	[0.036]
home ownership	0.129***	0.110***	0.123***	0.111**	0.208**	0.091**
	[0.017]	[0.019]	[0.023]	[0.039]	[0.016]	[0.032]
HPO: Managers	0.231***	0.187**	0.218*	0.200***	0.113	0.279***
	[0.042]	[0.063]	[0.094]	[0.012]	[0.070]	[0.059]
HPO: Professionals	0.281***	0.186**	0.294***	0.247***	0.09	0.287***
	[0.036]	[0.070]	[0.075]	[0.014]	[0.116]	[0.033]
HPO: Technicians and Associate Professionals	0.217***	0.099	0.238***	0.192***	0.057	0.297***
	[0.016]	[0.069]	[0.042]	[0.009]	[0.037]	[0.022]
HPO: Clerical Support Workers	0.220***	0.093	0.215***	0.138**	0.121	0.207***
	[0.033]	[0.074]	[0.050]	[0.035]	[0.091]	[0.013]
HPO: Services and Sales Workers	0.093***	0.017	0.089*	0.080***	0.025	0.088***
	[0.017]	[0.072]	[0.037]	[0.009]	[0.010]	[0.024]
HPO: Skilled Agricultural, Forestry and Fish	0.008	-0.077	0.144	0.037	-0.135	-0.025
	[0.029]	[0.056]	[0.079]	[0.027]	[0.048]	[0.031]
HPO: Craft and Related Trades Workers	0.055**	-0.046	0.094*	0.053***	-0.055	0.022
	[0.022]	[0.093]	[0.044]	[0.008]	[0.043]	[0.016]
HPO: Plant and Machine Operators and Assembl	0.038	-0.027	0.061	0.040*	-0.027	0.002
	[0.033]	[0.052]	[0.083]	[0.017]	[0.013]	[0.027]
HPE: secondary or postsecondary	0.104***	0.093	0.095**	0.157***	0.056	0.159***
	[0.020]	[0.052]	[0.032]	[0.009]	[0.045]	[0.026]
HPE: tertiary degree	0.283***	0.291***	0.252***	0.324***	0.304*	0.373***
	[0.034]	[0.036]	[0.063]	[0.021]	[0.041]	[0.033]
parent born outside EU	-0.108	0.029	-0.171	-0.071**	-0.008	0.049
	[0.065]	[0.045]	[0.160]	[0.021]	[0.034]	[0.039]
Observations	36 713	8 196	7 058	9 138	2 699	9 622
R^2	0.193	0.15	0.162	0.221	0.101	0.225

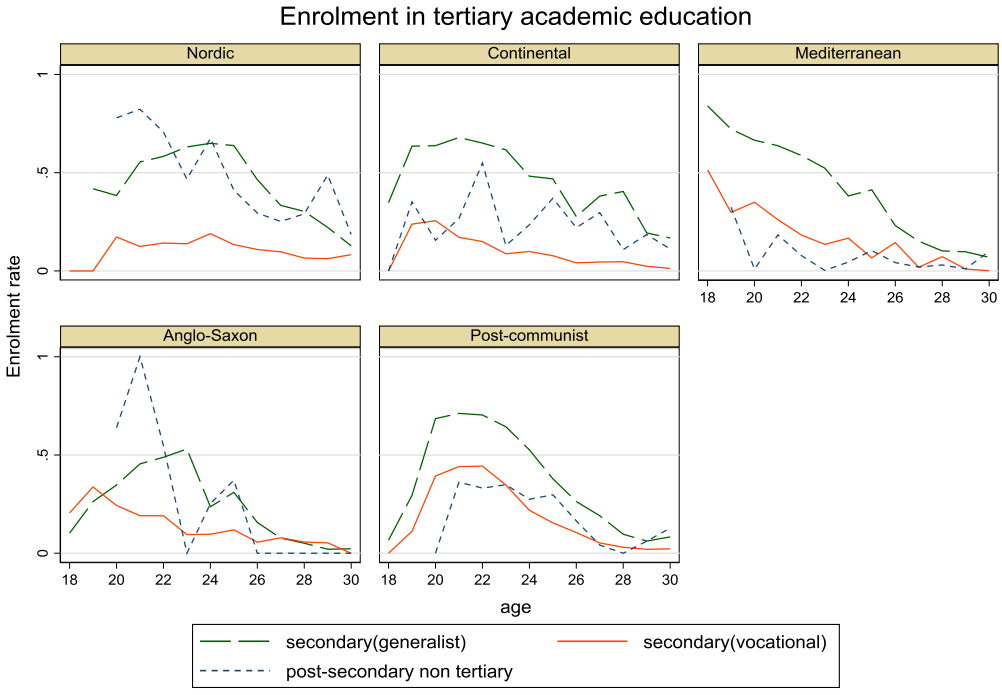
Robust standard errors in brackets - *** p<0.01, ** p<0.05, * p<0.1 – Constant and country fixed effects included – errors clustered at country level – weighed using sample weights - controls for imputed parental variables – HPO: highest parental occupation – HPE: highest parental education

Figure A1 – Enrolment in post-secondary education by secondary school attainment and age



Enrolment rates by previous attainment relative to the age cohort, using sample weights

Figure A2 – Enrolment in tertiary academic education by secondary school attainment and age



Enrolment rates by previous attainment relative to the age cohort, using sample weights

Beyond the Classroom: Global Competencies and the Path to Higher Education *

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1 Introduction

In the past, researchers and policymakers have typically assessed the quality of education and students' potential for success through learning outcomes. However, in today's interconnected and rapidly changing world, such metrics provide only a partial picture of an individual's readiness to thrive. Skills such as cultural awareness, effective communication, critical thinking, perspective-taking and the ability to engage meaningfully with people from diverse backgrounds have emerged as critical to success at both personal and societal levels. These competencies not only boost employability in the current global economy but also encourage social responsibility, ethical engagement with global issues, and the capacity to adapt and persevere through changes. In recent years, researchers have dedicated increasing attention to these dimensions, which have been collectively referred to as *Global Competences* (Bilgili 2019; Boix Mansilla 2016; Reimers 2009; Sälzer and Roczen 2018). Yet, how to define, measure, and analyze these competencies remains a challenging question, which this chapter aims to explore.

A key step in the formal recognition of the concept of global competencies was made in 2016 when the OECD's Programme for International Student Assessment (PISA) announced that it would assess global competence for the first time in its 2018 edition. The PISA program started back in 2000 and it regularly surveys thousands of 15-year-old students across the globe to assess their ability to use their reading, mathematics, and science knowledge and skills to meet real-life challenges. The PISA surveys are generally conducted every 3 years, and in the 2018 editions, they included a first attempt to systematically measure Global

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Competencies across countries, by focusing on students' socio-cognitive skills and attitudes about global and intercultural issues.

According to the PISA framework, global competence is defined as a multidimensional skill that encompasses the ability to "*examine local, global and intercultural issues, understand and appreciate different perspectives and world views, interact successfully and respectfully with others, and take responsible action toward sustainability and collective well-being*" (OECD, 2020, p. 4). It's thought of as a combination of four core dimensions – knowledge, skills, attitudes, and values – that work together to help individuals navigate global challenges and adapt to various cultural settings (OECD 2020).

The inclusion of Global Competencies within the PISA assessment reflected a growing recognition of the need for education systems to prepare students not only with traditional academic skills but also with the attitudes, skills, and knowledge necessary to tackle global challenges and thrive in a multicultural and interconnected world. Understanding how globalization affects student populations is especially relevant. Young people are today more globally connected than ever, thanks to greater access to international goods and services, extensive use of social media, and more opportunities for international study and travel (e.g. Leander and McKim 2003). Moreover, understanding how to nurture a global mindset in youth should be a crucial objective for societies, as individuals exposed to global perspectives in their formative years are more likely to grow into adults who are committed to a global outlook and take collective responsibility to improve the well-being of others, regardless of cultural and geographical differences (Boix Mansilla 2016; OECD 2020; UNESCO 2015). Educational institutions play a vital role in developing the global competence of young minds, equipping them to understand and engage with both their local communities and the broader world (Barrett 2018; Bilgili 2019; Jang, Schwarzenthal, and Juang 2023; OECD 2020; UNESCO 2015).

In this chapter, we use the PISA 2018 survey data to explore the factors that are associated with global competencies among young individuals and how these competencies relate to their educational trajectories and career ambitions. Global competencies are likely to be shaped by a combination of factors that influence an individual's ability to navigate and thrive in a globalized world. These influencing factors are interrelated and primarily stem from three main areas: individual attributes, family background, and educational environment.

We structure our analysis in two core parts. We start by using PISA 2018 data to describe Global Competencies and understand how they vary across countries. We focus our attention on all European countries included in the PISA sample. We also discuss how socioeconomic contexts and cultural experiences can influence Global Competencies by looking at a set of

cross-country correlations with relevant national characteristics.

We then move to study student-level data. We employ a pooled country fixed-effect model to control for both observed and unobserved cross-country variations and we investigate how different individual, family, and school characteristics are associated with different levels of Global Competencies. Importantly, we provide systematic evidence on how Global Competencies may influence students' further education aspirations, i.e. their willingness to continue studying in higher education, and their expectations for their future professional status.

The rest of the chapter is organized as follows. Section 2 discusses the definition and assessment of Global Competencies and section 3 presents the PISA 2018 data. Section 4 reports the analysis that we conduct at the country level, while section 5 reports and discusses our findings at the student level. Section 6 discusses the role of Global Competencies in shaping the path toward higher education and occupational status. Finally, section 7 offers some concluding remarks.

2 Defining Global Competencies

To thrive in an increasingly interconnected and rapidly changing world, individuals and societies need to be equipped with a rich set of competencies. A variety of frameworks, with different names, have been developed to attempt to capture these skills. Institutions such as the LEGO Foundation, the Brookings Institution, and J-PAL, for instance, refer to them as "holistic skills" or "breadth of skills". Other organizations and institutions have used terms such as whole child development, social and emotional learning (SEL), 21st-century skills, life skills, soft skills, and non-cognitive skills, to name a few (Zosh, Hassinger-Das, and Laurie 2022). To streamline and facilitate comparison among these frameworks, Harvard's EASEL Lab initiated the Taxonomy Project[1], which organizes and maps out the principal frameworks for social and emotional learning across different fields. The term *Global Competencies* gained increasing popularity and recognition after 2016, when the OECD used it to indicate the new set of skills that it was planning to measure in its 2018 PISA assessment, on top of the usual academic skills. As we plan to perform an empirical analysis using the publicly available PISA data, we will refer to the OECD definition of Global Competencies throughout this chapter.

Overall, as the name itself suggests, Global Competencies (GC) represent a set of skills that are increasingly relevant in today's globalized world, characterized by cultural diversity

1. Accessible at the following link: https://easel.gse.harvard.edu/taxonomy-project

and rapid information flows. Markets' integration, migration flows, new communication technologies, enhanced cultural awareness, urbanization, and global media influence are just some of the factors that contributed to the increasing importance of global competencies. Migration, in particular, has played a key role in spurring cultural diversity: people move to different regions for work, education, or refuge, bringing their unique cultures with them. These movements and the intersections of cultures and traditions they generate heighten the need for intercultural skills.

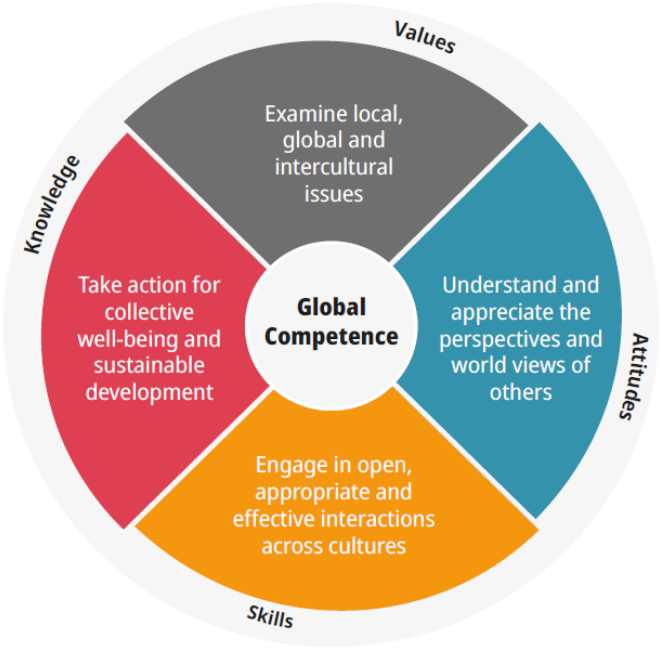
But what are exactly these Global Competencies? The term does not indicate just a specific skill but rather a combination of knowledge, skills, attitudes, and values that can be applied when interacting with individuals from culturally diverse backgrounds and when addressing global challenges. These challenges are characterized by their disregard for national boundaries and their significant implications for both present and future generations. More specifically, in the 2018 PISA framework, global competence comprises four highly interdependent dimensions (Figure 1):

1. The capacity to examine issues and situations of local, global, and cultural significance;
2. The capacity to understand and appreciate different perspectives and worldviews;
3. The ability to establish positive interactions with people of different national, ethnic, religious, social, or cultural backgrounds or gender;
4. The capacity and disposition to take constructive action towards sustainable development and collective well-being.

These four dimensions rest on four foundational elements: knowledge, skills, attitudes, and values, which are closely interconnected. Understanding global issues demands not only specific knowledge about the subject but also the skill to convert this awareness into a more profound comprehension. Moreover, it requires the capacity to contemplate the issue through various cultural lenses and a readiness to act in favour of sustainability and collective well-being.

Overall, global competencies are expected to capture the ability to interact respectfully and effectively with people from different cultural backgrounds, thus enhancing personal and professional relationships. Such cultural awareness and sensitivity imply an ability to understand and appreciate cultural diversity. It also relates to the ability to communicate effectively across cultural and linguistic barriers, as this can facilitate collaborations and reduce misunderstandings. Critical thinking and problem-solving attitudes also play a key role in the definition of global competencies, as they provide the resources that enable us to tackle complex problems that transcend national borders, such as climate change, migration,

Figure 1: The four dimensions of global competence



Source: OECD (2019)

and global health crises. Global competencies are also expected to encompass the ability to critically assess and effectively utilize digital information and communication technologies, as these are essential for staying informed and engaged in a world where digital interactions transcend geographical boundaries.

Global competencies are thus expected to be relevant both at an individual and societal level. At the individual level, they are expected to enhance employability and career prospects: in an increasingly global economy, employers are going to value individuals who can navigate international markets, understand global economic trends, and work effectively in multicultural teams. At the societal level, global competencies are expected to encourage a sense of responsibility towards global issues and ethical considerations, thus promoting a more compassionate, equitable, and sustainable world. Finally, global competencies are expected to increase adaptability and resilience, as the ability to strive in the midst of diverse cultures and global challenges is expected to help individuals adapt to change and navigate the uncertainties of the global landscape.

Global competencies hold particular significance for students, in an era where young people are interconnected on an unprecedented global scale through enhanced access to international goods and services, widespread social media use, and increased chances for studying and traveling abroad. By embracing global perspectives early on, individuals are likely to

become more inclined to adopt a global outlook and embrace a collective responsibility for enhancing the well-being of people across diverse cultural and geographical settings (Boix Mansilla 2016; OECD 2020; UNESCO 2015). Educational systems can thus play a vital role in nurturing global competencies, preparing young individuals to navigate and contribute to both their local communities and the wider international community (e.g. Barrett 2018; UNESCO 2015).

The inclusion of global competencies in the OECD's PISA assessment underscores the recognition that these skills are essential for young people preparing to enter a more interconnected world than ever. The focus on global competencies aims to prepare students not just for the workforce but to be active, informed, and responsible global citizens. Collectively, global competencies emphasize the development of a holistic set of skills that go beyond traditional academic skills.

As it is clear from the above discussion, global competencies aim to embrace a broad set of skills that are, for the most part, difficult to precisely define and quantify. The big challenge is, therefore, to operationalize this broad concept. The OECD did so by defining nine specific dimensions that together compose the concept of global competencies and by defining a set of survey questions that allows us to measure them. These nine dimensions, which will be discussed in more detail in the next section, are:

i. Awareness of global issues;

ii. Self-efficacy regarding global issues;

iii. Perspective-taking;

iv. Respect for people from other cultures;

v. Interest in learning about other cultures;

vi. Awareness of intercultural communication;

vii. Global-mindedness;

viii. Cognitive flexibility/adaptability;

ix. Attitudes towards immigrants.

The OECD's framework and the associated measurement are expected to support educational institutions and policymakers in their effort to develop curricula, teaching strategies, and assessment methods that could foster the development of Global Competencies among students.

2.1 Contributions and limitations of the OECD's framework

The OECD's framework for global competencies provides an ambitious attempt to encapsulate and evaluate the essential skills students need to navigate and contribute positively to a world that's more interconnected than ever. The breadth of dimensions that are covered by this concept highlights the multifaceted nature of global competencies. The framework not only highlights the importance of understanding and respecting cultural diversity in today's world but also gives weight to the cultivation of empathy and open-mindedness, which are crucial in a multicultural world facing complex challenges.

One of the key features of this framework is its push for standardization, offering a way for nations to benchmark their outcomes against a global yardstick. Such standardization can provide a key resource for policymakers and educational institutions that are keen on improving their curricula to improve their standards of global competence. Moreover, by stressing the development of critical thinking and problem-solving skills, the OECD framework aims to equip students with the ability to tackle pressing global issues, such as environmental sustainability and social inequality, encouraging a generation that is not only aware but also capable of contributing to sustainable solutions.

However, the ambitious nature of the OECD's framework comes with its challenges. Measuring global competencies, particularly the softer, more nuanced skills like empathy and cultural sensitivity, is a difficult task. The complexity of accurately assessing these competencies across different cultural landscapes means that there's a constant risk of falling short of the framework's inclusive and universal aspirations. Furthermore, the implementation of this framework across different countries and educational systems is inevitably going to confound the development of global competencies with other dimensions (e.g. resource availability and prevailing cultural norms).

The framework's emphasis on standardization, while beneficial for comparability, also carries the risk of encouraging an overreliance on measurable outcomes. So far, global competencies were only measured in the 2018 PISA data cycle, however, if they were to become the standard and new data collection took place in the future, they might lead to prioritizing quantifiable achievements over the deeper, more transformative aspects of developing the skills that are essential for true intercultural understanding and critical engagement with global issues. Additionally, there's a lingering concern that the framework, despite its global orientation, might suffer from underlying biases towards Western perspectives and values, potentially undermining its goal to cultivate a genuine appreciation for global diversity.

Finally, there is one challenge that is embedded in any attempt to capture attitudes and skills through survey questions: ideally, we would like to capture them through individuals'

actions and behaviors, but in the impossibility of observing them, we rely on self-reported measures. Such measures are filtered through individual experiences and might therefore suffer from different forms of biases.

The OECD's framework for teaching global competencies aims to prepare students for today's interconnected and rapidly changing world, but achieving this goal is complex. While the framework proposes a practical way of measuring these skills, the objective should not be to create tests to measure these skills, but rather to find ways to really embed the values of understanding, critical thinking, and perspective taking into education. As the world becomes increasingly interconnected, the importance of teaching students to navigate through it with awareness and respect for different cultures and perspectives grows. But the journey toward fully embracing these global competencies involves more than just assessments; it requires a deep commitment to genuinely enriching students' educational experiences with these essential skills.

PISA 2018 represents the first attempt to measure global competencies in a standardized way on a global scale, and as such, it provides an invaluable resource to researchers and policymakers. This is why we dedicate this entire chapter to such data and analysis. However, it is important to keep its limitations in mind while discussing and analyzing the data in the next sections.

3 The data

PISA 2018 data collection covered a total of 37 OECD member countries and an additional 42 partner countries. The data collection incorporated two primary instruments to gauge students' global competencies (Figure 2):

1. A Cognitive Test, which concentrated on assessing knowledge and cognitive abilities. This component was administered in only 24 participating countries.

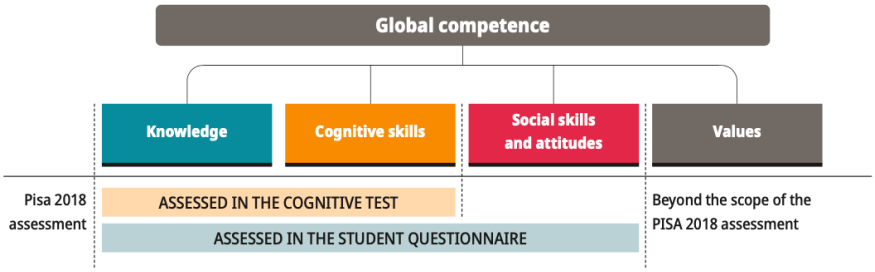
2. A Student Questionnaire, which gathered self-reported data pertaining to students' awareness, socio-cognitive skills, and attitudes. This was implemented across a wider range of 66 participating countries.

For our study, we focus on the student questionnaire because it is more comprehensive and has a wider coverage than the cognitive test. We consider all 29 European countries that participated in the study. The list includes Albania, Belarus, Belgium, Bosnia-Herzegovina, Bulgaria, Croatia, Estonia, Germany, Greece, Hungary, Iceland, Italy, Kosovo,

Latvia, Lithuania, Malta, Moldova, North Macedonia, Poland, Portugal, Romania, Scotland, Serbia, Slovakia, Slovenia, Spain, Switzerland, Turkey, Ukraine.

Survey questions were selected from a larger pool on the basis of theoretical considerations and previous research. Item response theory modeling was used to confirm the theoretically expected behavior of the indices and to validate their comparability across countries. The PISA 2018 Assessment and Analytical Framework (OECD 2019) and the Technical Report (OECD 2022) provide an in-depth description of this process and methodology.

Figure 2: PISA Assessment of Global Competence



Source: OECD (2019)

In addition to surveying students, the PISA assessment also surveys parents and schools. The school questionnaire is completed by each participating school, ensuring representativeness at the national level. In contrast, the parents' questionnaire is distributed to participating students for optional completion by their parents and may not achieve similar representativeness across the population. For this reason, when we perform our analysis at the individual level, we rely on household characteristics as recorded in the students' questionnaire, which has therefore the same coverage and representativeness as the students' questionnaire. Dimensions related to the family and educational ecosystem surrounding the students provide additional contextual depth, allowing us to study a richer set of factors that might influence global competence. Among other things, the school survey records details on specific programs, activities, and pedagogical approaches in place in the school to foster global competencies, providing the first recording of practical measures supporting the development of these skills.

The starting point for our analysis is represented by the nine components of Global Competencies that are recorded in the PISA 2018 data. Each component is measured through an index that is built based on students' answers to a set of survey questions specifically related to that dimension.[2] Table 1 lists all nine indexes, with the corresponding questions

2. Scale indices are constructed through the scaling of multiple items. Unless otherwise indicated, the

they are based on. Each index is constructed by combining the answers to those questions and is then standardized so that the mean of the index value for the OECD student population is zero and the standard deviation is one (countries were given equal weight in this standardization process). Positive values in each index thus mean that students expressed a "better" or "higher" score in that global competence (e.g. greater awareness or greater ability to adapt) than the average student across OECD countries. Table A1 in Appendix reports the summary statistics for these variables, along with those of all the variables that we will use in this chapter.

The nine indexes are meant to capture different aspects of the broader concept of global competencies. Each one of them condenses the information captured through the set of survey questions listed in Table 1. In an attempt to further reduce the dimensionality of this measure, we perform factor analysis to derive a single Global Competencies Index. In practice, we place respondents on a continuous Global Competencies scale, based on the scores of the first principal component. This approach is justified by the fact that, as expected, all nine GC indexes enter the first principal component with similar (and positive) weights, and the first factor alone explains more than 35% of the total variability.[3] Following the standard approach, we also standardize our PCA measure considering mean and standard deviation across the entire sample. When considering our single GC index we obviously lose the nuances that come from the different components, but we obtain a single proxy for global competencies, which will greatly simplify our exposition and analysis.

index was scaled using a two-parameter item-response model (a generalized partial-credit model was used in the case of items with more than two categories) and values of the index correspond to Warm likelihood estimates (Warm, 1989). For details on how each scale index was constructed, see the PISA 2018 Technical Report (OECD 2022). The item parameters were estimated based on all students from equally-weighted countries and economies. After constructing scale indices, the Warm likelihood estimates are standardized so that the mean of the index value for the OECD student population is zero and the standard deviation is one (countries/economies were given equal weight in the standardization process).

3. Details are reported in Table A2 in Appendix.

Table 1: Global Competencies Variables and Questions

Variable	Items
Awareness of global issues (GCAWARE)	How informed are you about the following topics? 1. Climate change and global warming 2. Global health (e.g., epidemics) 3. Migrations (movement of people) 4. International conflicts 5. Hunger or malnutrition in different parts of the world 6. Causes of poverty 7. Equality between men and women in different parts of the world
Self/efficacy regarding global issues (GCSELFEFF)	How easy do you think it would be for you to perform the following tasks on your own? 1. Explain how carbon-dioxide emissions affect global climate change 2. Establish a connection between prices of textiles and working conditions in the countries of production 3. Discuss the different reasons why people become refugees 4. Explain why some countries suffer more from global climate change than others 5. Explain how economic crises in single countries affect the global economy 6. Discuss the consequences of economic development on the environment
Perspective-taking (PERSPECT)	How well does each of the following statements below describe you? 1. I try to look at everybody's side of a disagreement before I make a decision 2. I believe that there are two sides to every question and try to look at them both 3. I sometimes try to understand my friends better by imagining how things look from their perspective 4. Before criticizing somebody, I try to imagine how I would feel if I were in their place 5. When I'm upset at someone, I try to take the perspective of that person for a while
Respect for people from other cultural backgrounds (RESPECT)	How well does each of the following statements below describe you? 1. I respect people from other cultures as equal human beings 2. I treat all people with respect regardless of their cultural background 3. I give space to people from other cultures to express themselves 4. I respect the values of people from different cultures 5. I value the opinions of people from different cultures

Continued on next page

Table 1 continued from previous page

Variable	Items
Interest in learning about other cultures (INTCULT)	How well does each of the following statements below describe you? 1. I want to learn how people live in different countries 2. I want to learn more about the religions of the world 3. I am interested in how people from various cultures see the world 4. I am interested in finding out about the traditions of other cultures
Attitudes towards migrants (ATTIMM)	People are increasingly moving from one country to another. How much do you agree with the following statements about immigrants? 1. Immigrant children should have the same opportunities for education that other children in the country have 2. Immigrants who live in a country for several years should have the opportunity to vote in elections 3. Immigrants should have the opportunity to continue their own customs and lifestyle 4. Immigrants should have all the same rights that everyone else in the country has
Awareness of intercultural communication (AWACOM)	You are talking in your language to people whose native language is different from yours. To what extent do you agree with the following statements? 1. I carefully observe their reactions 2. I frequently check that we are understanding each other correctly 3. I listen carefully to what they say 4. I choose my words carefully 5. I give concrete examples to explain my ideas 6. I explain things very carefully 7. If there is a problem with communication, I find ways around it (e.g., by using gestures, re-explaining, writing, etc.)
Global mindedness (GLOBMIND)	To what extent do you agree with the following statements? 1. I think of myself as a citizen of the world 2. When I see the poor conditions that some people in the world live under, I feel a responsibility to do something about it 3. I think my behavior can impact people in other countries 4. It is right to boycott companies that are known to provide poor workplace conditions for their employees 5. I can do something about the problems of the world 6. Looking after the global environment is important to me
Cognitive adaptability/flexibility (COGFLEX)	How well does each of the following statements below describe you? 1. I can deal with unusual situations 2. I can change my behavior to meet the needs of new situations 3. I can adapt to different situations even when under stress or pressure 4. I can adapt easily to a new culture 5. When encountering difficult situations with other people, I can think of a way to resolve the situation 6. I am capable of overcoming my difficulties in interacting with people from other cultures

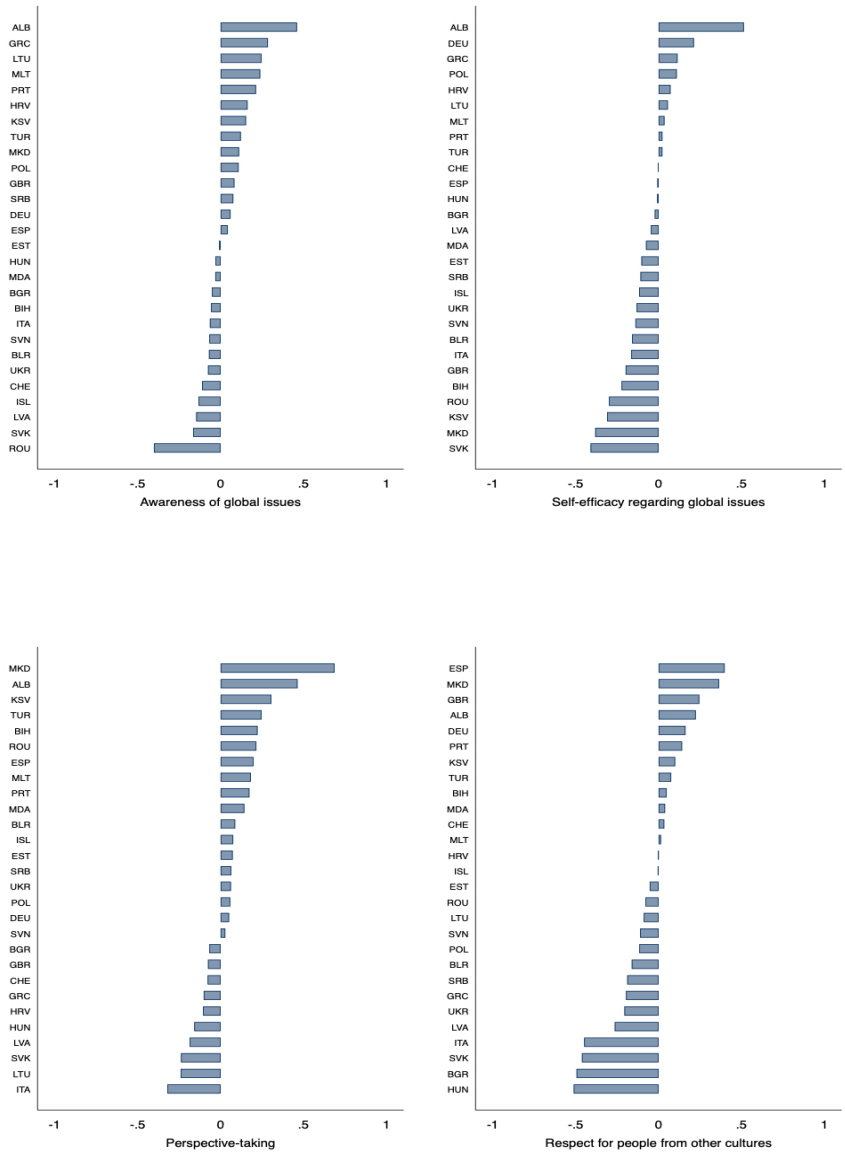
4 Cross-country Analysis

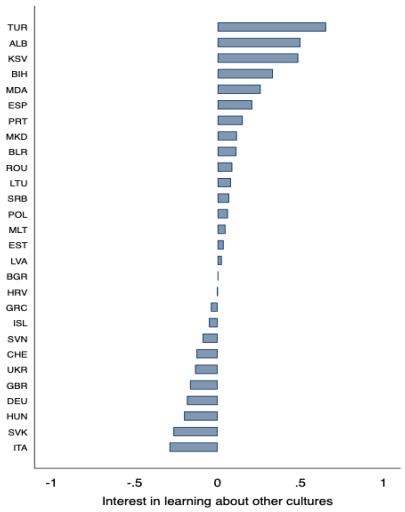
4.1 Global Competencies across countries

Figure 3 shows the distribution of each global competency across European countries. Three observations emerge from these graphs. First, global competencies vary substantially across countries. *Attitudes towards migrants* is the dimension with the largest variation (ranging from -0.90 to 0.47, with standard deviation equal to 0.31), while *Awareness of intercultural communication* is the dimension with the smallest variation (ranging from -0.30 to 0.40, with standard deviation equal to 0.15).

Second, the ranking across countries appears remarkably stable across dimensions: the combined index we generated through PCA places Albania, Spain, and Portugal on top of the list of countries with higher levels of global competencies, while at the bottom of the ranking, we find Italy, Hungary, and Slovakia. These countries consistently appear among the top or bottom countries in each dimension, with only a few exceptions. This is also confirmed when we look at the cross-correlation matrix across dimensions, as reported in Table 2. Panel A shows the cross-correlations of the dimensions defined at the country-level and shows that, apart from one exception, they are all positively correlated, with an average correlation of .461, ranging between -0.051 (between *Cognitive adaptability/flexibility* and *Awareness of global issues*) and .829 (between *Attitudes toward migrants* and *Respect for people from other cultural backgrounds*). Panel B shows instead the cross-correlation of global competencies at the individual level, and although the correlation is lower, on average, it remains positive across all dimensions, ranging from 0.14 to 0.51.

Figure 3: Distribution of Global Competencies across countries

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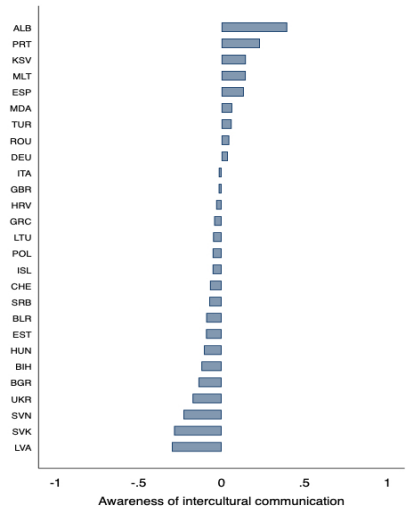
Interest in learning about other cultures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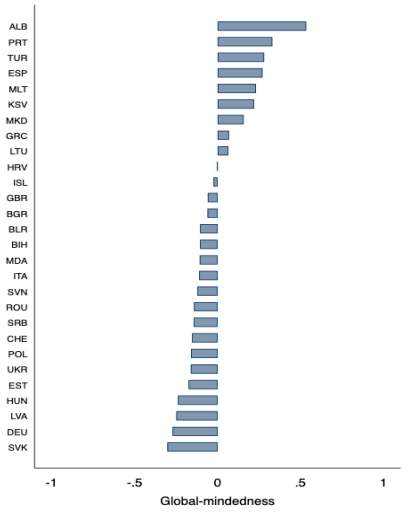
Awareness of intercultural communication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Global-mindedness


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Cognitive flexibility/adaptability

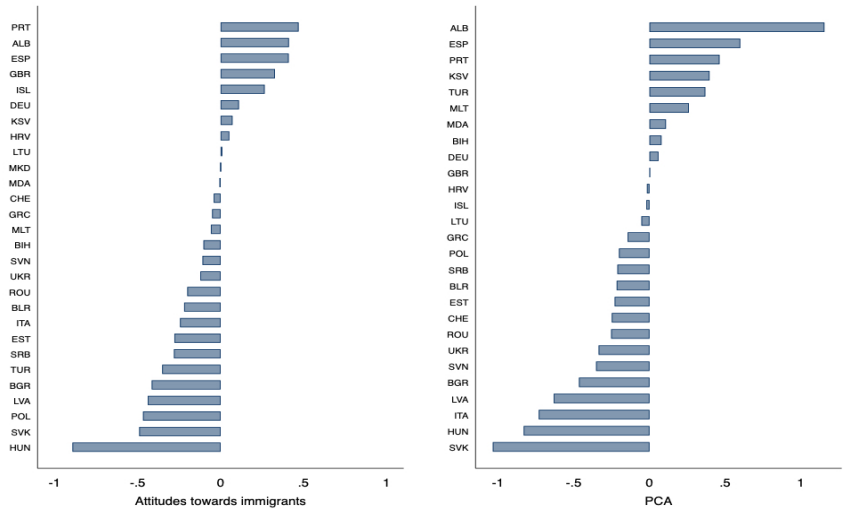


Table 2: Cross-Correlation Matrices

Panel A: Country-Level Data (N=29)

	GCAWARE	GCSELFEF	PERSPEC	RESPECT	INTCULT	AWACOM	GLOBMIN	COGFLEX	ATTIMM	PCA
GCAWARE	1.000									
GCSELFEF	0.650	1.000								
PERSPEC	0.273	0.207	1.000							
RESPECT	0.385	0.305	0.643	1.000						
INTCULT	0.372	0.197	0.729	0.469	1.000					
AWACOM	0.549	0.496	0.576	0.636	0.530	1.000				
GLOBMIN	0.681	0.441	0.554	0.546	0.671	0.816	1.000			
COGFLEX	-0.051	0.080	0.725	0.533	0.577	0.206	0.188	1.000		
ATTIMM	0.413	0.280	0.422	0.829	0.219	0.641	0.594	0.206	1.000	
PCA	**0.635**	**0.514**	**0.784**	**0.856**	**0.719**	**0.832**	**0.837**	**0.523**	**0.762**	1.000

Panel B: Student Level Data (N=137,254)

	GCAWARE	GCSELFEF	PERSPEC	RESPECT	INTCULT	AWACOM	GLOBMIN	COGFLEX	ATTIMM	PCA
GCAWARE	1.000									
GCSELFEF	0.518	1.000								
PERSPEC	0.182	0.142	1.000							
RESPECT	0.243	0.171	0.396	1.000						
INTCULT	0.263	0.217	0.338	0.450	1.000					
AWACOM	0.316	0.280	0.261	0.302	0.259	1.000				
GLOBMIN	0.277	0.255	0.197	0.241	0.289	0.326	1.000			
COGFLEX	0.232	0.219	0.458	0.338	0.304	0.224	0.175	1.000		
ATTIMM	0.224	0.166	0.202	0.404	0.251	0.308	0.399	0.146	1.000	
PCA	**0.598**	**0.534**	**0.593**	**0.678**	**0.639**	**0.609**	**0.581**	**0.571**	**0.575**	1.000

Note: The table reports the correlations across the different Global Competencies variables. Panel A reports the correlation at the country level (i.e. one observation is one country), while Panel B reports the correlation at the student level (i.e. one observation is one student).

Third, the overall ranking of the countries does not match particularly well the clusters that were identified in the first chapter, based on the educational system. As just mentioned, for instance, Mediterranean countries appear both within the top-3 and the bottom-3 countries in terms of global competencies. Table 3 illustrates more systematically the average value for each dimension, within each cluster. The table shows that countries in the Post-

Communist and Nordic groups perform generally worse in terms of global competencies, while Mediterranean and Balkans countries perform generally better.[4]

Table 3: Global Competencies by Country Cluster

	Nordic	Mediterranean	Continental	Anglo-Saxon	Post-Communist	Balkans	Other
GCAWARE	0.025	0.142	0.035	0.138	-0.021	0.211	0.222
GCSELFEFF	-0.035	0.007	0.181	-0.150	-0.074	-0.091	0.059
PERSPECT	-0.026	-0.004	0.012	-0.060	0.019	0.280	0.241
RESPECT	-0.048	-0.005	0.148	0.256	-0.198	0.075	0.061
INTCULT	0.025	0.003	-0.109	-0.111	0.012	0.370	0.362
AWACOM	-0.095	0.096	0.043	0.007	-0.058	0.128	0.137
GLOBMIND	-0.075	0.140	-0.187	-0.037	-0.125	0.145	0.273
COGFLEX	0.051	-0.112	0.060	-0.057	0.056	0.144	0.156
ATTIMM	-0.072	0.160	0.086	0.366	-0.289	0.046	-0.199
PCA	-0.182	0.057	-0.103	0.033	-0.328	0.368	0.341

Note: The table reports the average value in the Global Competencies variables for the countries that are part of the same cluster. The clusters are: Nordic (Estonia, Iceland, Latvia, Lithuania, and Slovenia), Mediterranean (Greece, Italy, Portugal, and Spain), Continental (Germany and Switzerland), Anglo-Saxon (Belgium and Scotland), Post-Communist (Bulgaria, Croatia, Hungary, Poland, Romania, Slovakia, Belarus, Moldova, and Ukraine), Balkans (Albania, Bosnia and Herzegovina, Kosovo, North Macedonia, and Serbia), Other (Turkey and Malta).

4.2 Global Competencies and country characteristics

In the previous section, we have seen a relatively high degree of variation in Global Competencies across countries. In this section we take a closer look at country characteristics that might be associated with such variation. We focus in particular on three key aggregate dimensions related to the socio-economic and cultural context: GDP per capita, the share of immigrants, and the average educational attainments of the adult population.[5]

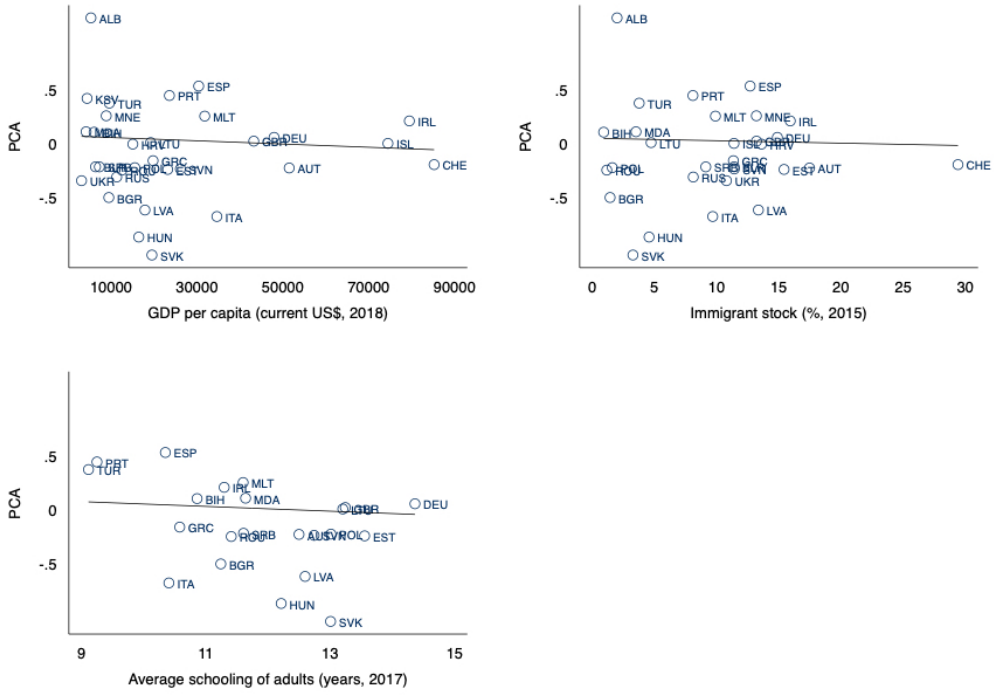
Our objective is to study whether global competencies are associated with the country's economic wealth, the overall exposure to other cultures, and the level of education within the population. While we cannot claim causality in these relationships, as multiple factors and country characteristics (such as culture and history) might be associated with global competencies as well as with these dimensions, we find that understanding how global competencies vary along these dimensions might help us understand this relatively new concept. Figure 4 illustrates the correlation between the PCA Index of global competencies and these

4. The Nordic group does not include Sweden, Norway, Finland, and Denmark as they did not administer the global competencies questionnaire, thus complicating the comparison with the analysis conducted in the first chapter. The Balkans group was not present in the first chapter.

5. GDP per capita (current US$, 2018), Immigrant Stock (%, 2015), and Average Schooling of Adults (years, 2017) and are obtained from the World Bank Open Data. GDP per capita and Immigrant Stock cover all countries besides Kosovo, the Average Schooling of Adults is instead missing for Albania, Belarus, Switzerland, Croatia, Iceland, Kosovo, North Macedonia, Russia, Ukraine, and Montenegro.

country-level dimensions. The pattern emerging from these figures is that on average global competencies appear unrelated to the country's level of development, immigration, and education (Figures A1 – A3 in Appendix show that there is virtually no variation in this pattern across individual global competencies.)

Figure 4: Global Competencies (PCA) and Country-level Dimensions

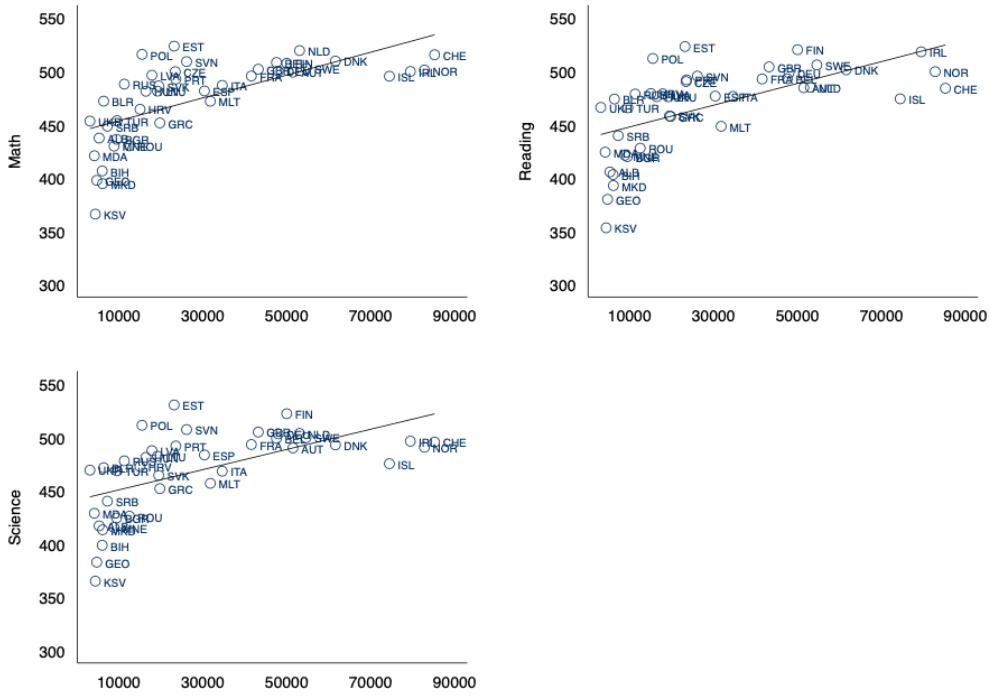


In a comparative fashion, we plot the unconditional correlation between those same country-level dimensions and average students' academic performances in maths, reading, and science, as captured by the 2018 PISA standardized test scores. Figures 5 to 7 show that test scores are highly correlated with development, immigration, and education. The stark difference with what we observed for Global Competencies indicates that the latter captures a rather different set of capabilities than traditional learning outcomes.

This is also confirmed in Figure 8, where we show the unconditional correlation across countries between the summary PCA Index of global competencies and students' average PISA test scores. The figure confirms that standard schooling performance, as captured through test scores, correlates poorly with global competencies: if anything, countries that perform relatively better in terms of learning outcomes are those that tend to perform *worse* in terms of global competencies.

Although these cross-country correlations should be interpreted with a grain of salt, as

Figure 5: PISA Test Scores and GDP per capita (current US$)



they are simple bivariate correlations that do not control for any other country characteristics, they hint at the fact that broad aggregate factors are likely to play a limited influence on the overall development of Global Competencies. We might therefore expect to learn more by exploring variations in these competencies across individuals within the same country, making use of the richer data that comes from the PISA 2018 surveys. This is what we plan to do in the next section.

Figure 6: PISA Test Scores and Immigrant Stock (%)

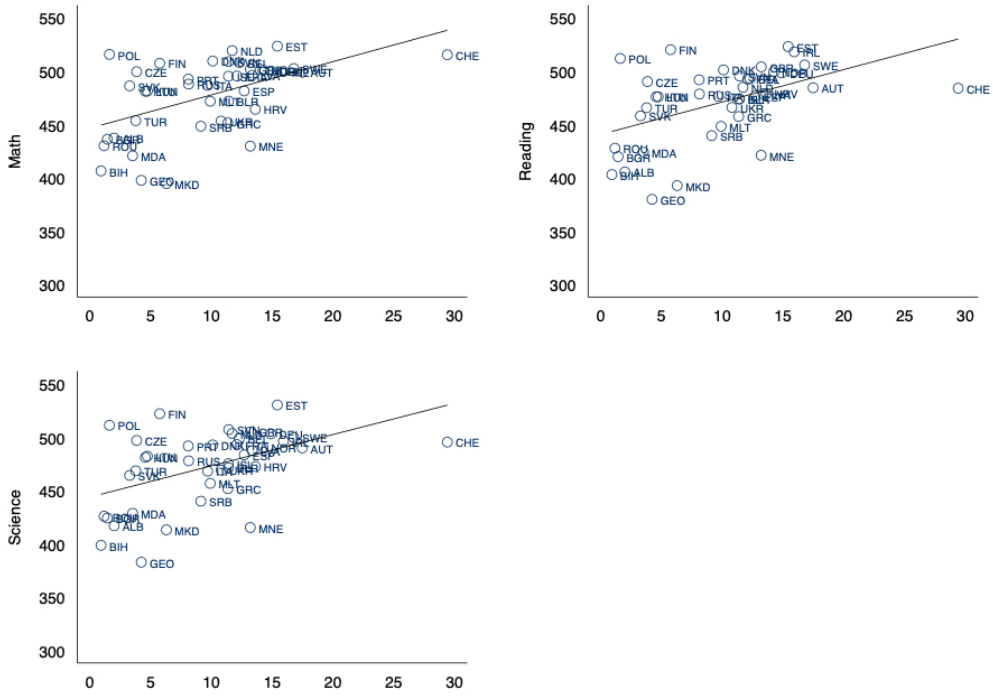


Figure 7: PISA Test Scores and Average Schooling of Adults

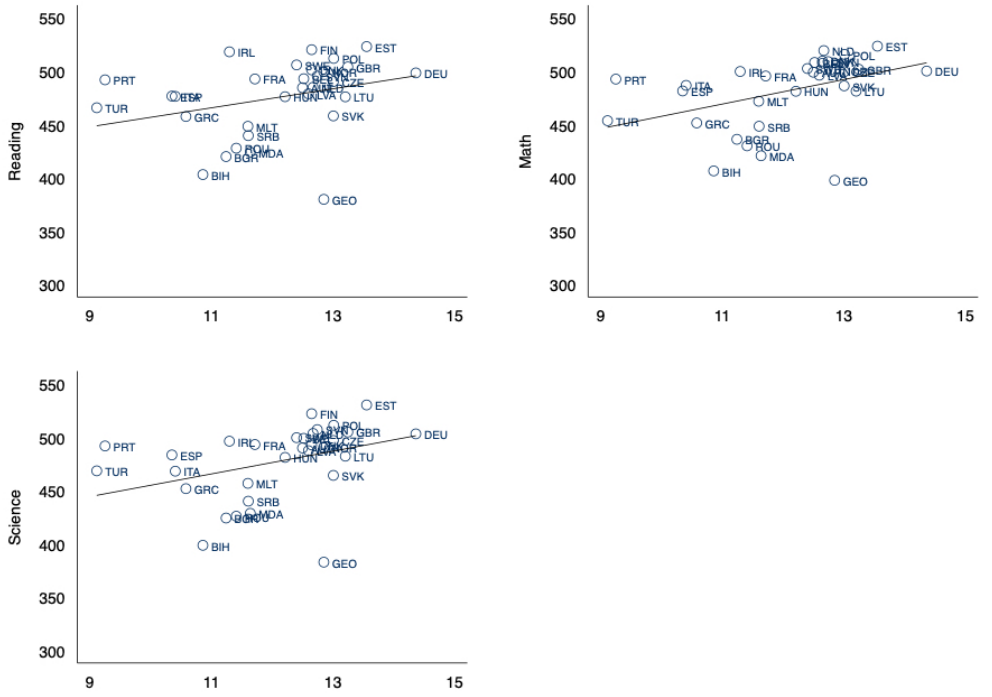
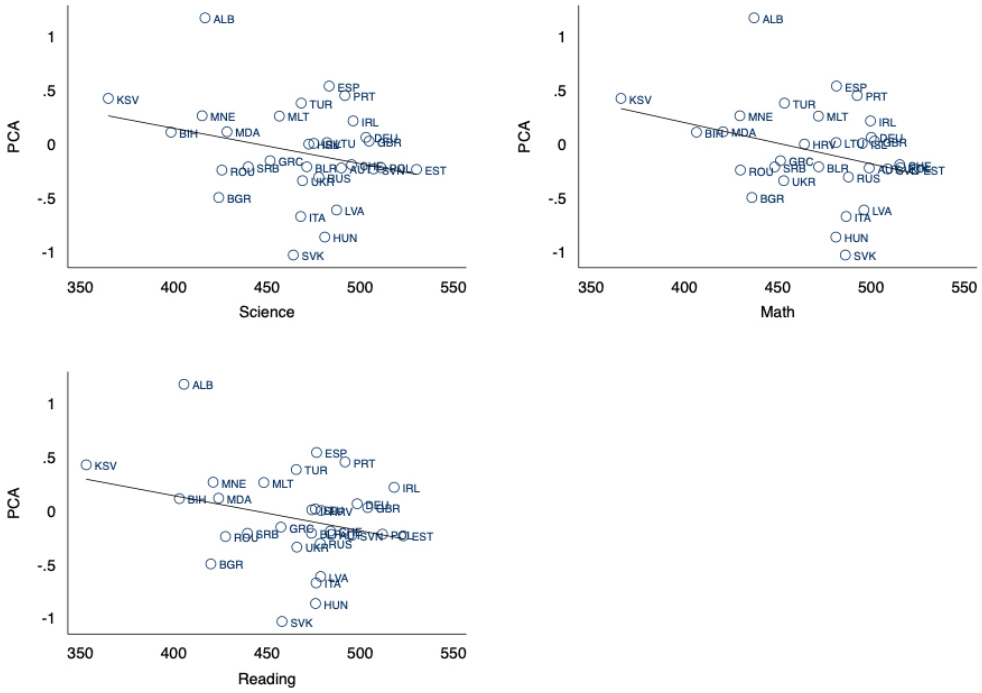


Figure 8: Global Competencies (PCA) and Test Scores



5 The correlates of Global Competencies - Regression analysis

In this section, we move beyond cross-country comparisons and investigate the individual-level factors that are associated with global competencies, holding fixed (observed and unobserved) country-specific characteristics. Our starting point is that global competencies are shaped by a combination of factors that influence an individual's ability to navigate and thrive in a globalized world. These characteristics are likely interconnected and can be traced back to three key dimensions: personal, family, and educational environment.

We take advantage of the rich information contained in the PISA dataset to study how these three dimensions relate to an individual's level of global competencies, by pooling the full sample and using the following model:

$$GC_{i,c} = \beta_1 Stud_{i,c} + \beta_2 Parents_{i,c} + \beta_3 School_{i,c} + \mu_c + \varepsilon_{i,c} \quad (1)$$

Where $GC_{i,c}$ indicates one of the measures of global competencies for student i in country c; $Stud_{i,c}$ is a vector of characteristics of the student; $Parents_{i,c}$ is a vector of family characteristics, as recorded in the students' survey; $School_{i,c}$ is a vector of school and educational environment characteristics, as recorded in the school survey; μ_c are country fixed effects, which control for all (observed and unobserved) cross-country variation. Finally, $\varepsilon_{i,c}$ is the error term. We cluster standard errors at the sampling unit (school) level and apply weights (already reported in the PISA dataset) to reflect the population structure. Given the relatively new nature of the concept of global competencies and the still limited evidence on its determinants, we start our analysis by considering a set of standard individual and family variables that the literature has generally found to be relevant for cognitive and non-cognitive outcomes: gender, age, migration status[6], and test score[7] (individual dimensions); parental education, parental occupation, and family wealth (family dimensions).[8] We then also con-

6. We consider a person an immigrant if they were born in a foreign country or if one of their parents was. Thus, our definition of immigrants includes both first and second-generation immigrants.

7. PISA records test scores on three dimensions: mathematics, language, and science. The three measures are highly correlated among themselves, as shown in Table **??**. For our analysis, we decide to consider language test scores as our measure of cognitive ability. Results are unchanged when we consider either of the other measures or when we consider an index of the three scores (when we enter the three measures separately in the same regression, we observe stable results for language and science, while at times the scores in mathematics flip sign).

8. These variables resemble the components of the PISA index of economic, social, and cultural status (ESCS), which combines parental education, parental occupational status, and home possessions. The family wealth index is constructed by combining a set of variables that capture household possessions and the broader home environment. The variables include the availability of a private room, access to the

sider the following more specific environmental dimensions: school location (an indicator for large cities, with a population size higher than 1 million), school type (public/private), number of school activities related to Global Competencies [9], and the share of immigrants in the school. We will also run a regression considering two additional school-level variables that are commonly considered as a proxy for 'school quality': the average test scores and the teacher-pupil ratio.[10]

For ease of exposition, we focus primarily on the summary PCA Global Competencies Index, but we will highlight relevant deviations from the observed pattern for specific global competencies (full results are reported in Tables A4 and A5 in Appendix). Table 4 illustrates the results. Some clear patterns emerge from looking at the individual characteristics reported in the first column: girls, elder students, immigrants (first or second generation), and students with higher test scores tend to have significantly higher Global Competencies. The patterns for girls, immigrants, and test scores are remarkably stable across all competencies and are confirmed when parental and environmental factors are added to the analysis, in columns 2 to 4.[11]

Family characteristics (column 2) also appear to matter: parental occupation and wealth are significantly and positively associated with Global Competencies, while parental education appears to have only a weak association, which even flips sign once environmental factors are added to the analysis, in columns 3 and 4. This is confirmed when looking across specific competencies: the association with occupational status is remarkably stable, while the one with parental education appears weaker and is often not statistically significant. Interestingly, also the association with wealth is not always consistent across dimensions, and it flips sign for *Attitudes towards migrants*, indicating that, *ceteris paribus*, students coming from richer families display worse attitudes towards immigrants, although they tend to have

Internet, ownership of a dishwasher, possession of a DVD or VCR player, and ownership of cellular phones, televisions, computers, and cars. The International Socio-Economic Index of occupational status (ISEI) is instead constructed from occupational data of students' parents, obtained via open-ended questions, and coded into four-digit International Standard Classification of Occupations (ISCO) codes. These codes are then mapped to ISEI values, based on the methodology by Ganzeboom and Treiman (2003), employing the updated 2008 versions of ISCO and ISEI. The highest occupational status of parents (HISEI) is calculated, representing the higher ISEI score of either parent or the sole score if only one is available.

9. The Global Competencies Index is based on questions asking if there's a formal curriculum in the school covering topics like climate change, global health issues, migration, international conflicts, world hunger or malnutrition, poverty causes, and gender equality globally. Each topic scores 1 if included in the curriculum and 0 if not. The index is the total sum of these scores.

10. The school-level average test score is generated as a leave-out-mean of individual PISA test scores within the school.

11. While the immigration status and academic performance are positively associated with across all individual competencies, the gender variable flips its sign for two components, namely *Self efficacy regarding global issues* and *Cognitive adaptability* (Tables A4 and A5 in Appendix).

better global competencies as measured throughout all other indicators.

Finally, in columns 3 and 4 we include environmental factors. Overall, our results indicate that these factors play a smaller role (once individual and family characteristics are controlled for). Results only suggest that global competencies are higher in public schools and in smaller schools and cities, although even these findings are generally weaker and hold only for a subset of competencies. Notably, even our standard measures of school 'quality', as captured through average academic achievements and student-teacher ratio, display only a small and weak association with global competencies (column 4).[12]

Overall, our analysis highlighted that holding fixed all country-specific features, global competencies vary across gender, immigrant status, academic performance, and family background (especially parental occupation and wealth). We now explore how some of these dimensions might interact with each other in their relationship with global competencies. More specifically, we study whether the strong relationships that we observed between test scores and global competencies, as well as between gender and global competencies, vary according to household wealth, which is one of our core variables that capture the family background. Figure 9 plots the point estimates of the test score coefficient, together with its 95% confidence intervals, from a set of regressions similar to the one we run in column 3 of Table 4, where however we estimate different coefficients for each decile of the family-wealth distribution. The deciles are defined within each country, to ensure that we do not simply pick up variation across countries with different levels of wealth. The figure shows that the relationship between test scores and global competencies becomes smaller as wealth increases, indicating that the link between academic achievement and global competencies is weaker in wealthier families.

In a similar way, figure 10 plots the point estimates of the gender coefficient, for students located at different deciles of the wealth distribution. In this case, the coefficients appear fairly stable along the whole distribution, indicating that female students have better global competencies than male students regardless of household socio-economic background. Interestingly, when we perform the same exercise to explore how the relationship between gender and global competencies varies along the distribution of PISA test scores (Figure 11), we see that the gender gap in global competencies increases almost monotonically with academic performance. This means that the gender gap in global competencies is larger among students that perform well in school, and smaller for students that perform worse. This suggests that efforts aimed at improving academic outcomes should be accompanied by measures aimed at boosting global competencies, with a specific eye on engaging male

12. The variable teacher-pupils ratio is missing for some schools, leading to a loss of 1,413 observations.

Table 4: The Correlates of Global Competencies

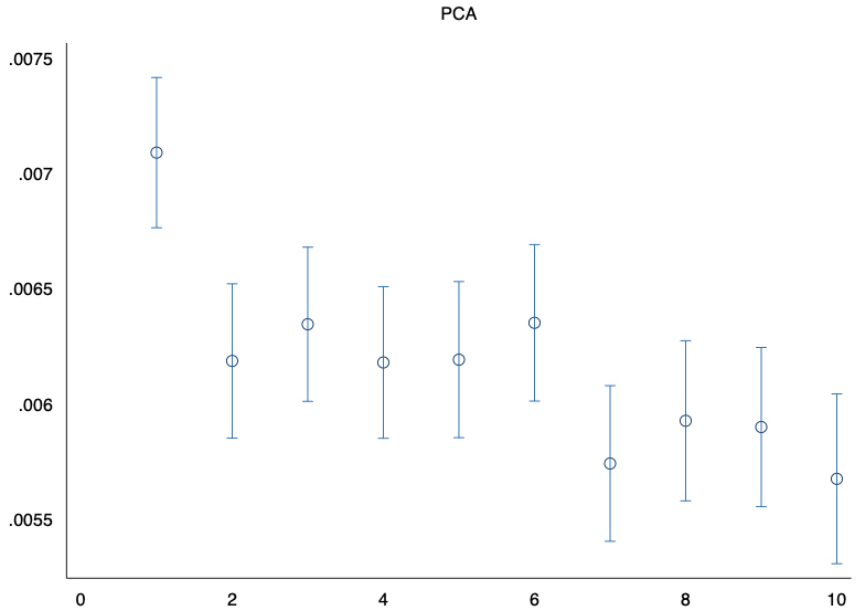
Dep Variable:	GCs Index (PCA)			
	(1)	(2)	(3)	(4)
Female	0.501***	0.522***	0.521***	0.521***
	(0.009)	(0.009)	(0.001)	(0.009)
Age	0.034***	0.040***	0.041***	0.039**
	(0.015)	(0.015)	(0.015)	(0.015)
Immigrant	0.232***	0.285***	0.288***	0.294***
	(0.019)	(0.019)	(0.020)	(0.020)
PISA test score	0.006***	0.006***	0.006***	0.00616***
	(0.000)	(0.000)	(0.000)	(0.000)
Parent's education		-0.004*	0.012***	0.013***
		(0.002)	(0.002)	(0.002)
Parent's occupation		0.002***	0.002***	0.002***
		(0.000)	(0.000)	(0.000)
Family wealth		0.118***	0.121***	0.122***
		(0.007)	(0.007)	(0.007)
Private school			-0.073***	-0.078***
			(0.021)	(0.021)
School index of GC activities			0.001	0.003
			(0.003)	(0.003)
School share of immigrants			-0.006	-0.049
			(0.066)	(0.066)
School size			-0.000**	-2.29e-05*
			(0.000)	(0.000)
Large city (> 1,000,000)			-0.074***	-0.077***
			(0.023)	(0.023)
School average PISA test score				1.09e-05
				(0.000)
Student-teacher ratio				0.001
				(0.001)
Country FE	YES	YES	YES	YES
Observations	137,254	137,254	137,254	135,841
R-squared	0.112	0.114	0.208	0.208

Note: The dependent variable is the Global Competencies Index constructed through Principal Components Analysis (PCA). *PISA test score* corresponds to the reading test score. All regressions include country fixed effects. The list of countries is: Albania, Bulgaria, Bosnia and Herzegovina, Belarus, Switzerland, Germany, Spain, Estonia, United Kingdom, Greece, Croatia, Hungary, Iceland, Italy, Kosovo, Lithuania, Latvia, Moldova, Malta, Montenegro, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Turkey, Ukraine. Standard errors clustered at the school level in parentheses. There are 6,600 schools in the sample. *** p<0.01, ** p<0.05, * p<0.1.

students, or else the gender gap in global competencies might increase.[13]

Empirical evidence so far suggests that 'standard' academic learning and achievement, as measured by PISA test scores, is a key factor associated with students' levels of Global Competencies, but not the only one. This is consistent with the conceptual nature of Global Competencies, which include not only a cognitive component but also, importantly, a socio-emotional component related to global awareness, respect, interest, and perspective-taking of others. However, it is not clear to what extent current education systems are able to address these socio-cognitive skills, and thus how school curricula can incorporate different cultural lenses and work with students on global issues and collective well-being.

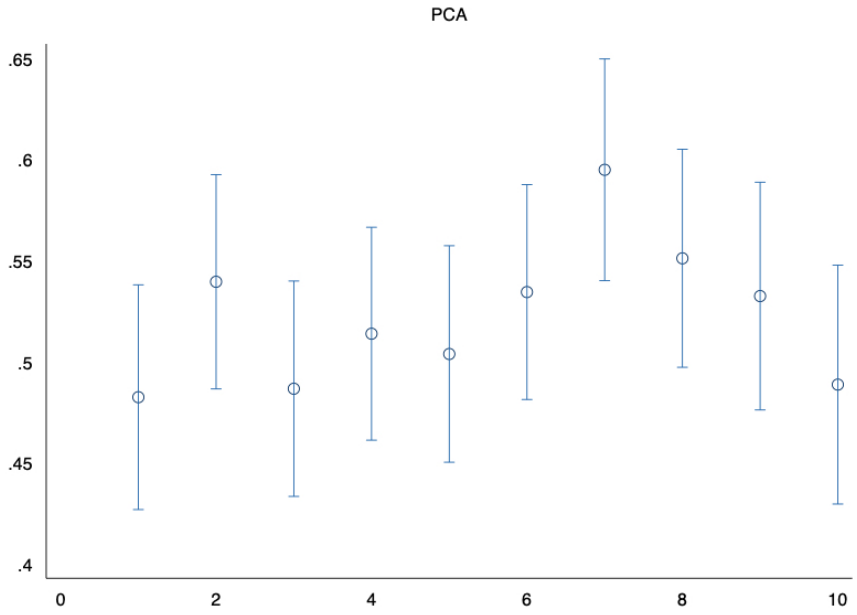
Figure 9: PISA test score and GCs (PCA) by family wealth deciles



Note: The graph illustrates the point estimates of the test score coefficient, together with its 95% confidence intervals, from a set of regressions similar to the one in column 3 of Table 4, which are however constrained to only consider students belonging to different deciles of the family wealth distribution. The deciles are defined within each country.

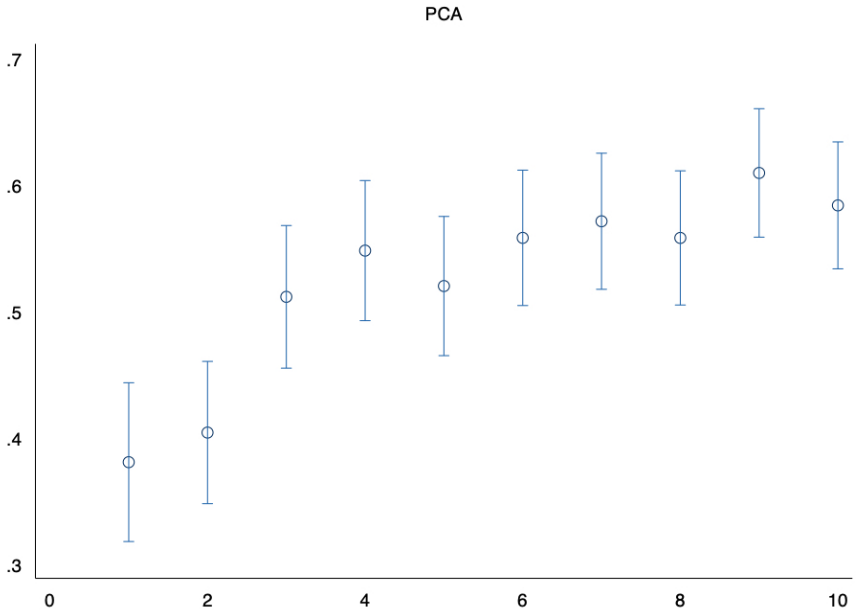
13. Looking at the disaggregated results across specific competencies, it is worth noting that for some individual indicators, the monotonic pattern is especially clear, e.g. "awareness of global issues" (see Figures A10 and A11 in Appendix).

Figure 10: Gender and GCs (PCA) by family wealth deciles



Note: The graph illustrates the point estimates of the gender coefficient, together with its 95% confidence intervals, from a set of regressions similar to the one in column 3 of Table 4, which are however constrained to only consider students belonging to different deciles of the family wealth distribution. The deciles are defined within each country.

Figure 11: Gender and GCs (PCA) by PISA test score deciles



Note: The graph illustrates the point estimates of the gender coefficient, together with its 95% confidence intervals, from a set of regressions similar to the one in column 3 of Table 4, which are however constrained to only consider students belonging to different deciles of the test score distribution. The deciles are defined within each country.

5.1 Cross-country heterogeneity

The regression analysis above pooled together survey data from 29 different countries. One might therefore wonder how much heterogeneity we can expect across countries and whether the relationships that we have highlighted with our regression hold across all of them, especially given the significant differences in their education systems. In Figures 12 – 14 we tackle this question, by focusing on three key dimensions that we have found to be associated with global competencies: academic performance (test scores), gender, and wealth. The figures illustrate the estimated coefficients in a regression specification as column 3 of Table 4 but are only estimated for one country at a time. Also in this case, we focus on the PCA Index and report the graphs for the different competencies in Appendix. Figure 12 shows that the relationship between academic test scores and Global Competencies is remarkably strong and stable across all countries, and this is true across virtually all competencies (Figure A7).[14] It is interesting to note that the test score coefficient is rather similar across all of the countries (close to +0.006), with Turkey displaying a lower correlation coefficient, and Kosovo the highest.

Also the relationship between gender and Global Competencies appears to be generally strong and stable (Figure 13), although in this case, when we dig into the specific competencies, we do observe some more variation. In particular for *self-efficacy regarding global issues* and *cognitive flexibility/adaptability*, we observe that the relationship flips for most countries, with girls generally having lower competencies than boys (Figure A8). Overall, the gender gap is lowest in Hungary and highest in Albania and Turkey.

Finally, the relationship between family wealth and Global Competencies (Figure 12) is the most heterogeneous one, with some countries where it appears strong and stable and others where it is weak and varying across specific competencies. *Perspective Taking*, *Respect for people from other cultures*, and *Attitudes towards migrants* are the three competencies where the correlation with wealth is the weakest for most countries (Figure A7). Overall, family wealth does not appear to be significantly associated with Global Competencies in the relatively richer countries in our sample (i.e. Switzerland, Germany, the UK, Italy), while it is positive and significant in most other countries, with the lowest coefficient in Spain and the highest in Belarus, Bosnia and Herzegovina, Ukraine, and Russia.

14. Turkey is the only country that displays a negative and statistically significant association between one (and only one) of the nine specific competencies – namely, *Attitudes towards migrants* – and test scores.

Figure 12: Test Scores and GCs (PCA)

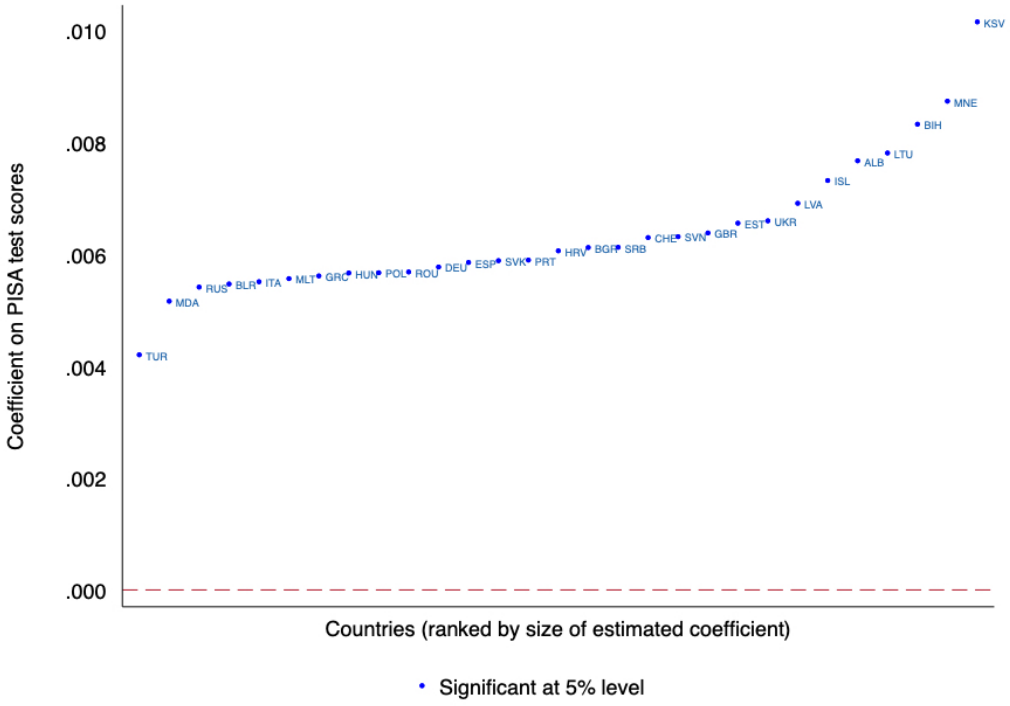


Figure 13: Gender and GCs (PCA)

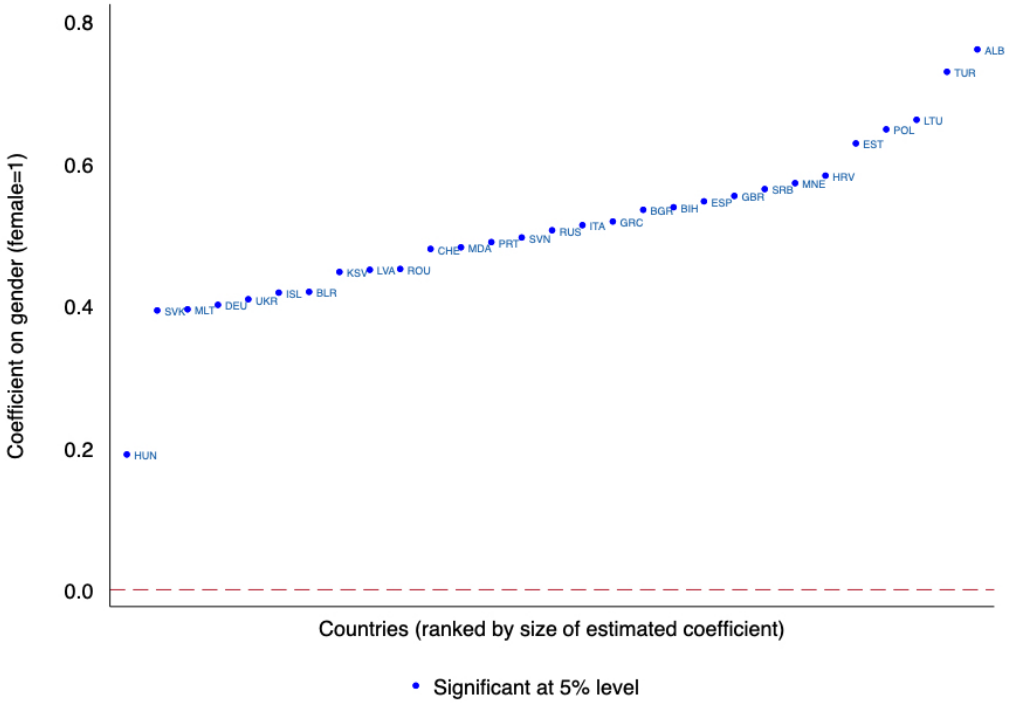
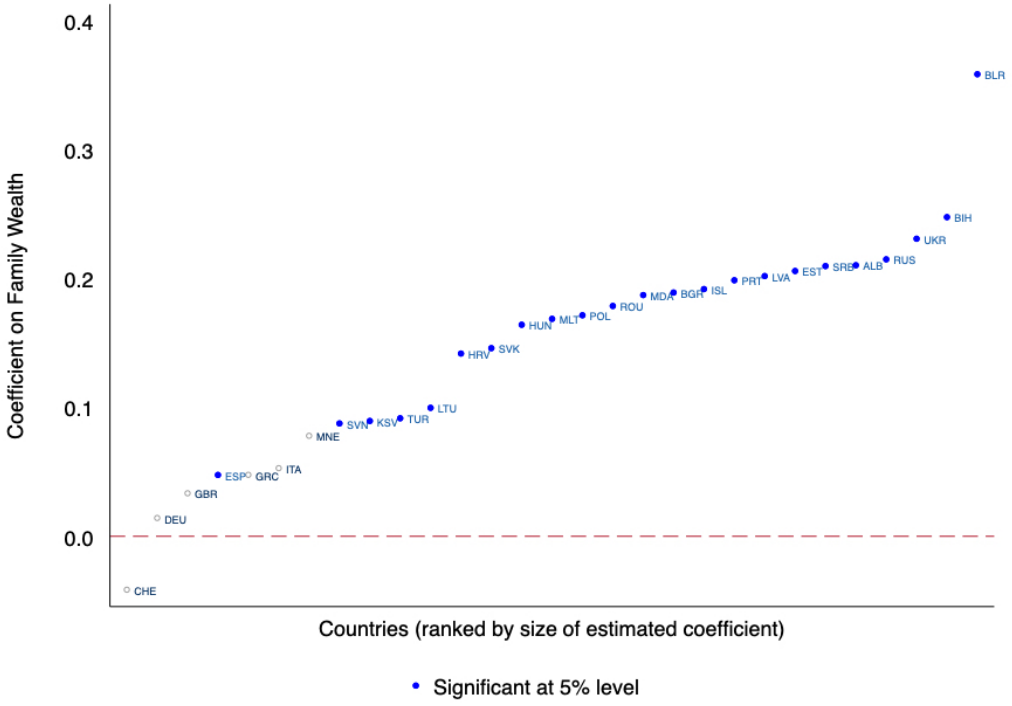


Figure 14: Wealth and GCs (PCA)



6 Global Competencies and the Transition to Tertiary Education

In the previous section, we discussed a set of individual, family, and environmental dimensions that could shape and influence global competencies. Our empirical analysis highlighted some patterns emerging from the (conditional) correlations across these dimensions. In this section, we go one step further and explore how global competencies themselves are related to students' ambitions and expectations for their future. We focus in particular on two dimensions, that are included in the 2018 PISA dataset:

- *Desire to continue studying*: students were asked what they believe they will be doing 5 years later. They could choose among multiple options, including studying or working. We define our "desire to continue studying" variable as a binary variable that takes value 1 if the student believes he/she will be studying and 0 if the student believes he/she will be working. Answers that do not allow us to unequivocally assess whether the student plans to study or not (i.e. *I will be studying or working for other reasons* and *I will be doing something else*) are recorded as missing (this affects 13% of the answers).

- *Expected occupation*: students were asked what kind of job they expect to have when they will be 30 years old. Answers to this open-ended question were then re-coded in the PISA dataset and mapped to the international socio-economic index of occupational status (ISEI) (Ganzeboom and Treiman 2003). Higher scores on this variable indicate higher levels of a student's expected occupational status.

We again focus on conditional correlations by regressing these two dimensions on our global competencies PCA index in a pooled country-fixed effect model (the first variable is available for a subset of countries only, since it is missing for 15 countries out 29). Table 5 reports the results. When we look at the simple correlation, conditional only on country fixed effects (columns 1 and 3), we see that Global Competencies are positively and significantly associated with students' ambitions. This association could however be driven by many factors. For instance, students from a family with a higher socio-economic background might be more likely to have higher levels of Global Competencies (as we saw above) and to have higher ambitions for their future. In our preferred specification (columns 2 and 4), we therefore include the whole set of variables related to individual, family, and environmental dimensions that we discussed above. Results reported in columns 2 and 4 show that when controlling for all these dimensions the coefficients on the global competencies index

become sensibly smaller, but retain its significance, confirming that higher levels of global competencies are associated with higher students' ambitions. The coefficients suggest that a one standard deviation increase in the Global Competencies index (equivalent to 1.78) is associated with an increase in the expected occupational status of 1.71 and in the desire to continue studying of 2.3 percentage points. To give a sense of this magnitude, this is much larger than the increase associated with a one standard deviation increase in family wealth (0.88 and 2 percentage points, respectively). Tables A6 and **??** in Appendix report the same analysis disaggregated by individual competency and show that the pattern is remarkably consistent across all of them (with the single exception of the relationship between *Cognitive adaptability/Flexibility* and desire to continue studying).

This analysis suggests that, *ceteris paribus*, Global Competencies are associated with "desirable" outcomes such as students' transition to higher education and better occupational status. This holds after controlling for a large set of individual, family and school characteristics as well as country fixed effects. However, one open question remains how to train and strengthen Global Competencies, as rigorous evidence of effective ways to improve them is still very scant. In the box below, we summarize a recent experimental study conducted in Italian high schools that found that a program designed to improve social inclusion towards migrants through active learning techniques managed to improve attitudes and knowledge about global issues.

Table 5: Global Competencies and Expected Life Choices

Dep Variables:	Desire to continue studying		Expected occupational status	
	(1)	(2)	(3)	(4)
GCs Index (PCA)	0.051***	0.013***	2.685***	0.960***
	(0.00118)	(0.00113)	(0.0394)	(0.0347)
		(1.015)		(0.876)
Female		0.0861***		5.647***
		(0.004)		(0.139)
Age		-0.00956		-0.421**
		(0.006)		(0.191)
Immigrant		0.029***		2.723***
		(0.008)		(0.229)
PISA test score		0.002***		0.067***
		(0.000)		(0.000)
Parent's education		0.008***		0.224***
		(0.001)		(0.023)
Parent's occupation		0.002***		0.098***
		(0.000)		(0.003)
Family Wealth		0.022***		0.977***
		(0.003)		(0.081)
Private school		0.012**		0.836***
		(0.006)		(0.294)
School index of GC activities		-0.001		0.007
		(0.001)		(0.050)
School share of immigrants		-0.114***		0.130
		(0.026)		(0.972)
School size		0.000		0.001***
		(0.000)		(0.000)
Large city (> 1,000,000)		-0.007		-0.718**
		(0.008)		(0.315)
Country FE	YES	YES	YES	YES
Observations	62,081	62,081	117,581	117,581
R-squared	0.055	0.175	0.089	0.225

Note: The variable "Desire to continue studying" is constructed from responses to the survey question, "What do you think you will be doing 5 years from now?" This variable is assigned a value of 1 for responses indicating a continuation of studies and 0 otherwise. Answers that do not allow us to unequivocally assess whether the student plans to study or not are recorded as missing. Countries with data available for this variable are: Albania, Bulgaria, Spain, Greece, Croatia, Hungary, Iceland, Italy, Lithuania, Malta, Poland, Serbia, Slovakia and Slovenia. The variable "Expected Occupational Status" is calculated from student responses to question ST114 regarding their anticipated job at age 30. Responses were mapped onto the International Socio-Economic Index of Occupational Status (ISEI). Higher scores signify aspirations towards higher-status occupations. Countries with data available for this variable are: Albania, Bulgaria, Bosnia and Herzegovina, Belarus, Switzerland, Germany, Spain, Estonia, Scotland, Greece, Croatia, Hungary, Iceland, Italy, Kosovo, Latvia, Lithuania, Moldova, Malta, North Macedonia, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Turkey and Ukraine. All regressions include country fixed effects. Standard errors clustered at the school level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

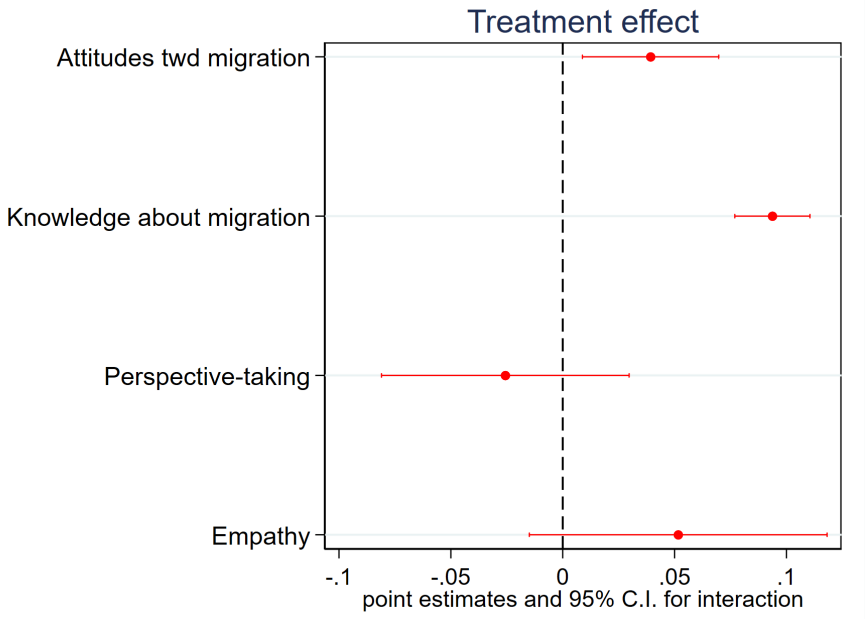
BOX 1: A randomized intervention in high schools in Italy

"Integration - Beyond Prejudices" (IBP) is an innovative classroom-based educational program launched in northern Italy (Milan and Genoa) in 2022 and tailored for students in grades 9 to 13 (aged 14-19) attending high schools. IBP employs a multifaceted approach to reshape immigration attitudes among youth while recognizing adolescence as a crucial period in the formation of socio-political attitudes and global competencies towards diversity and collective well-being. At its core, IBP incorporates active learning workshops rooted in the Global Citizenship Education approach and Game-based Learning techniques. These activities are designed to impart both hard facts and critical thinking skills while fostering collaborative knowledge construction and perspective-taking among participants. Moreover, IBP adopts a peer-to-peer intervention model, where university students serve as educators, receiving thorough training and support from educational experts. This peer-to-peer approach not only ensures cost effectiveness, but also uses appropriate communication tools to circumvent potential teacher stereotypes. Inspired by the successful program *"Migration au dela' des prejudges"* developed by an interdisciplinary team at the Université Libre de Bruxelles in Belgium during the 2015 refugee crisis, IBP was adapted to the Italian context by the University of Genoa and implemented by an Italian NGO specializing in educational programs. The core of the intervention consists of two active learning workshops conducted by peer educators during school hours, for a total of four hours. The program was implemented across 40 high schools (grades 9 to 13) in Milan and Genoa, two of the northern provinces with the highest immigration rates in Italy. The impact of the program was evaluated using a randomized controlled trial, that took advantage of the over-subscription. The schools identified a total of 252 classes as eligible for receiving the program, which far exceeded the capacity of the implementers. Half of these classes were therefore randomly selected to receive the program during the 2022-2023 school year, while the other half did not receive the program that year (and might receive it in the following years). Randomization was stratified by school so that within each school, half of the eligible classes were assigned to the program and half to control. The rigorous evaluation was based on a rich survey dataset that captures students' attitudes, feelings, and concerns about immigration. More than 4,500 students, both boys and girls, with an average age of 16, were surveyed as part of the study. We analyze the intervention's effects shortly after the program ended on immigration attitudes, as measured by explicit questions on students' preferences and perceptions about immigrants, and anecdotes on stereotypes about immigrants' characteristics.

BOX 1: Cont.

In addition, we measure revealed preferences of *pro-social behavior* toward immigrants through an incentivized experimental game (ultimatum game), where researchers experimentally changed the identity of the other players.

The results from the evaluation were promising. Attitudes towards migration among students participating in the program improved by approximately 10% after the intervention, compared to students in the control group, with discriminatory behavior decreasing by about 8% as observed in the incentivized behavioral game. Notably, the effects were more pronounced in classes with a higher proportion of immigrant students, where misconceptions were also more prevalent. This highlights the program's effectiveness in addressing and reversing misconceptions through an appropriate education intervention. While the IBP program did not yield significant improvements on individual-level dimensions such as implicit bias (as captured through an Implicit Association Test) or empathy, it demonstrated a significant impact on socio-tropic dimensions, particularly in addressing misperceptions/over-generalization and social norms. These findings underscore the importance of targeted educational interventions in combating prejudices and promoting social inclusion among youth in multicultural societies.



Source: Giunti, S., Guariso, A., Mendola, M. and Solomone, I. "Hacking negative immigration attitudes and stereotypes: a randomized intervention in high-schools in Italy", mimeo 2023.

7 Conclusions

The investigation into Global Competencies offers a new perspective for comprehending the changing landscape of education and its pivotal role in equipping individuals for success in an interconnected world. As discussed in this chapter, the traditional assessment of learning outcomes through test scores only provides a partial understanding of individuals' readiness to thrive in diverse and dynamic environments. The rise of global competencies, which include dimensions such as cultural awareness, effective communication, critical thinking, and perspective-taking, but are not limited to cultural sensitivity, adept communication, critical analysis, and the ability to consider multiple perspectives, underscores the importance of holistic education that goes beyond academic achievement.

The inclusion of global competencies in assessments like the 2018 edition of OECD's PISA reflects a significant shift in recognizing the need to equip students with the skills and attitudes necessary to navigate global challenges and contribute to collective well-being. Educational institutions play a pivotal role in fostering these competencies, shaping young minds to engage meaningfully with local and global communities.

Through the analysis of PISA 2018 data, this chapter has shed light on the factors influencing global competencies among youth and their implications for educational trajectories and career aspirations. From individual attributes to family background and educational environments, various factors intersect to shape individuals' abilities to thrive in a globalized world. Our analysis employs a pooled country fixed-effect model to control for both observed and unobserved cross-country variations to investigate how different factors are associated with students' levels of Global Competencies. We find that, within each country, Global Competencies vary across students, mainly according to their gender, immigrant background, academic performance, and family wealth. Conditional on the above individual and family characteristics, our analysis points to a minor role of school-level characteristics in shaping students' level of Global Competencies. One way to interpret this finding is that education systems are not yet equipped to truly teach global competencies and to deliver equitable outcomes in terms of awareness and interest in global issues. Most of the variation in these socio-cognitive skills across OECD countries can be attributed to students' own economic, social, and cultural backgrounds. Given the increasing relevance that Global Competencies are going to play in our societies in the coming years, education systems need to significantly strengthen their ability to train these skills, so that students can develop them irrespectively of their background circumstances such as family socio-economic status, immigration background or gender. This appears even more important given the systematic evidence that we provided that such Global Competencies are strongly associated with

students' willingness to continue studying, i.e. the transition to higher education, and with their ambitions for their future professional status. By strengthening the socio-cognitive skills related to global issues, educational systems can thus strengthen students' aspirations, motivation, and effort, with consequences for their long-term life outcomes.

As we strive to nurture global mindsets in future generations, we need to continue exploring the multifaceted nature of global competencies and their impact on individuals and societies. By understanding and cultivating these competencies, we can empower individuals to embrace diversity, tackle complex challenges, and contribute to a more inclusive and sustainable global community. Future research should continue seeking effective methods to accurately assess these skills, which inherently are more elusive than traditional academic knowledge. The definition of the Global Competencies Indexes by the OECD and their integration into the global PISA assessment marked a significant initial stride towards acknowledging the importance of these competencies. However, the journey towards refining the definitions and methodologies for assessing these skills is far from complete. Developing widely accepted tools for evaluating global competencies could significantly improve our ability to monitor their evolution over time, something that unfortunately is not currently possible with the Global Competencies measures developed by the OECD, as they only appeared in the 2018 round of the PISA assessments but remained excluded from the subsequent ones. Even more critically, future research and policies should explore effective strategies for nurturing these competencies. The development of innovative educational approaches in developing global competencies should be accompanied by rigorous evidence to understand those who succeed and those that fall short. As this body of evidence grows, it is expected to offer invaluable insights into the mechanisms through which we can better prepare future generations to navigate and contribute to an ever-more interconnected world. This promotion of global competence requires the collaboration of researchers, educators, policymakers, and stakeholders worldwide. Through collective efforts, we can ensure that education remains a catalyst for fostering global citizenship and empowering individuals to thrive in an ever-changing global landscape

References

Barrett, Martyn. 2018. "How schools can promote the intercultural competence of young people." *European Psychologist.*

Bilgili, Özge. 2019. "Policy approaches to integration of newly arrived immigrant children in schools: The case of the Netherlands."

Boix Mansilla, Veronica. 2016. "How to Be a Global Thinker." *Educational Leadership* 74 (4): 10–16.

Ganzeboom, Harry BG, and Donald J Treiman. 2003. "Three internationally standardised measures for comparative research on occupational status." In *Advances in cross-national comparison: A European working book for demographic and socio-economic variables,* 159–193. Springer.

Jang, Gyeongah, Miriam Schwarzenthal, and Linda P Juang. 2023. "Adolescents' global competence: A latent profile analysis and exploration of student-, parent-, and school-related predictors of profile membership." *International Journal of Intercultural Relations* 92:101729.

Leander, Kevin M, and Kelly K McKim. 2003. "Tracing the everyday'sitings' of adolescents on the internet: A strategic adaptation of ethnography across online and offline spaces." *Education, communication & information* 3 (2): 211–240.

OECD. 2019. *The PISA 2018 Assessment and Analytical Framework.*

———. 2020. "PISA 2018 Results: Are Students Ready to Thrive in an Interconnected World?" In *OECD, PISA,* 1–426.

———. 2022. *PISA Technical Report.*

Reimers, Fernando M. 2009. "Leading for global competency." *Educational Leadership* 67 (1): 1–7.

Sälzer, Christine, and Nina Roczen. 2018. "Assessing global competence in PISA 2018: Challenges and approaches to capturing a complex construct." *International journal of development education and global learning* 10 (1).

UNESCO. 2015. "Topics and learning objectives." *Organisation des Nations Unies pour l'éducation, la science et la culture. Printed in France.*

Zosh, Jennifer M, Brenna Hassinger-Das, and Margaret Laurie. 2022. "Learning through play and the development of holistic skills across childhood." *Billund, Denmark: LEGO Foundation.*

APPENDIX

Figure A1: Specific Global Competencies and GDP per capita (current US$, 2018)

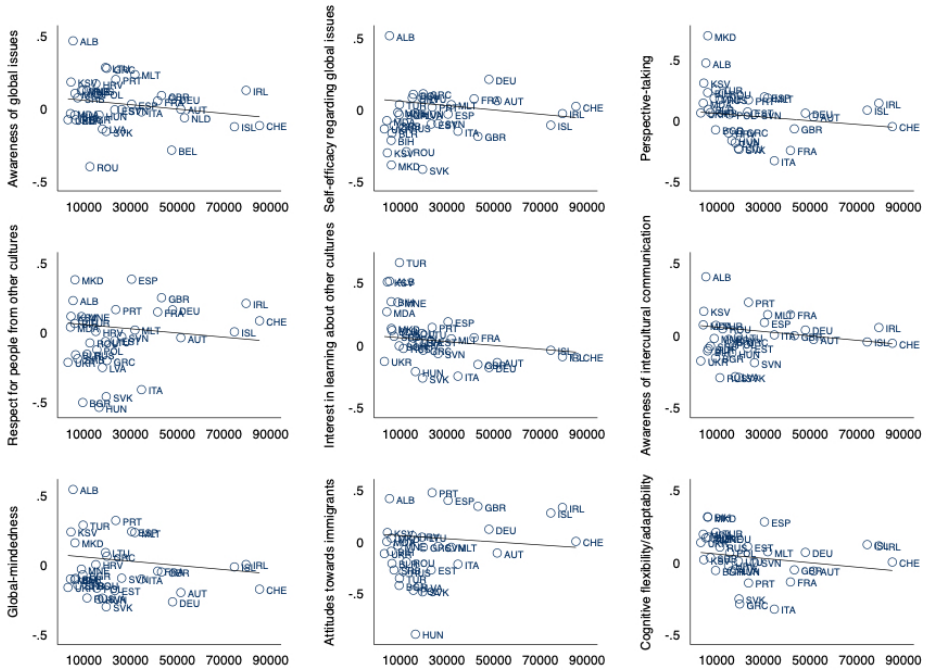


Figure A2: Specific Global Competencies and Immigrant Stock (%, 2015)

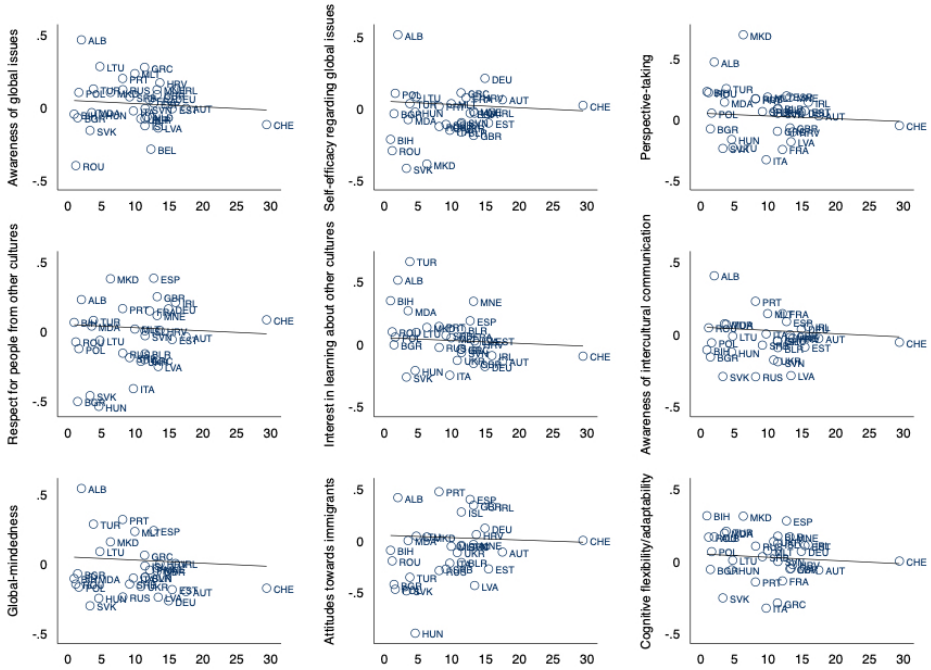


Figure A3: Specific Global Competencies and Average Schooling of Adults (years, 2017)

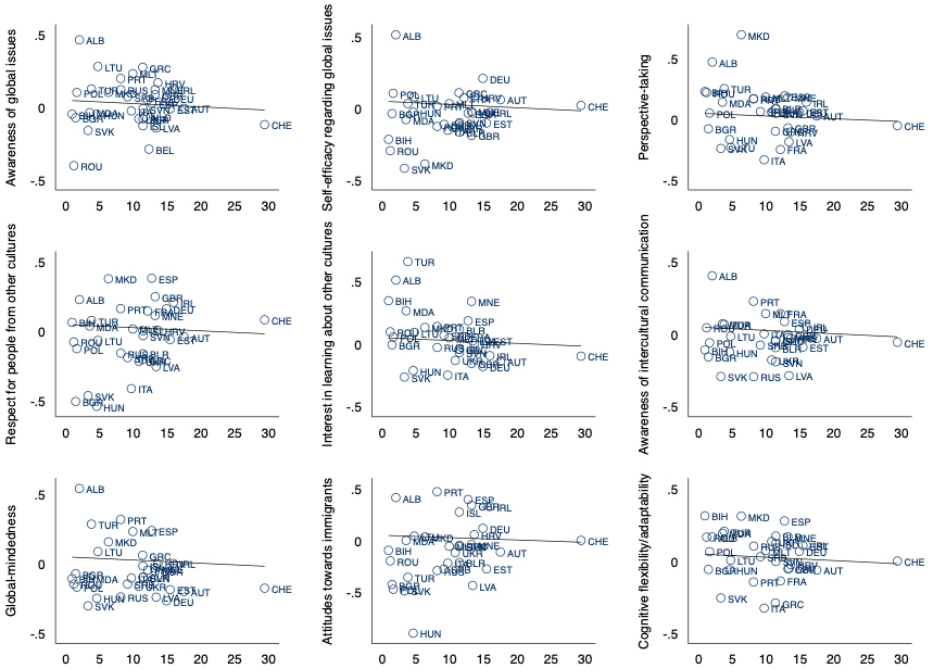


Figure A4: Specific Global Competencies and Reading Test Scores

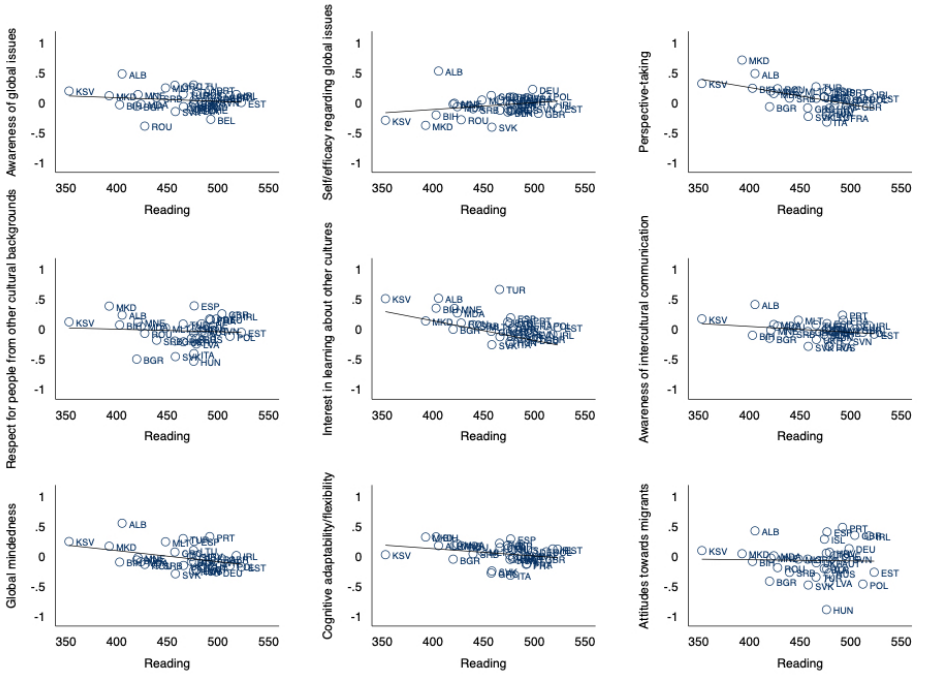


Figure A5: Specific Global Competencies and Math Test Scores

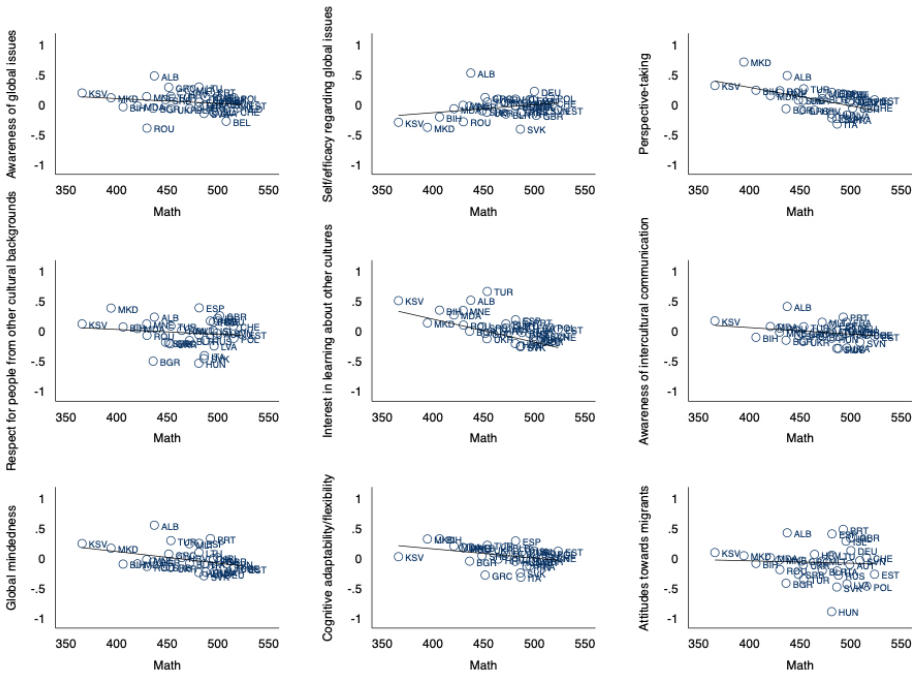


Figure A6: Specific Global Competencies and Science Test Scores

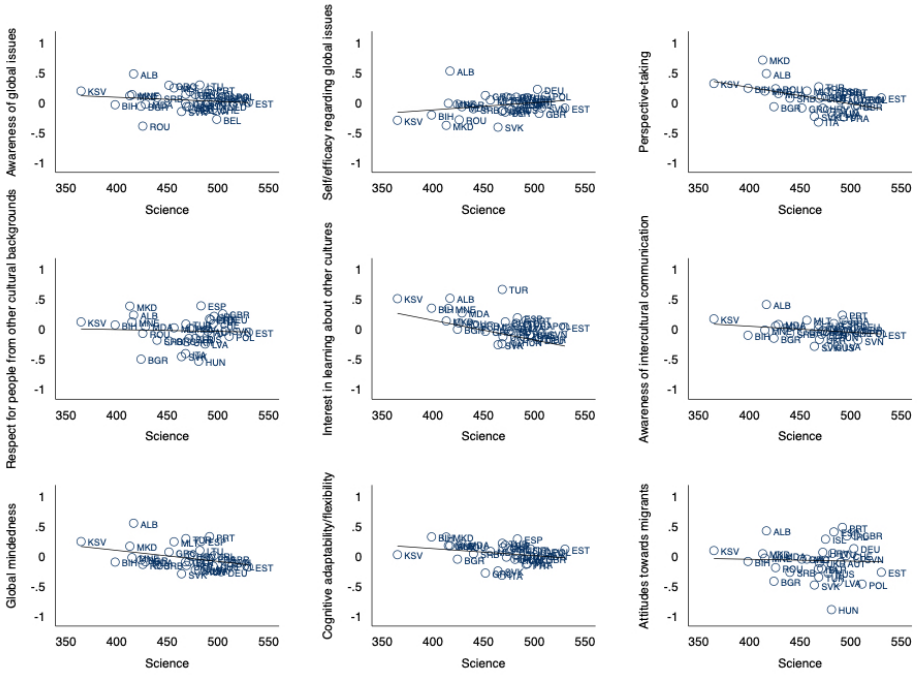
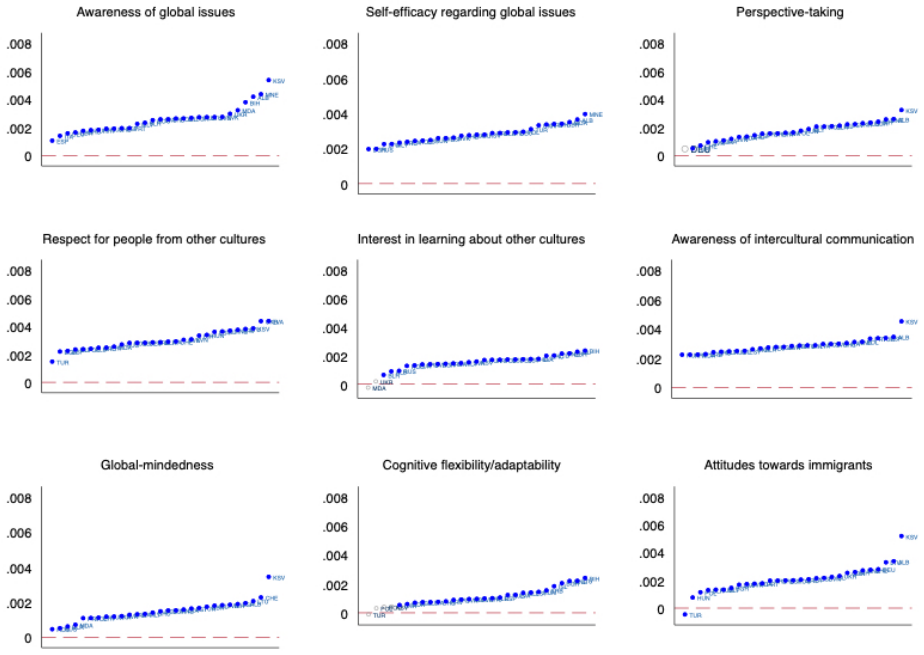
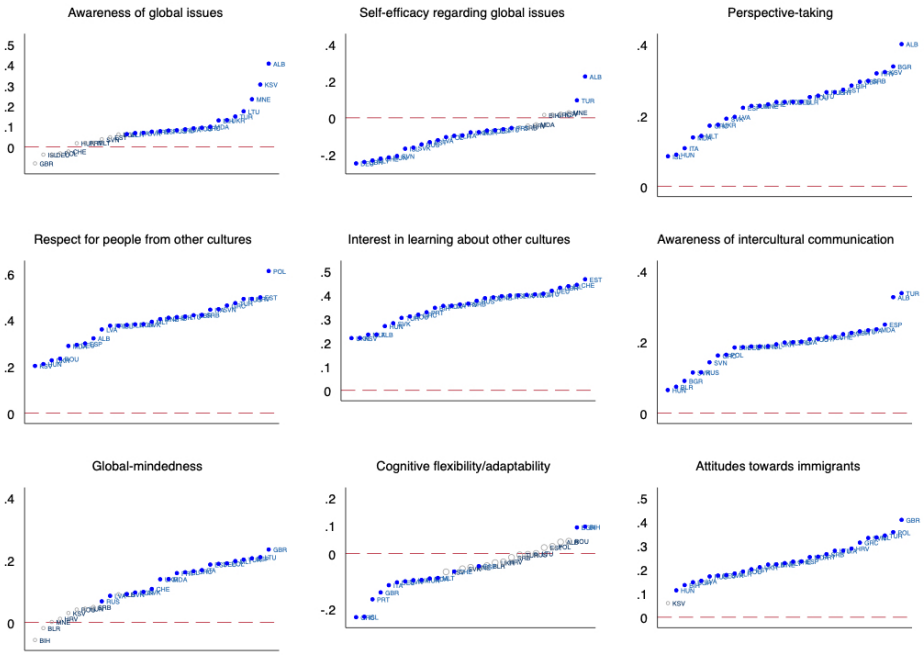


Figure A7: Test Scores and specific Global Competencies across countries



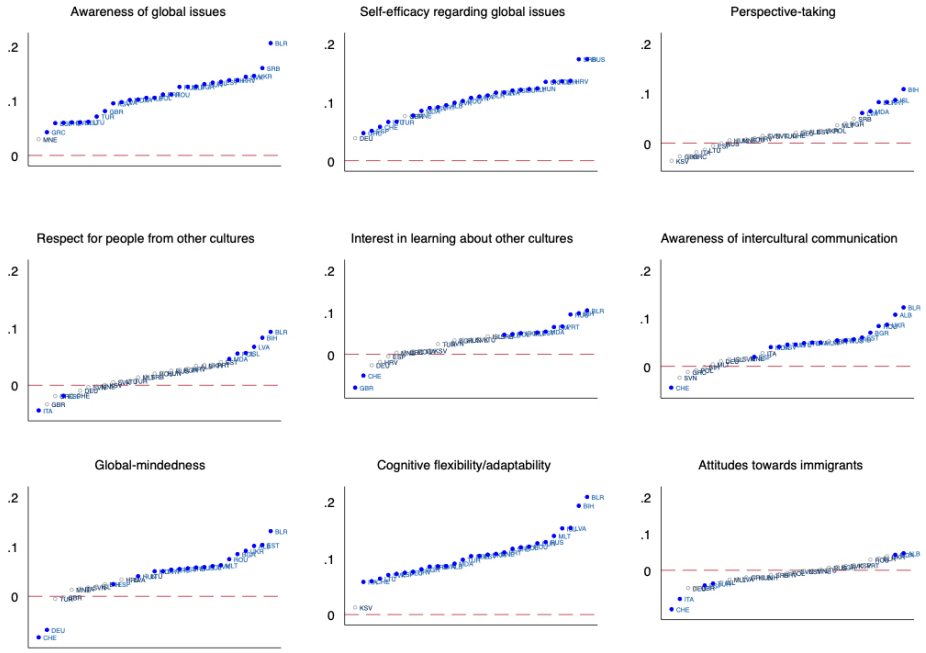
Note: Blue dots indicate that the coefficient is significant at 5%

Figure A8: Gender and specific Global Competencies across countries



Note: Blue dots indicate that the coefficient is significant at 5%

Figure A9: Wealth and specific Global Competencies across countries



Note: Blue dots indicate that the coefficient is significant at 5%

Figure A10: PISA test score and specific Global Competencies by family wealth deciles

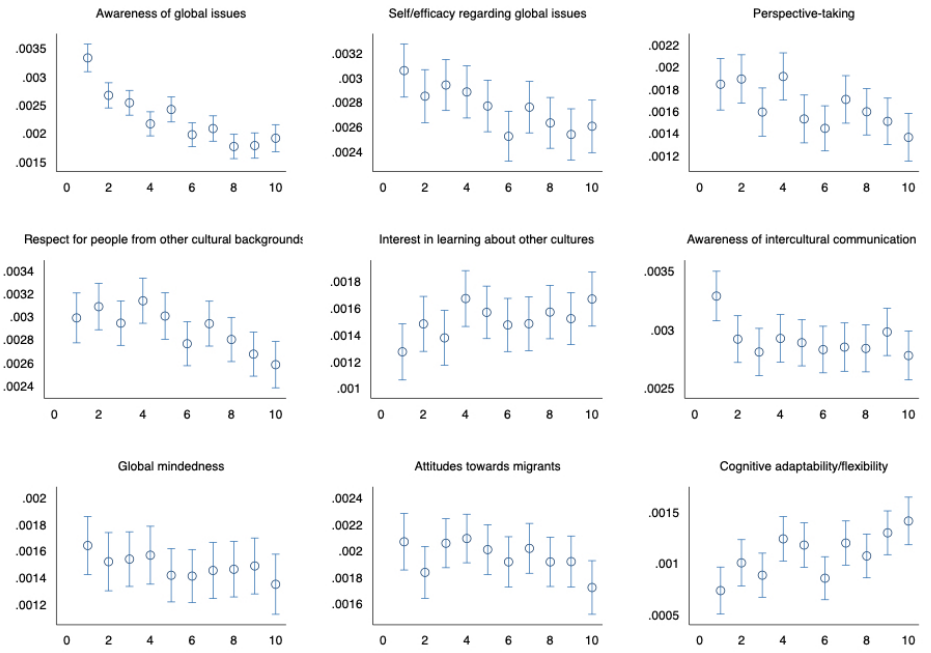


Figure A11: Gender and specific Global Competencies by family wealth deciles

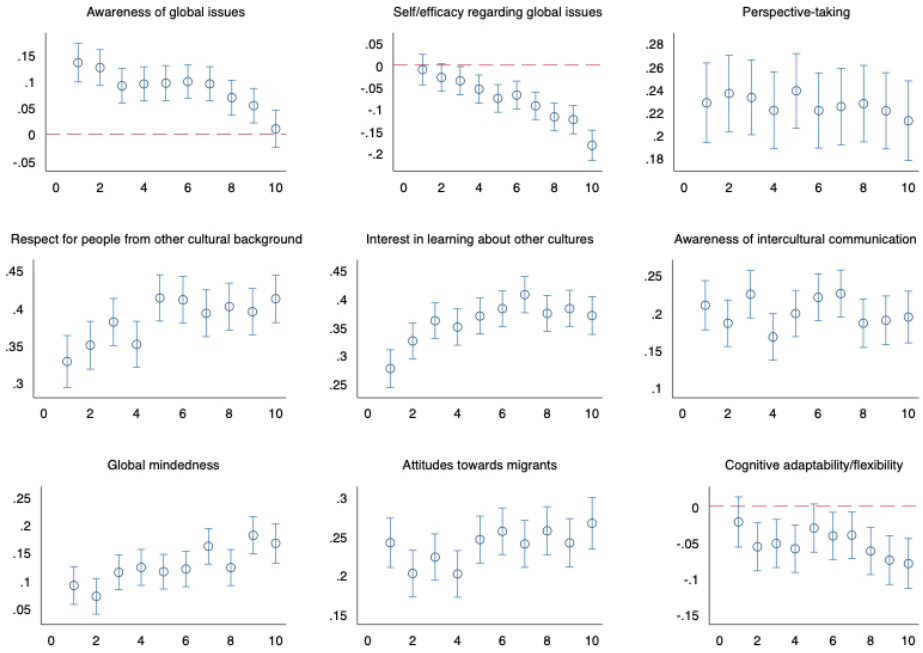


Figure A12: Gender and specific Global Competencies by PISA test score deciles

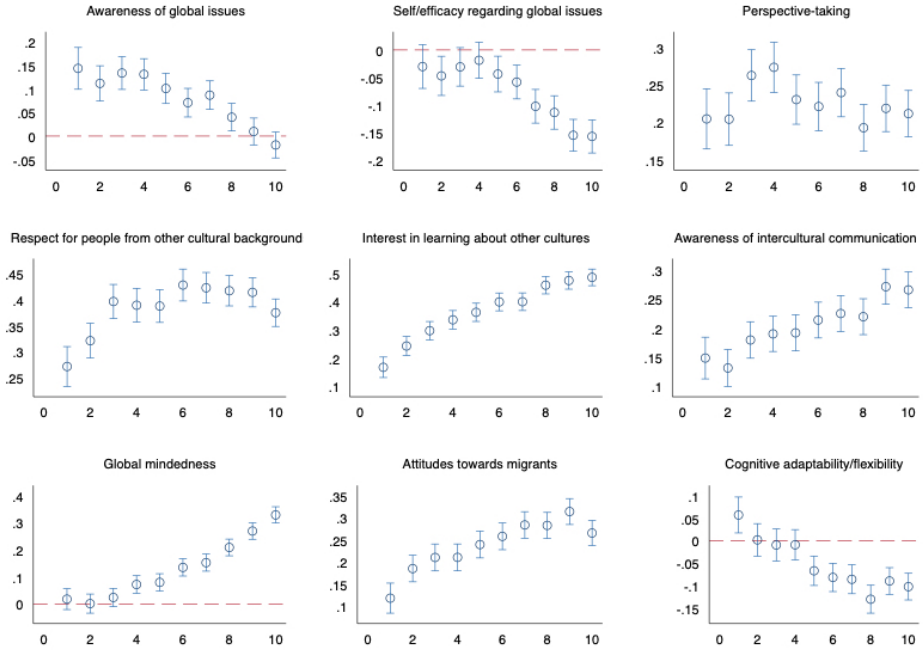


Table A1: Summary Statistics

Variable	Obs	Mean	Std. dev.	Min	Max
GCAWARE	137,254	.0740289	1.004993	-3.4944	2.3015
GCSELFEFF	137,254	-.0240992	.9947978	-2.7142	2.3535
PERSPECT	137,254	.0743111	1.015177	-3.2053	1.9097
RESPECT	137,254	.0049486	.9963667	-3.1739	.9289
INTCULT	137,254	.1055348	.9897768	-2.5546	1.6986
AWACOM	137,254	.0102311	.9854973	-2.7948	2.0513
GLOBMIND	137,254	.0232519	.9915638	-2.9241	2.7223
COGFLEX	137,254	.0793459	1.006337	-3.2784	2.1449
ATTIMM	137,254	-.0387462	.967697	-2.264	1.4992
GC Index (PCA)	137,254	.0061125	1.775632	-8.830274	5.641115
PISA reading test score	137,254	480.4343	91.21598	118.7499	809.952
PISA math test score	137,254	484.5078	84.71512	152.9811	781.4288
PISA science test score	137,254	481.4252	85.31161	128.3076	796.6606
Female	137,254	.5113658	.4998726	0	1
Immigrant (1st and 2nd generation)	137,254	.0668906	.2498333	0	1
Age	137,254	15.78895	.2890868	15.08	16.33
Parent's education	137,254	14.03374	2.986936	3	18
Parent's occupation	137,254	50.41629	22.47647	11.01	88.96
Family wealth	137,254	-.3077439	.900818	-7.5465	4.5046
School share of immigrants (1st and 2nd generation)	137,254	.0702616	.1072427	0	1
School index of GC activities	137,254	5.567138	2.31242	0	7
Private school	137,254	.1131479	.3167746	0	1
School Size	137,254	676.9067	480.6316	1	8150
Large city (> 1,000,000)	137,254	.0865913	.2812362	0	1
Student-teacher ratio	136,001	11.75523	5.840924	1	100
Expected occupational status	136,001	11.75523	5.840924	1	100
Desire to continue studying	62,081	.668256	.4708434	0	1

Table A4: The correlates of global competencies (I)

	Dependent Variables			
	GCAWARE	**GCSELFEFF**	**PERSPECT**	**RESPECT**
	(1)	(2)	(3)	(4)
Female	0.086***	-0.080***	0.225***	0.382***
	(0.00568)	(0.00560)	(0.00551)	(0.00553)
Age	0.004	0.041***	0.038***	-0.003
	(0.00923)	(0.00899)	(0.00938)	(0.00852)
Immigrant	0.090***	0.095***	0.034***	0.137***
	(0.0117)	(0.0115)	(0.0119)	(0.0106)
PISA test score	0.002***	0.003***	0.002***	0.003***
	(4.01e-05)	(3.73e-05)	(3.64e-05)	(3.54e-05)
Parent's education level	0.008***	0.012***	0.001	-0.001
	(0.00114)	(0.00110)	(0.00113)	(0.00101)
Parent's occupational status	0.001***	0.001***	0.000	0.001***
	(0.000149)	(0.000143)	(0.000149)	(0.000139)
Family wealth	0.095***	0.092***	0.016***	0.009**
	(0.00427)	(0.00386)	(0.00392)	(0.00366)
Private School	0.003	-0.013	-0.045***	-0.061***
	(0.0107)	(0.0109)	(0.0110)	(0.0109)
School index of GC activities	0.004**	0.002	0.001	0.001
	(0.00165)	(0.00157)	(0.00147)	(0.00152)
School share of immigrants	0.035	0.011	0.024	0.046
	(0.0356)	(0.0360)	(0.0369)	(0.0359)
School size	-0.000*	-0.000***	-0.000	-0.000***
	(7.21e-06)	(7.15e-06)	(6.99e-06)	(6.90e-06)
Large city (> 1,000,000)	-0.027**	-0.038***	-0.026**	-0.003
	(0.0125)	(0.0114)	(0.0116)	(0.0119)
Country FE	YES	YES	YES	YES
Observations	137,254	137,254	137,254	137,254
R-squared	0.077	0.095	0.069	0.187

Note: *PISA test score* corresponds to the reading test score. All regressions include country fixed effects. The list of countries is: Albania, Bulgaria, Bosnia and Herzegovina, Belarus, Switzerland, Germany, Spain, Estonia, United Kingdom, Greece, Croatia, Hungary, Iceland, Italy, Kosovo, Lithuania, Latvia, Moldova, Malta, Montenegro, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Turkey, Ukraine. Standard errors clustered at the school level in parentheses. There are 6,600 schools in the sample. *** p<0.01, ** p<0.05, * p<0.1.

Table A5: The correlates of global competencies (II)

	Dependent Variables				
	INTCULT	**AWACOM**	**GLOBMIND**	**COGFLEX**	**ATTIMM**
	(1)	(2)	(3)	(4)	(5)
Female	0.359***	0.199***	0.127***	-0.052***	0.236***
	(0.00559)	(0.00529)	(0.00560)	(0.00561)	(0.00519)
Age	0.012	0.028***	0.004	0.032***	-0.031***
	(0.00865)	(0.00900)	(0.00919)	(0.00912)	(0.00856)
Immigrant	0.183***	0.032***	0.006	0.058***	0.237***
	(0.0116)	(0.0112)	(0.0115)	(0.0121)	(0.0119)
PISA test score	0.002***	0.003***	0.001***	0.001***	0.002***
	(3.48e-05)	(3.49e-05)	(3.62e-05)	(3.68e-05)	(3.51e-05)
Parent's education level	0.009***	0.002**	0.005***	0.003***	-0.002
	(0.00108)	(0.00108)	(0.00110)	(0.00114)	(0.00102)
Parent's occupational status	0.001***	0.0001***	0.001***	0.001***	0.001***
	(0.000141)	(0.000141)	(0.000148)	(0.000148)	(0.000133)
Family wealth	0.020***	0.036***	0.037***	0.092***	-0.020***
	(0.00368)	(0.00383)	(0.00403)	(0.00409)	(0.00357)
Private School	-0.014	-0.005	-0.002	0.001	-0.076***
	(0.0113)	(0.0104)	(0.0113)	(0.0113)	(0.0120)
School index of GC activities	-0.001	-0.001	-0.001	0.001	0.000
	(0.00149)	(0.00144)	(0.00145)	(0.00150)	(0.00148)
School share of immigrants	-0.044	-0.121***	-0.116***	0.074**	-0.057
	(0.0349)	(0.0349)	(0.0361)	(0.0346)	(0.0373)
School size	0.000	-0.000	-0.000*	-0.000	-0.000
	(7.00e-06)	(7.17e-06)	(7.14e-06)	(7.38e-06)	(6.98e-06)
Large city (> 1,000,000)	-0.014	-0.028**	-0.029**	-0.042***	-0.033**
	(0.0121)	(0.0112)	(0.0114)	(0.0120)	(0.0129)
Country FE	YES	YES	YES	YES	YES
Observations	137,254	137,254	137,254	137,254	137,254
R-squared	0.113	0.109	0.073	0.051	0.171

Note: *PISA test score* corresponds to the reading test score. All regressions include country fixed effects. The list of countries is: Albania, Bulgaria, Bosnia and Herzegovina, Belarus, Switzerland, Germany, Spain, Estonia, United Kingdom, Greece, Croatia, Hungary, Iceland, Italy, Kosovo, Lithuania, Latvia, Moldova, Malta, Montenegro, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Turkey, Ukraine. Standard errors clustered at the school level in parentheses. There are 6,600 schools in the sample. *** p<0.01, ** p<0.05, * p<0.1.

Table A6: Global competencies and desire to continue studying

Dep Variable:	Student plans to continue studying								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
PANEL A (UNCONDITIONAL)									
GCAWARE	0.0571***								
	(0.00211)								
GCSELFEFF		0.0668***							
		(0.00204)							
PERSPECT			0.0353***						
			(0.00193)						
RESPECT				0.0725***					
				(0.00211)					
INTCULT					0.0632***				
					(0.00204)				
AWACOM						0.0657***			
						(0.00196)			
GLOBMIND							0.0460***		
							(0.00201)		
COGFLEX								0.0186***	
								(0.00198)	
ATTIMM									0.0499***
									(0.00213)
Country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Controls	NO	NO	NO	NO	NO	NO	NO	NO	NO
Observations	62,081	62,081	62,081	62,081	62,081	62,081	62,081	62,081	62,081
R-squared	0.035	0.040	0.026	0.043	0.038	0.039	0.030	0.022	0.030
PANEL B (CONDITIONAL)									
GCAWARE	0.0163***								
	(0.00195)								
GCSELFEFF		0.0220***							
		(0.00191)							
PERSPECT			0.00522***						
			(0.00179)						
RESPECT				0.0143***					
				(0.00204)					
INTCULT					0.0224***				
					(0.00190)				
AWACOM						0.0125***			
						(0.00188)			
GLOBMIND							0.0138***		
							(0.00185)		
COGFLEX								-0.00152	
								(0.00181)	
ATTIMM									0.00799***
									(0.00198)
Country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	62,081	62,081	62,081	62,081	62,081	62,081	62,081	62,081	62,081
R-squared	0.175	0.175	0.174	0.174	0.175	0.174	0.174	0.174	0.174

Note: The table reports the coefficients of the specific Global Competencies variables. *PANEL A* refers to regression that only includes country Fixed Effects and no additional controls (similar to column 1 of Table 5). *PANEL B* refers instead to regression that also include the full list of individual, family, and school controls reported in column 2 of Table 5. The dependent variable is constructed from responses to the survey question, "What do you think you will be doing 5 years from now?" This variable is assigned a value of 1 for responses indicating a continuation of studies and 0 otherwise. Answers that do not allow us to unequivocally assess whether the student plans to study or not are recorded as missing. Countries with data available for this variable are: Albania, Bulgaria, Spain, Greece, Croatia, Hungary, Iceland, Italy, Lithuania, Malta, Poland, Serbia, Slovakia and Slovenia. Standard errors are clustered at school level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

The role of information and stereotypes

Maria De Paola and Antonio Filippin

Abstract

This chapter explores the potential misperception of costs and benefits associated with tertiary education, influencing decisions to pursue higher education and field selection. These choices hold significant socio-economic and gender connotations, prompting an exploration of potential reasons for suboptimal choices and a discussion on the disparities observed at the group level. We present empirical evidence on the determinants of HE enrollment and field of study choice, considering factors that might contribute to a misperception of costs and benefits. We also examine, using INVALSI data on the universe of students attending the last year of upper secondary school, the influence of teachers in shaping students' choices through the grading process. More precisely we analyze whether teachers grade less generously students coming from a weaker socio-economic background and females. The chapter concludes by exploring the positive impact of information provision interventions on educational decision-making.

Introduction

Education is a leverage of paramount importance to foster economic growth and innovation, and is therefore a crucial area of intervention at the policy level. For instance, the Europe 2020 Strategy highlighted the goal of increasing the share of the population aged 30-34 with a tertiary education or equivalent qualification to at least 40% by 2020. Similarly, the European Union aims to close the gender gap in STEM (Science, Technology, Engineering, and Mathematics) fields as part of its broader efforts to promote gender equality and diversity in education, research, and the workforce.

Educational choices, such as the decision between entering the labour market vs. pursuing Higher Education (HE) as well as the selection of a Field of Study (FoS), can be modelled as a classic instance of decision under risk. The human capital model of school choice (Becker, 1964) is based on the subjective evaluation of the expected costs and benefits of each option, given student's ability. In other words, students take their favorite course of action among the available alternatives, given their preferences about the future and uncertain outcomes and the corresponding probabilities.

Policy interventions need to be aligned with the preferences of the agents, otherwise they are doomed to fail. Educational choices based on heterogeneous preferences satisfy individual rationality even when raising concerns from a perspective of equality of opportunity and efficiency. Choices made maximizing individual utility cannot be reversed by a paternalistic approach that superimposes social betterness. In other words, policy goals can be achieved only if consistent with (the perception of) an improvement of the outcomes at the individual level.

In this chapter we focus on two stylized facts that are difficult to reconcile with optimal choices driven by heterogeneous individual preferences. In particular:

(i) Students with a higher socio-economic family background enroll more often in higher Education (HE) than their less advantaged counterparts with the same school performance (Boudon, 1974, MUR CSNU, 2022).

(ii) Females disproportionately choose less occupationally rewarding FoS (Charles and Bradley, 2009; Gabay-Egozi and Yaish, 2020; Zafar, 2013). In particular, females are under-represented in the so-called STEM disciplines.[1] Education systems worldwide increasingly focus on STEM to prepare students for a technology-driven world. Careers in STEM are often emphasized for their prospects in terms of job growth, demand, and potential for innovation. STEM fields have historically been male-dominated, creating unbalanced job opportunities along a gender dimension. For this reason, there has been a significant push to increase diversity and gender representation in these fields. Females are now the majority of students in most of the fields in Italy according to Almalaurea data. This is the case even in some of the STEM, with males that are the majority only in engineering and information technologies. Nevertheless, the distribution of females across fields of study remains unbalanced away from STEM if compared with that of males.

The reason why heterogeneous preferences cannot account for these stylized facts is that these differences are observed at a very aggregate level. It would then be necessary to assume that preferences differ at the level of very large groups, something rather hard to believe.[2] These trends can be driven by factors contributing to suboptimal decision-making. On the one hand, limited financial resources, joint with market imperfections, may pose a significant barrier for students from less affluent families. A limited access to information about the higher education system and lack of guidance and mentorship in navigating the application process and understanding available educational opportunities can hinder the ability of certain groups of students to make informed

[1] STEM is an acronym that stands for Science (natural and physical sciences, including biology, chemistry, physics, geology, and astronomy), Technology (information technology, robotics, computer science, artificial intelligence, and data science), Engineering (various branches like mechanical, civil, electrical, chemical, and aerospace engineering), and Mathematics. This term is commonly used to group these fields together in the context of education, curriculum choices, and career fields.

[2] In principle, a potential candidate is risk aversion, which has been shown to negatively correlate with income and has been claimed to systematically differ by gender. However, Belzil and Leonardi (2013) show that risk aversion acts as a deterrent to HE investment, but in addition to family background. Experimental evidence suggests that females are more risk averse than males (Charness & Gneezy, 2012; Croson & Gneezy, 2009), but the magnitude of such differences is small (Filippin & Crosetto, 2016; Nelson, 2016).

choices. On the other hand, a distorted representation of future prospects, i.e. misperceptions of potential outcomes and/or their associated probabilities may induce individuals to prioritize immediate employment over the pursuit of a university degree or opting for less lucrative fields of study. For instance, unintentional biases can characterize teachers' perceptions of different student groups, potentially resulting in disparate treatment based on factors such as ethnicity or gender. Such differential treatment may, in turn, constitute a signal that shapes the perception of the educational and employment opportunities of the students. Moreover, social norms and gender stereotypes regarding ability and attitudes in certain fields can significantly contribute to the persistent gender gap in STEM.

A considerable effort has been exerted to tackle financial constraints, primarily focusing on the reduction of direct costs of HE. This policy, though crucial to promote equal opportunities in higher education, is however very costly. In contrast, the cost of tackling lack of information and stereotypes is likely much lower but their role has been analyzed to a limited extent.

The main goal of this chapter is to analyze whether and why the prospects of educational choices can be misperceived, leaving scope to policy interventions based on information provision that are on the one hand aligned with individual rationality and on the other hand capable of enhancing efficiency and equality of opportunities. An explanation based on a wrong perception of the expected outcomes of educational choices may seem counter-intuitive at first sight because objective information is available. However, such information is difficult to collect and to process. We know from the behavioral economics literature that individuals tend to rely upon fast and frugal heuristics, and therefore on readily available but incomplete information, and in order to reduce the cost and the cognitive burden of decision-making processes. Moreover, biases and stereotypes can on the one hand add non-monetary payoff and on the other hand alter the perception of the probability of the outcomes. As a result, sub-optimal choices can be observed. Importantly, a growing literature reviewed in the next section suggests that these information biases can be stratified along socio-economic and gender dimensions.

In this chapter we focus on the role played by information and stereotypes using two distinct sets of data. The first comes from a field experiment conducted by Ballarino et al. (2022). Using the pre-experimental survey we provide evidence about the intended educational choices of a sample of Italian students focusing on their determinants. Our findings reveal that students from more educated families report a significantly higher value placed on tertiary education by their parents. Female respondents also report a higher parental value on tertiary education compared to males. Additionally, our study identifies a gender disparity in expected returns for graduating in a given field, with males anticipating systematically higher earnings than females. This gap widens across fields categorized

as 'weaker' (humanities) to 'stronger'. However, the gender gap in the intention to enroll in fields of study with lower labour market returns remains large and significant even when controlling for the expected wage. Interestingly, we find preferences for humanities subjects in high school account for a significant portion of the gender gap. The dataset of Ballarino et al. (2022) also allow us to shed some light on the effect of information provision. Our ability to link such effects to the questions that emerges from the analysis of the pre-experimental survey is however limited by the fact that the intervention was designed before the survey was administered and therefore it cannot provide an answer to some of the questions we raise in our chapter.

The second dataset we use for our analysis is provided by the National Institute for the Evaluation of the Educational System (Istituto Nazionale per la Valutazione del Sistema Educativo di Istruzione e di Formazione, called INVALSI), a government agency placed under the control of the Ministry of Education, which every year carries out a testing of student attainment through national standardized tests in literacy and numeracy. The INVALSI also submits questionnaires to students in order to investigate other elements useful for the evaluation of the system. These data allow us to observe both standardized blindly-graded test scores obtained by students and scores assigned by teachers on non-blindly-graded tests in Italian Language (Language) and Mathematics (Math). Whereas the INVALSI test scores are comparable across schools and students, this is not the case for teachers' marks. The INVALSI tests are graded in the same manner for everyone, while teachers' marks are non-blind marks and might be affected by the student behavior, class size, and class composition. Using the last wave of the INVALSI data (school year 2021/22) and focusing on students in grade 13th (last year of upper secondary school), we provide evidence suggesting that teachers grade less generously students coming from a weaker socio-economic background and males. Controlling for INVALSI standardized tests in math (language) and for individual, class and school characteristics, an increase of one standard deviation in the indicator of the student socio-economic background results in a math (language) grade increase of about 0.05 (0.06). The lower grades assigned by teachers to male students and students from disadvantaged economic backgrounds may contribute significantly to the reduced likelihood of these groups attending university. Conversely, our findings indicate that being a female student is associated with an average increase of about 0.4 in teacher-assigned grades compared to male students, which should encourage female students to purse STEM fields. However, while explicit evaluations may show no gender bias or even favor female students, underlying implicit biases can still influence female students' performance and educational choices. A recent paper by Carlana (2019) indicates that teachers' implicit biases, as assessed by the Implicit Association Test (IAT), negatively affect female students' performance in math, while having little to no impact on male students. A consequence of this sort of bias is the

inclination of female students to opt for less challenging high-school tracks. The chapter is structured as follows. Section 1 offers a general discussion of reasons that can lead to suboptimal educational choices and discusses why differences at group level can be observed, focusing mainly on socio-economic status and gender. Section 2 provides original evidence about the possible misperception of cost and benefits of HE. Section 3 investigates the misperception of probabilities, focusing in particular on the role played by teachers in shaping the educational choices of their students. In Section 4 we discuss the state of the art in the effect of interventions based on information provision. Section 5 concludes.

1. Why can choices be suboptimal

For the sake of exposition, in this section we represent educational choices as lotteries framed within the Expected Utility Theory. We then summarize and review potential departures from a correct representation of such a lottery considering both the outcomes (cost and benefits) and the corresponding probabilities.

Let us consider an individual facing the decision of whether to pursue Higher Education (HE) or not. If the individual opts to enroll in a HE program there are two possible outcomes: *i)* with a probability denoted by *p*, the individual successfully completes the program, earns the degree, and subsequently experiences a (discounted) lifetime utility denoted as U_{HE}, which stems from securing a wage associated with a job requiring the degree obtained; *ii)* with probability $1-p$, the individual drops out of the program and receives a discounted lifetime utility U_0 that, for the sake of simplicity, is assumed to be equal to what the student would have obtained without attending the degree program. The decision to attend the HE program implies a cost *C* that, again for the sake of simplicity, but without loss of generality, is assumed to be the same regardless of whether the individual completes the program or drops out. The cost *C* should be thought as the sum of additional costs associated to pursuing HE. *C* includes expenses such as tuition fees, books, etc., but also earnings that the individual forgoes by dedicating time to education rather than working. On the other hand, if the individual decides not to attend the HE program, his/her utility is equal to U_0. The individual decides to enroll in the HE program if:

$$pU_{HE} + (1 - p)U_0 - C > U_0. \qquad (1)$$

This equation is admittedly an oversimplification of the underlying problem for several reasons. First, the probability *p* represents the perceived likelihood of successfully obtaining the degree and is

contingent on various idiosyncratic factors, such as individual ability, self-confidence, etc. Second, the choice to proceed with HE is multidimensional, as the student faces a wide range of degree programs available that differ in terms of their probability of success as well as of the cost incurred and the returns offered. In other words, p, U_{HE}, and C should be considered as vectors. Third, the cost C and even more so the outcomes (U_{HE}, U_0) are very complex magnitudes that require to aggregate a great deal of information about outcomes that are highly dispersed in space and time. The choice is in fact inherently intertemporal. Furthermore, the utility of the outcomes also contains non-monetary components such as social recognition.[3]

It is therefore not surprising that individuals may fail to make well-informed decisions about their education. For instance, individuals' perception of their likelihood of success in completing a HE program is influenced by their self-confidence and is affected by the signals they receive from various sources, including teachers, parents, and friends. Moreover, research in behavioral economics underscores that individuals frequently rely on easily accessible information and favor swift, less complicated decision-making processes to reduce both the effort and the mental strain.

In what follows, we discuss a number of factors that could contribute to render educational decisions different from those predicted by the simplified predictions implicit in Equation (1)

Wrong expectations about the costs and benefits of HE

Individuals need comprehensive and tailored information about the costs and benefits associated with HE. Objective (although aggregate) data on the outcomes of educational choices may be available, the real challenge lies in the scattered nature of this information as well as on the difficulty to tailor such information to one's individual situation.

Predicting the expected returns becomes even more intricate as it involves considering both immediate and long-term factors in a rapidly evolving job market, influenced by technological advancements and global economic shifts, which makes it difficult to predict the future value of a university degree. Even with available data on typical graduate pathways or average salaries, prospective students often miss comprehensive information, especially considering the growing width in salary ranges (Green and Zhu, 2010). While information regarding the direct monetary costs

[3] The specific functional form of the utility function, which incorporates individual attitudes towards risk, also plays a crucial role in this choice. For instance, when students choose a field of study, they face the uncertainty deriving from the unknown probability of obtaining the final degree and of finding suitable job afterwards. Different degrees of risk aversion may lead to different choices. As long as the choice is optimal given the corresponding preferences, however, the shape of the utility function per se does not raise a concern about lack of information.

is to available (with the aforementioned caveats), estimating the opportunity costs poses a greater challenge. Opportunity cost refers to the potential benefits (income, but also experience and skills) that a student forgoes by choosing a specific HE pattern instead of pursuing alternative patterns of working full-time.

Non-monetary components of costs and benefits of HE

Graduate salaries are of paramount importance but do not exhaust the subjective evaluation of the outcomes of HE. Decisions are not made based on economic considerations alone. HE may also have a consumption value represented by the personal interest for a particular field or by the university prestige (Chevalier, 2011; Walker and Zhu, 2011). Family expectations and social norms can also heavily influence the decision. Non-monetary components render purely economic assessment of the decision insufficient, at the same time contributing to the complexity of the decision.

Misperception of probabilities

As discussed above, costs and benefits are multifaceted. In principle every state of nature is associated with the corresponding probability that likely differs at the individual level. Individual decisions in education involve a considerable degree of uncertainty along various dimensions. For instance, individuals entering a specific educational program typically lack the ability to predict whether they will successfully complete the course and attain the desired qualification, exposing them to the risk of dropping out. Even if not dropping out, accurately estimating the duration required to complete a given educational program is also challenging. Furthermore, predicting whether an individual, upon obtaining a particular educational qualification, will find a suitable job and secure the corresponding wage proves to be a complex task.

The information available affects the evaluation both of the possible outcomes and of the corresponding probability to occur. With higher quality information students are better equipped to understand the application process and recognize the long-term benefits of higher education. The quality of information also improves students' perceptions of the feasibility and relevance of tertiary education. When relying upon poor information, instead, students may make suboptimal decisions, for instance underestimating the expected return of tertiary education or overestimating the barriers. As a result, these students may decide to forgo higher education and pursue alternative paths. Similarly, overestimating the expected return of HE (or of a specific field of study) may route individuals toward choices in which they are doomed to fail or that are relatively worse than available alternatives.

Given the complexity of the lottery to evaluate, it is easily predictable that not all the information is acquired and processed correctly. Even worse, differences may be encountered at the group level in a way that is consistent with the stylized facts outlined in the introduction. If this is the case, policies aimed at providing tailored and reliable information promise to enhance efficiency while at the same time improving equality of opportunities. There are indeed several reasons why this seems to be the case from the viewpoint of both socio-economic background and gender.

Socio-Economic Status (SES)

The ability to obtain and process information can be closely related to the student's socio-economic background. Parents with higher levels of educational attainment not only possess a deeper understanding of the educational systems (e.g. the available options, the procedures involved, the expected outcomes, etc.), but also have the resources to search and gather up-to-date information that they might eventually miss. The connection between the educational level of the family and information quality establishes a notable advantage for students hailing from more affluent backgrounds. We show in Section 3 below that this seems indeed to be the case. These students benefit not only from their parents' firsthand knowledge but also from their ability to tap into additional resources and to rely upon more informed social networks. Social networks, in fact, also play a pivotal role, with high SES families that likely belong to networks with a higher ability to complement the information that the family may miss.

Since the quality of the available information correlates with socio-economic status (Erikson, Jonsson, et al., 1996) high SES students are often better equipped to navigate the complexities of the application process, understand the nuanced long-term benefits of pursuing higher education, and form more accurate perceptions of the feasibility and returns of tertiary education. Conversely, students from low SES may encounter barriers in accessing high-quality information. The reduced exposure to pertinent information may consequently contribute to misunderstandings or misconceptions about tertiary education and impair their educational decisions.

Families can also differ along socio-economic status in terms of social norms and role models. High SES families may in fact be characterized by behavioral perspectives entailing group-level status maintenance concerns (Breen and Goldthorpe, 1997; Malloy, 2015), or identity and social belonging mechanisms (Akerlof and Kranton, 2000, 2002) that make their offspring more likely to proceed with HE given the same fundamentals. In some cases, there may be cultural factors at play. For instance, in families where higher education has not been the norm, there is less emphasis placed on pursuing tertiary education (see Section 3 below). The influence of family background on educational trajectories begins even before university choices are made, as the level of parental education

significantly impacts the types of school students enroll in during their secondary education. In Italy, the choice of school track is made after the Junior High School. Students with parents holding higher education degrees show a higher propensity to enroll in generalist and more academic-oriented school tracks like Classical and Scientific Lyceums (Checchi, 2010).

The arguments above extend straightforwardly to the information about the student's probability of success when pursuing HE. How individuals perceive their probability of success depends on the available information about their ability relatively to the difficulty of a certain degree program. Such perception is formed relying upon signals received, such as the teachers' grades in secondary school. We show in Section 4 below that such signals might be distorted, possibly by unconscious attitudes or stereotypes, along the socio-economic background. Incorrect information, social norms, and stereotypes may therefore contribute to explain the persistence of intergenerational inequality in educational attainments.

Gender

As regards gender, and in particular the observed pattern of choice in which females are under-represented in FoS paying wages and offering better career advancements, the aforementioned mechanisms do not seem to be at work. We show below in Section 3 that females do not suffer a penalty within the family neither in terms of ability to acquire information nor of the importance assigned to proceeding to HE (Section 3). We also see below (Section 4) that females are not penalized by teachers' stereotypes in terms of biased expectations to succeed as signaled by grades in secondary school., In contrast, there is compelling evidence of a noteworthy gender gap favoring females in the grades assigned by teachers, both in language and math, as detailed in Section 4.

In spite of this evidence, the probability of enrolling in strong fields of study remains significantly lower for females even when controlling for the expected wage, suggesting that non-monetary factors are at play. For instance, females are typically found to be less confident than males ceteris paribus (Barber and Odean, 2001; De Paola et al, 2014). The level of confidence in accomplishing a specific goal directly affects the perceived probability of success, thereby influencing the optimal amount of resources one is willing to invest. Some works also show that gender disparities in overconfidence play a substantial role in explaining females' inclination to avoid competitive environments (Niederle and Vesterlund, 2007; Datta Gupta, Poulsen, and Villeval, 2013; Ors, Palomino, and Peyrache, 2013). The fact that the STEM may be perceived as more competitive may contribute to explain females' underrepresentation in these fields.

Stereotyped social norms regarding gender attitudes in scientific or technical fields can also significantly contribute to the persistent gender gap in STEM. For example, if there exists a stereotype

suggesting that females are less proficient in mathematics or science, it can dissuade females from pursuing STEM fields, thereby contributing to the observed gender disparity. These beliefs, about the ability, interests, and social roles of males and females, exert an influence through various channels. In professional settings, stereotypes can manifest as biases in hiring and promotion decisions, hindering career advancement and opportunities and resulting in a lower expected return. As an illustration, Reuben et al (2014) show that, in the absence of further information beyond visual cues, males are more likely to be selected for mathematical assignments in comparison to females. Parents and advisers, whether consciously or unconsciously, may hold stereotypical views about the abilities of males and females in STEM subjects, impacting the encouragement, support, and opportunities provided. Peer dynamics may also be relevant, creating gendered expectations within peer groups. If peers hold gender-stereotypical beliefs, they may cause beliefs distortion on the perceived ability of females, further exacerbating the gender gap (Bordalo et al, 2014).

These channels may also operate with similar effects through a different social recognition of the educational attainments rather than through ability. The absence of visible female role models in STEM fields can reinforce the stereotype that females are not suitable in these areas, discouraging them. Media portrayals of scientists, engineers, and STEM professionals can reinforce these stereotypes. The fact that media consistently depicts males in scientific roles and females in non-STEM roles can shape public perceptions and influence career aspirations.

In the end, gender stereotypes may also backfire becoming cognitive shortcuts to streamline the process of acquiring information, albeit at the expense of the optimal choices (Barone et al, 2019; Favara, 2012). Regardless of the specific channels, several studies indeed indicate that individuals tend to display reduced self-confidence and hesitation to contribute ideas in domains not traditionally linked to their gender roles (Coffman 2014; Bordalo et al. 2018). In the worst case scenario the anticipation of the effects of such stereotypes may lead females to decide against enrolling in STEM disciplines.

All the factors described in this section can have a significant impact on the (sub)optimality of decisions regarding higher education, potentially influencing students' aspirations and choices related to tertiary education, particularly along SES and gender. In the next two sections we provide original evidence about some of the determinants outlined above. Even though a distinction turns out to be difficult, for ease of exposition we can think of such factors as pertaining mostly to the evaluation of the outcomes (Section 3) vs. the probability of success (Section 4).

Section 2. Knowledge of cost and benefits

This section provides original evidence about the expected educational choices of a sample of Italian students (12^{th} grade). In particular, we focus on some determinants that are likely to impact the decisions along socio-economic background and gender.

2.1 The dataset

The data used in this section comes from the randomized control trial of Ballarino et al. (2022). This experiment involves more than 9000 students from high school stratified according to three geographical areas in Italy (North-West: Milan; North-East: Vicenza and Bologna; South: Salerno) and 10 high-school tracks. Within each stratum schools have been randomly assigned to the treatment. Randomization was implemented at school level in order to minimize the risks of treatment contamination. The treatment was nested in a longitudinal survey. The first wave of data collection (October 2013, pre-intervention) was fielded administering paper and pen questionnaires in the classroom and aimed at collecting ex ante information on students' social background and school career, as well as on their beliefs and plans regarding HE. Data collection took place in 62 schools and 475 classes.

During the meeting (October 2013) all students, including the controls, filled out a questionnaire concerning their family background and previous school career, as well as their beliefs and plans about HE. Then, the intervention started only for students in treated schools.

The intervention was then administered by a team of 18 senior instructors, with experience of educational activities for high school students. They met each class in the treated schools on three occasions during school hours to foster student participation, and with each meeting lasting about two hours. Instructors relied upon presentations and information materials prepared by the experimenters and illustrated in a rehearsal meeting in order to ensure treatment uniformity.

The order of the topics was chosen having in mind the sequence of choices to be made by the students, i.e.: (i) whether or not to enroll to university; (ii) which course to choose; (iii) managing to get the degree. The timing of the meetings was also thought to be compatible with some early admission tests.

The intervention provided students with detailed information concerning the costs, the academic selectivity, and the occupational prospects of university programs. Data on costs were collected by the research team using administrative sources. Information on opportunity costs, returns to education and academic selectivity relied upon detailed data from the National Statistical Office (ISTAT). In

the first meeting instructors provided students with detailed information concerning costs and opportunities for financial aid, including procedures to apply for university grants. The instructors provided statistics illustrating the indirect costs (foregone earnings), and how both direct and indirect costs depend on the time to graduation. Students were invited to examine data about costs of tertiary education regardless of their prior intention to enrol or not to university. The general information could be adjusted to the individual situation taking into account a restricted set of parameters including family income, preferred FoS, and province of residence. Each student had the chance to estimate his/her university cost in terms of fees, transportation, meals, study materials and accommodation (when relevant).

In the second meeting students received information on economic returns to university degrees, compared with the prospects of high school degrees in the same track and province as theirs. Four outcomes were considered during the presentations: (i) duration of first job search, (ii) net monthly salary four years after graduation from high school, bachelor's and master's programs, (iii) risks of over-education and (iv) risks of horizontal mismatch between job and degree. By means of detailed figures, the instructors showed how these returns vary across undergraduate and graduate programs and across FoS, allowing students to figure out their earning according to different university choices.

The third and final meeting first delivered numeric estimates of the risks of university dropout and delayed graduation. Also in this case, information was disaggregated across FoS and conditioned on four individual characteristics (gender, parental education, school track, and previous academic performance) representing the major predictors of failure in university education. Moreover, students received information concerning vocational HE and post-secondary non-academic training, in terms of available study opportunities and related occupational prospects.

The longitudinal sample was then built in subsequent waves, collecting information via CATI after the completion of the treatment by interviewers' blind to the treatment/control status of respondents. The evolution of students' beliefs was elicited in Wave 2 (May 2014) before the opening of university applications. The third wave (November 2014) recorded students' decisions about HE. The fourth and final wave was conducted one year later (November 2015) collecting information on students' outcomes: delayed enrolment, change of FoS, drop-out after the first year, academic performance for students enrolled in HE; occupational condition for those who did not enroll in HE.

2.2 Analysis

In this section we present some evidence based on the data collected in Wave 1 of the intervention that illustrates how students' plans and beliefs regarding HE differ by socio-economic background and gender.

We begin our analysis focusing on a cultural factor that likely shapes the intention to pursue higher education, i.e. the importance that parents attach to HE. In particular we expect to observe that this variable differs along the socio-economic background. We define high SES the family of a student with both parents holding at least a high school degree, and low SES 0 otherwise. Within families where higher education has not been the norm, it is reasonable to conjecture that there might be less emphasis on pursuing tertiary education. The data consistently reveal a distinct trend in this regard. As shown in Table 1, students from more educated families report a significantly higher value placed on tertiary education by their parents. In a similar manner, although more surprisingly, female respondents report a higher value placed by their parents on tertiary education as compared to males. While the magnitude of the difference is higher along the SES dimension, differences are highly significant in both cases.

Table 1. Self-reported value attached by parents to proceeding with HE

	Low SES	***High SES***	***Total***	
Males	*5.91*	*7.24*	*6.51*	*P.val < 0.001*
Females	*6.67*	*7.99*	*7.25*	
Total	*6.32*	*7.63*	*6.90*	
	P.val <0 .001			

Note: Students answer on a 1-10 scale to the question "It is important to my parents that I enroll to tertiary education". High SES: students with both parents holding at least a high school degree. P-values computed with non-parametric Mann-Whitney test.

To investigate the role played by socio-economic background in shaping student decisions to enroll in HE we have estimated a linear probability model where the outcome variables is a dummy equal to 1 if the student intends to proceed with HE certainly or likely, and 0 otherwise. The independent variables include an indicator for student socio-economic status. Results are reported in Table 2. We find that the intention to enroll greatly differs along a socio-economic dimension. Students with a High SES are about 25 percentage points more likely to intend to proceed with HE. Notably, the reported importance that parents attach to HE accounts for a substantial portion of such difference. In fact, the coefficient of the SES dummy drops to 15.7% when *Importance to parents* is partialled out in Column (2). The expected wage, whilst significant, does not alter the picture across SES (Column 3).

Table 2. Intention to enroll in HE

	(1)	(2)	(3)	(4)
High SES	0.251***	0.157***	0.155***	0.197***

	(0.010)	(0.009)	(0.009)	(0.012)
Female				0.149***
				(0.012)
Female*High SES				-0.072***
				(0.017)
Importance to parents	-	0.073***	0.073***	0.070***
		(0.002)	(0.002)	(0.001)
Log expected wage	-	-	0.018**	0.036**
			(0.007)	(0.008)
Constant	0.591***	0.119***	-0.013	-0.206***
	(0.066)	(0.012)	(0.056)	(0.057)
Observations	8017	8017	8017	8017
R-squared	0.075	0.261	0. 261	0. 278

Note: Linear probability estimates using a sample of 4th year students. The dependent variable is a dummy equal to one if the student intends to proceed with HE certainly or likely, and zero otherwise. Importance to parents: answer on a 1-10 scale to the question "It is important to my parents that I enroll to tertiary education." Standard errors in brackets. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

The results in Table 1 are mirrored by a remarkable difference in job search intentions based on the educational attainment of parents.[4] A lower proportion of respondents with high SES intends to search for a job compared to those with less educated parents. Overall, the data suggest that parental education influences the decision to proceed with HE as well as job search intentions after secondary school, with respondents with less educated parents that show a relatively lower intention to pursue HE. In Column (4) we also include gender and its interaction with SES. Females report a significantly stronger intention to enroll in HE than males (about 15 percentage points higher). This result is consistent with the observation that females are the majority of. At the same time we see that SES matters significantly more for males.

Hence, gender differences appear to favor females in this respect.

However, our data confirm that there is an unbalanced distribution across fields of studies that entails significantly different job prospects. Table 3 presents data on the expected field of study. The fields of study are divided into four categories according to their strength:[5] STEM, Health, Medium Humanities. Where STEM is defined above (footnote 1), Health includes medical fields that in Italy are also considered strong fields of study as they are associated with high wages; Medium encompasses architecture, economics and business, law, Humanities includes fields that are typically

[4] Results available upon request.

[5] The categorization differs from that used in Ballarino et al. (2022) which instead is based on three categories. Weak fields are defined as those yielding relatively low returns with respect to every indicator considered, both at the undergraduate and graduate level (Humanities and Social Sciences, including Sociology, Anthropology, Psychology, Communication Studies, Criminology and Political Science). Returns to intermediate fields are moderate at the undergraduate level, but they are large with a master's degree (Economics, Law, Math and Natural Sciences). Finally, strong fields are highly rewarding even at the undergraduate level (Engineering, ICT, Medicine and other health-related fields).

considered weak in the labor market, such as psychology, education, literature, philosophy, history, and other arts and social sciences.

Table 3. Distribution of the favorite field of study by gender

	Males	Females	
STEM	33.6	8.5	
Health	20.0	29.0	Fisher Exact Test P.val < .001
Humanities	17.9	37.0	
Others	28.5	25.5	
Total	100.0	100.0	

Note: Answer to the question "If applying to university, which degree program do you think you would choose?" for students who certainly or likely intend to enroll to HE. STEM: Science, Technology, Engineering and Mathematics; Health: Medicine, Pharmacy, Dental studies, Nursing, Therapy and Rehabilitation, Veterinary; Medium: Law, Economics, Business, Architecture, Agriculture, Nutrition; Humanities: Psychology, Education, Social Sciences, Languages, Philosophy, Literature, Arts.

There is a significant gender disparity in the intended fields of study. Males are more likely to enroll in STEM fields, while females are more likely to pursue health and humanities. The "medium" category shows instead a more balanced distribution. Overall, the distribution significantly differs (Fisher's exact test, P.val <.001). The lower percentage of females in STEM and the higher percentage in health tend to partially compensate, as both can be considered strong categories. However, the sum (37.5% vs. 53.6%) is clearly lower for females, who instead are about 20% more likely to expect to enroll in the weaker category.

There is an additional problem. Even within the same category there is an expected wage gap by gender, as shown in Table 4. In other words, the expected return for graduating in a given field differs for males and females. Looking first at the overall expectation, we note that the health field shows the highest expected wages, even higher than STEM, which is traditionally considered the most lucrative category. This evidence corroborates the inclusion of health in the strong fields of study. Humanities show the lowest expected wages, consistent with general trends that often place humanities at a lower earning potential. From this perspective the expected wages are quite accurate at first sight, as they reflect at least qualitatively the observed and well-known patterns.

Table 4. Expected wage by category of expected field of study

	Males	Females	Overall	% Expected Gap	% Observed Gap
STEM	2134.5	1567.0	1989.0	28.5	12.2%
Health	2570.5	2114.3	2265.1	20.1	2.9%
Medium	2395.0	1906.8	2126.1	23.0	15,8%
Humanities	1680.1	1465.0	1520.8	14.1	7.7%
Total	2215.6	1776.7	1961.6	22.4	

Note: Expected monthly net wage (in euro) for the expected field of enrolment for 4th year students in secondary school who (certainly or likely) intend to proceed with Higher Education. The % Observed gap refers to Almalaurea data, 5 years after Master graduation. STEM: Science, Technology, Engineering and Mathematics; Health: Medicine, Pharmacy, Dental studies, Nursing, Therapy and Rehabilitation, Veterinary; Medium: Law, Economics, Business, Architecture, Agriculture, Nutrition; Humanities: Psychology, Education, Social Sciences, Languages, Philosophy, Literature, Arts. Gap computed as the difference across gender over the total.

Across all categories, however, there is a remarkable gender gap in expected wages, with males who expect to earn systematically (and significantly) more than females. What is astonishing is the dimension of the expected gap, which is in the order of 25%. In terms of decision to proceed with HE these expectations can compensate at least in part the apparent advantage of females in terms of importance attached to HE by the family, as well as of the signal received by the teacher (see Section 4 below).

Data reported in Table 4 reveal another very compelling pattern: the percentage gap between males and females widens as we move from fields categorized as 'weaker' (humanities) to 'stronger' (STEM). In humanities, the gap is relatively modest (14%), while in STEM, it reaches its peak at 28.5%. The larger gap in expected wages (increasing with the strength of the field of study) may have future implications in the labor market, for instance affecting the reservation wage and the determination in bargaining affecting promotions and in general opportunities and outcomes in the working life. These expectations are particularly striking if we compare them with the realized gap. While a clean comparison is admittedly difficult, we rely upon data from Almalaurea referring to wages 5 year after Master graduation. The observed percentage gap is of a different order of magnitude, about 10 percentage points lower. The comparison of the expected vs. observed gender gap is suggestive of self-stereotyping. Crucially towards the goal of this chapter, the anticipated gap constitutes evidence that males and females attribute different values to seemingly equal outcomes.

We then investigate the expected wage gap constitutes a potential driving force behind gender-based variations in educational choices, particularly regarding the selection of fields of study. The probability to enroll in strong fields (STEM and Health), when accounting for the significance ascribed by parents, reveals a gender gap amounting to 16.1% (Table 5).

Table 5. Intention to enroll in "strong" fields of study

	(1)	(3)
Female	-0.161***	-0.083***
	(0.014)	(0.013)
Importance to parents	0.012***	0.013***
	(0.003)	(0.003)
Humanities pref. subject		-0.368***
		(0.013)
Observations	5025	5025
R-squared	0.027	0.158

Note: Linear probability estimates using a sample of 4th year students who certainly or likely will proceed with HE. The dependent variable is a dummy equal to one if the expected field of study belong to STEM or Health, and zero otherwise. Importance to parents: answer on a 1-10 scale to the question "It is important to my parents that I enroll to tertiary education." Humanities preferred is a dummy equal to one if the favorite subject in high school belongs to humanities. Standard errors in brackets. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

Column (2) proxies a non-monetary component of the utility function with a dummy that takes a value equal to 1 when students reports humanities as their favorite high school subject. The inclusion of this control yields significant effects. First, this variable has an important predictive power as the overall variance explained jumps from 4.5% to 15.8%. Second, individuals who have a preference for humanities at high school are much less likely (-36.8 percentage points) to enroll in a strong field of study. Third and foremost, this variable has a clear gender connotation and explains a great deal of the gender gap. In fact, the female dummy drops by a half and accounts now only for 8.3%.

This result, although rather strong, should be interpreted with care because consistent with two explanations that are non-mutually exclusive, but with opposite policy recommendations. On the one hand, such preferences may signal that HE has a genuine component of consumption value. If this is the case, gender differences in preferences should not be overturned by paternalistic policies. On the other hand, what appears to be an exogenous preference at first sight may subconsciously reflect social norms about gender roles (see Section 2 above) that should instead be tackled by appropriate policy interventions.

Section 3. Misperception of the probability of success and teachers' unconscious biases

Teachers play a pivotal role in shaping the educational and career trajectories of their students, influencing their choices regarding university enrollment and fields of study in multifaceted ways. One significant channel through which teachers influence students' choices is through the grades they assign. Grades serve as invaluable feedback, impacting students' self-confidence and shaping their academic preferences. Positive grades not only boost students' confidence in specific subjects but also inspire them to delve deeper into those subjects at the university level. Conversely, lower grades might discourage students, potentially diverting them away from fields or universities they perceive as academically daunting. Teachers often interact closely with parents, and the grades assigned in specific subjects can convey not only to students but also to their family an assessment of the student's attitude and suitability for a particular field of study. Moreover, in cases where university admissions consider high school grades as a relevant factor, teachers' assessments can have a direct and material impact on the probability of being accepted in competitive programs or institutions.

Another critical channel through which teachers shape students' paths is through recommendations and advice. In Italy students in the final year of middle school receive formal guidance, known as "Consiglio Orientativo", from their teachers to help them transition from a comprehensive to a diversified secondary school cycle. Even if families and students have the freedom to ignore these

recommendations, teachers' opinions can significantly impact students' choices and influence how families assess the risks and opportunities associated with different educational paths. Notably, the likelihood of pursuing higher education is generally higher for students who have attended a Lyceum compared to those who have chosen a vocational or technical school[6]. Consequently, it becomes evident that teachers, through their suggestions, also impact the probability of university enrollment. While teachers exert a powerful influence on students' choices, it is crucial to acknowledge that they can be susceptible to unconscious biases and stereotypes. Numerous studies in the field of psychology have demonstrated the existence of implicit biases, which are unconscious attitudes or stereotypes that affect our understanding, actions, and decisions. Teachers, like any other individuals, can be susceptible to these biases, which may lead to differential treatment of students based on ethnicity, gender, or other factors.

We will focus on stereotypical attitudes of teachers towards students coming from poorer socio-economic environments and males and females.

3.1. Data and methodology

A common method for investigating teachers' grading biases is to compare grades assigned by teachers with the results achieved by their students in standardized blind tests administered by independent institutional entities (Dardanoni, Modica, and Pennisi, 2009; Alesina, Carlana, Pinotti, 2018). These test scores serve as a benchmark against which teachers' grades are compared (Bonesrønning, 1999; Lindahl, 2007).

We will use this method exploiting INVALSI data that allow us to observe both standardized blindly-graded test scores obtained by students and scores assigned by teachers on non-blindly-graded tests in core subjects, such as Italian Language (*Language*) and Mathematics (*Math*)[7]. More precisely we use the last wave of the INVALSI data, school year 2021/22, and focus on students in grade 13th (which in Italy corresponds to the last year of upper secondary school). Teacher-assigned grades are on a scale from 1 to 10.

As regards student performance in standardized tests, we use scores computed by INVALSI, applying the IRT Rasch model to address the different difficulty associated with each question composing the test (*Rasch Language score* and *Rasch Math score*).[8] It is worth noting that the

[6] In Italy about 68% of students who have attended a Lyceum purse higher education compared to a 25% rate for those with a technical diploma and an 8% rate for individuals with a vocational diploma (MUR CSNU, 2022).

[7] The data allow the distinction between "written grades" and "oral grades", but given the larger percentage of missing values in written grades, we only consider oral grades.

[8] The Rasch model is a logistic model belonging to the category of Item Response Theory (IRT) and operates a joint estimate of two types of parameters: a difficulty parameter for each test question and a skill parameter for each student.

INVALSI tests are identical across schools, whereas marks assigned to students in class are based on a standard that is independently set by each teacher.[9]

To differentiate between students of different socio-economic background we use a variable that comes from the INVALSI dataset, called *ESCS Student* - Economic and Social Cultural Status. This indicator is built in accordance to the one proposed in the OECD-PISA framework and considers parents' occupation, education and educational resources at home (for instance, the number of books) [10]. The dataset at hand also provides information on student gender, which we use to build a dummy variable taking the value of 1 for females and 0 for males.

We also observe an additional number of students', parents', and schools' characteristics (gender, attendance at pre-primary school, etc.) that we use as controls. Exploiting this information, we build a set of dummy variables, taking the value 1 - and 0 otherwise -, for: students with an immigrant background (*Immigrants)*; students who have attended pre-primary school (*Pre-primary*); students who are regular in their educational path compared grade-repeaters or early-starters (*Regular)*[11]. As regards school organization, we have information on the number of students enrolled in each grade at the beginning of the school year (*Class size*) and the number of classes for the 13th grade within the school (*School size*). In addition, we have computed the average ESCS of students attending a given class, *ESCS Class*, share of female students in the class, *Share of female students in class* and the share of immigrant students in the class, *Share of immigrants in class*. We also build a dummy variable taking the value of 1 for *Lyceums* and 0 for technical and vocational schools.

Table 6 reports some descriptive statistics of the variables of interest for the sample we use in our estimates.

Table 6. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Grade Language	329,695	6.968	1.205	1	10
Grade Math	326,175	6.544	1.498	1	10
Rasch Language score	329,695	190.254	39.867	2.364	329.148
Rasch Math score	329,695	194.882	38.947	72.507	325.823
ESCS Student	329,695	0.034	1.027	-3.870	2.554
Girl	329,695	0.517	0.500	0	1
Immigrant	329,695	0.082	0.275	0	1

In particular, the Rasch model allows to express the probability of choosing the correct answer in an item as a function of the difficulty of the item itself and of the student's ability measured on the entire test.

[9] Moreover, while INVALSI tests assess student performance on an absolute grading scale, teachers might adopt relative marking which might also be affected by class composition, or by class size.

[10] For a detailed description see Ricci (2010), http://new.sis-statistica.org/wp-content/uploads/2013/09/RS10-SP-The-Economic-Social-and-Cultural-Background-a-continuous-index-for-the-Italian-Students-of-the-fifth-grade.pdf.

[11] In Italy a student starts primary school in September of the calendar year (Jan-Dec), in which she turns six, e.g. children born in 2014 start primary school in September 2020. In case students are just too young for the cut-off (i.e. children born in January-April 2015 in our example) parents can freely choose to let their children start primary school a year earlier; this parents' choice is typically correlated with a higher socio-economic background. It is not uncommon that recently arrived immigrants, who are lagging in language skills or academic background, are put in classes with students younger than them: in our data 33 percent of students attending a lower grade than their age are immigrants.

Pre-primary School	329,695	0.856	0.351	0	1
Regular	329,695	0.847	0.359	0	1
Lyceum	329,695	0.438	0.496	0	1
Class size	329,695	18.139	5.350	1	35
School size	329,695	9.493	3.345	1	23
ESCS Class	329,695	0.016	0.568	-3.195	1.671
Share of female students in class	329,695	0.517	0.291	0	1
Share of immigrants in class	329,695	0.082	0.102	0	1

INVALSI, 13th graders, school year 2021-22

In Table 7 we provide descriptive evidence for students' performance according to teachers' assessments and to results obtained at the INVALSI standardized tests, both for math and language, divided by socio-economic background and gender. As it can be seen from the Table, students coming from economically disadvantaged backgrounds tend to receive lower grades from teachers and exhibit poorer results in standardized tests for both mathematics and language when compared to their more privileged counterparts. For instance, the mean score on the math INVALSI test for students with higher ESCS stands at 199.527, whereas it diminishes to 180.830 for students with lower ESCS. Likewise, students from more affluent families achieve an average language grade of 7.147 from their teachers, contrasting with an average grade of 6.786 for those from less affluent backgrounds. Descriptive statistics further reveal gender-based difference. In standardized language tests, females outperform males with a mean score of 195.417 compared to 184.728. However, in mathematics, males exhibit stronger performance. Despite these test differences, females consistently receive higher grades from their teachers in both language and mathematics.

Table 7. Descriptive Statistics of Student performance: by Socio-Economic background and Gender

Variable	Low ESCS (below median)	High ESCS (above/equal median)	Females	Males
Grade Language	6.786	7.147	7.241	6.675
	(1.204)	(1.179)	(1.145)	(1.199)
Grade Math	6.411	6.676	6.762	6.311
	(1.495)	(1.489)	(1.439)	(1.524)
Rasch Language score	180.830	199.527	195.417	184.728
	(37.983)	(39.501)	(37.580)	(41.471)
Rasch Math score	186.796	202.840	190.191	199.902
	(36.859)	(39.306)	(36.396)	(40.912)

INVALSI, 13th graders, school year 2021-22. mean values and standard errors in brackets

To investigate whether some groups of students (students coming from poorer socio-economic environments and females) receive lower grades compared to their counterparts, we estimate the following Ordinary Least Squares (OLS) model:

$$y_{is} = \beta_0 + \beta_1 Female_{is} + \beta_2 Student\ ESCS_{is} + \beta_3 g(Invalsi\ \ Test\ \ Score)_{is} + \beta_4 X_{is} + \beta_5 W_s + \mu_s + \varepsilon_{ismt} \quad (2)$$

The dependent variable y_{is} in this model is the score assigned to student *i* in class *s* by teachers on non-blindly-graded tests in language or math. To assess whether students with a lower socio-economic background get lower or higher grades compared to students coming from wealthier families, the model incorporates the variable *ESCS Student.* Similarly, to investigate any eventual grade advantage or disadvantage among female students, we also include a dummy variable, *Female*, taking the value of one for female students and zero for male students. We control for student performance at the INVALSI test (a flexible polynomial function, ranging from linear to cubic, capturing the score obtained by students on blindly graded tests in language or math). The model also considers a vector X of additional students' characteristics (*Immigrant, Pre-primary School, Regular,)*, a vector W of school and class characteristics (*Lyceum, School size, Class size, ESCS class, Share of female students in class, Share of immigrants in class)* and province fixed effects (μ) to partial out possibly different grading standards at the geographical level.

It is worth noting that the estimated model relies upon the assumption that the production function of the two scores is the same. Such an assumption is admittedly strong, as behavior and effort are more likely to matter at school than in the INVALSI test.

3.2 Bias toward students with a low socio-economic background

A number of studies highlight that students from more affluent families are more likely to pursue higher education, with Italy standing out as a particularly illustrative case where family background significantly shapes the likelihood of obtaining a tertiary education degree. In households where at least one parent holds a university degree, the percentage of 25-34-year-olds with a tertiary degree reaches 67.6%, while this figure drops to 39.1% when at least one parent has completed high school and further diminishes to 12.3% when parents possess at most a lower secondary education qualification (ISTAT, 2023, Statistiche report).

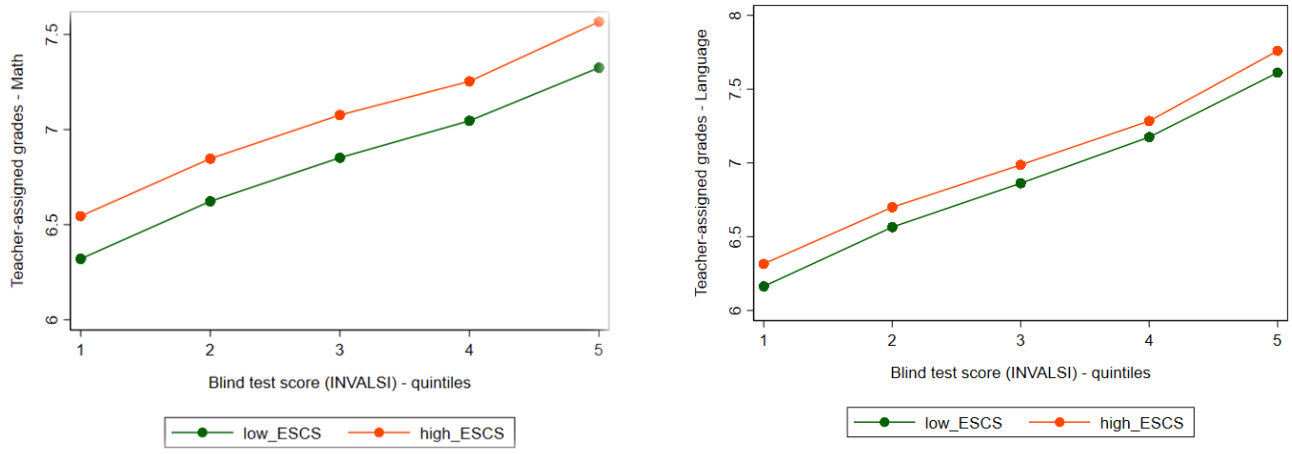
On top of the reasons outlined in the previous sections, the lower likelihood of low SES students to pursue HE may be attributed to factors such as comparatively lower academic performance (see for instance INVALSI, 2017). However, a significant role in shaping these outcomes may be played by teachers. Exposure to teacher stereotypes may discourage students from less well-off families, leading to decreased effort in their studies and adverse effects on their future prospects. Teachers might unconsciously adjust their behavior based on students' economic and social background, developing stereotyped expectations about their abilities, thereby creating a self-fulfilling prophecy (Papageorge et al., 2020).

In what follow we use the INVALSI data, described above to test whether, ceteris paribus, students from low SES families systematically receive lower teacher evaluations even when controlling for an objective proxy of their ability.

Figure 1 displays the average grades assigned by math and language teachers to students characterized by low and high socio-economic backgrounds (ESCS above/equal and below the mean) across quintiles of standardized test scores in math and language. A remarkable gap exists in the grades received by these two groups in both math and language subjects. The disparity is more pronounced in mathematics compared to language, and this trend remains consistent among students positioned within various quintiles of standardized test scores

Figure 1: Teacher-assigned grades vs standardized test scores – low vs high ESCS

(b) Math (a) Language



INVALSI, 13th graders, school year 2021-22

This disparity persists even when using Ordinary Least Squares (OLS) to estimate the model in Equation (2), which allows us to examine the influence of *Student ESCS* on the behavior of teachers, while accounting for a comprehensive set of controls, including the ESCS at the class level. Results are reported in Table 8. In columns (1) and (4), in which we do not control for the student's grade obtained in INVALSI standardized tests, we find that an increase of one standard deviation in ESCS Student leads ceteris paribus to an increase of about 0.07 in grades assigned by math teachers and of about 0.08 in those assigned by language teachers. Controlling for INVALSI standardized tests in math (language), an increase of one standard deviation in the ESCS indicator results in a math (language) grade increase of about 0.05 (0.06). In columns (3) and (6), in which we control for INVALSI scores in both subjects we find similar results.

Table 8. Gap between students with different socio-economic background, province-FE estimates – 13th graders, school year 2021-22

	(1)	(2)	(3)	(4)	(5)	(6)
	Math	Math	Math	Language	Language	Language

ESCS Student	0.066***	0.052***	0.047***	0.082***	0.062***	0.062***
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)
INVALSI score in Math	NO	YES	YES	NO	NO	YES
INVALSI score in Lang.	NO	NO	YES	NO	YES	YES
Full set of other controls	YES	YES	YES	YES	YES	YES
Observations	326959	326959	326959	329695	329695	329695
R-squared	0.074	0.210	0.216	0.148	0.253	0.264

Note: Province-FE estimates. The dependent variable is measured by the teacher-assigned grade in Math (columns 1-3) and Language (columns 4-6). We control for province fixed effects and the full set of student, class and school characteristics. Standard errors are robust to heteroskedasticity and are clustered at the local labor market level (shown in brackets). Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

We also explore whether such stereotypes are stronger or weaker in Lyceums, i.e. the type of secondary school with the highest frequency of students proceeding to HE. To do so, we run separate regressions for Lyceums and Technical and Vocational schools to take into account the fact that the distribution of grades might differ in the two types of school. As shown in Table 9, in columns (1) and (4), where we do not account for the student's grade obtained in INVALSI standardized tests, we observe that a one standard deviation increase in the individual indicator of family socio-economic conditions (ESCS student) for Lyceum students leads to an increase of 0.075 (0.082) in grades assigned by math (language) teachers, while for students attending technical or vocational schools we observe an increase of 0.036 and 0.066 respectively. Upon controlling for a linear polynomial of student performance in the standardized test of the corresponding subject (columns 2 and 5), we find that a one standard deviation increase in individual ESCS for Lyceum students results in an increase of 0.051 in grades assigned by math teachers (0.057 for language), instead for students attending technical or vocational schools the increase is smaller and equal to 0.019 and 0.051. These findings remain consistent when accounting for the INVALSI scores obtained in both math and language. Overall, these results suggest that stereotypes are even stronger in the more academically oriented schools.

Table 9. Gap between students with different socio-economic background, province-FE estimates – 13th graders by Lyceum attendance, school year 2021-22

	(1)	(2)	(3)	(4)	(5)	(6)
			Lyceums			
	Math	Math	Math	Language	Language	Language
ESCS Student	0.075***	0.051***	0.044***	0.082***	0.057***	0.056***
	(0.007)	(0.006)	(0.006)	(0.005)	(0.005)	(0.005)
Observations	143618	143618	143618	144520	144520	144520
R-squared	0.061	0.239	0.248	0.106	0.238	0.254
			Technical and Vocational Schools			
ESCS Student	0.036***	0.019***	0.017***	0.066***	0.051***	0.049***
	(0.005)	(0.005)	(0.005)	(0.004)	(0.004)	(0.004)
INVALSI score in Math	NO	YES	YES	NO	NO	YES
INVALSI score in Lang.	NO	NO	YES	NO	YES	YES
Full set of other controls	YES	YES	YES	YES	YES	YES
Observations	183341	183341	183341	185175	185175	185175

R-squared	0.077	0.187	0.190	0.110	0.202	0.212

Note: Province-FE estimates. The dependent variable is measured by the teacher-assigned grade in Math (columns 1-3) and Language (columns 4-6). We control for province fixed effects and the full set of student, class and school characteristics. Standard errors are robust to heteroskedasticity and are clustered at the local labor market level (shown in brackets). Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

Existing research also show that immigrant students, who typically come from more disadvantaged backgrounds, receive lower grades than native students in primary and lower secondary school, even after controlling for their performance on standardized, blindly-graded tests (see for instance De Paola and De Benedetto (2022), who focus on 2nd to 5th graders in primary school, and Alesina et al. (2018), who study 8th graders).

The SES gap in teacher grades can derive from unconscious biases that affect their perceptions of students from different socio-economic backgrounds. However, it is crucial to emphasize that the observed gap in grades between students with low and high socio-economic backgrounds can be influenced by several additional factors. Student socio-economic background can be linked to cultural and language differences, impacting academic performance beyond standardized test scores and resulting in divergences in teacher-assigned grades. In addition, socio-economic factors can affect students' social and emotional well-being, influencing their classroom engagement and behavior. These factors may not be fully captured by standardized tests and affect how teachers perceive and grade students.

Research aimed at unraveling these channels is currently lacking. However, understanding and addressing these potential contributing factors is imperative for establishing a fair and equitable educational environment.

3.2 Gender bias

In recent years, a discernible trend has emerged showing that females consistently outperform males across various educational levels. This disparity is observed in terms of better academic achievements, higher enrollment and graduation rates in secondary and tertiary education. Concurrently, males constitute the predominant group among early school leavers. However, even if females attain the same educational levels as men, they remain underrepresented in scientific and technical fields, which typically lead to higher-paying occupations. Several factors may contribute to these trends, with teacher behavior emerging as a potential influencer.

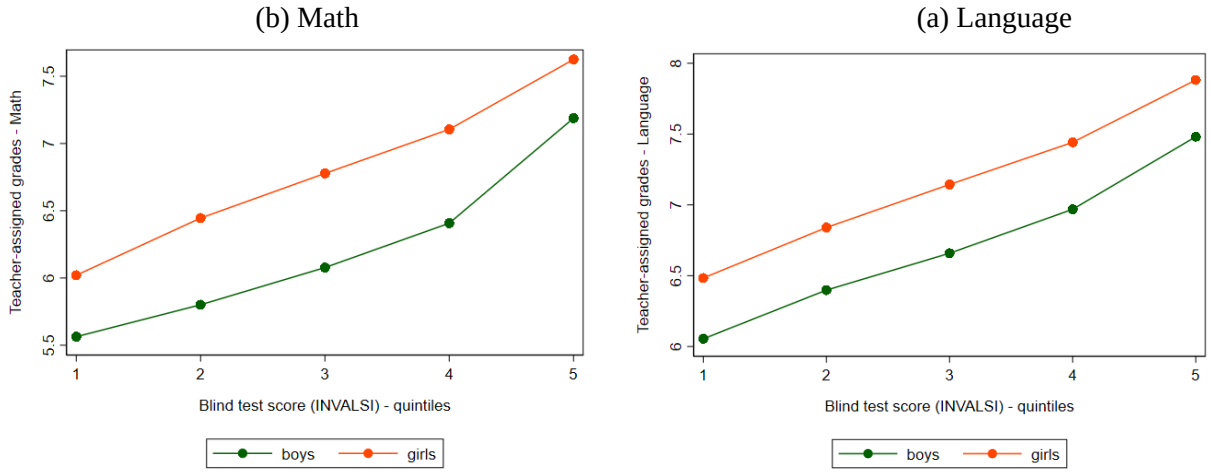
A significant body of literature explores stereotypical attitudes held by teachers towards males and females. Pioneering research by Lavy (2008), based on Israeli high school data, reveals discriminatory practices against male students, resulting in lower grades across all subjects. Similar evidence is found in studies conducted in various countries (Hinnerich et al., 2011; Hanna and Linden,

2012; Cornwell et al., 2013; Di Liberto et al., 2016). Recent findings by Di Liberto et al. (2021), utilizing Italian data from INVALSI, underscore that, starting from primary school, males consistently receive less favorable grades than females in both mathematics and language, a pattern that persists into middle school.

To delve deeper into the examination of potential systematic variations in the evaluation of male and female students by teachers, we adopt the identical methodology used in Section 4.2. Our goal is to understand whether teacher grades differently by gender students with a comparable performance in blind standardized tests.

Figure 2 illustrates the average grades assigned by math and language teachers to male and female students across quintiles of standardized test scores in math and language. This visualization highlights how females receive higher grades by teachers in both math and language compared with males who have a similar score at the INVALSI test in each of the two subjects.

Figure 2. Teacher-assigned grades vs standardized test scores – males vs females



INVALSI 13th graders, school year 2021-22

Table 10 presents OLS estimates obtained from a regression model in which we examine the effect of student gender on grades given by teachers controlling for the score at the INVALSI test and for individual, class and school characteristics. Results show that females receive higher teacher-assigned grades than males after controlling for their performance on standardized blindly-graded tests. This advantage is clear and very similar in magnitude both for math and language.

Table 10. Gap between females and males. province-FE estimates – 13th graders

	(1)	(2)	(3)	(4)	(5)	(6)
	Math	Math	Math	Language	Language	Language
Female	0.340***	0.456***	0.425***	0.466***	0.424***	0.465***

	(0.007)	(0.006)	(0.006)	(0.005)	(0.005)	(0.005)
INVALSI score in Math	NO	YES	YES	NO	NO	YES
INVALSI score in Lang.	NO	NO	YES	NO	YES	YES
Full set of controls	YES	YES	YES	YES	YES	YES
Observations	326959	326959	326959	329695	329695	329695
R-squared	0.074	0.210	0.216	0.148	0.253	0.264

Note: LLM-FE estimates. The dependent variable is measured by the teacher-assigned grade in Math (columns 1-3) and Language (columns 4-6). We control for province fixed effects and the full set of student, class and school characteristics. Standard errors are robust to heteroskedasticity and are clustered at the local labor market level (shown in brackets). Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

We have also checked whether the economic background has the same influence on male and female student by including among regressors an interaction term between the indicator of socio-economic background (ESCS student) and the dummy Female. The Female dummy variable and the indicator of socioeconomic background remain positive. Additionally, the interaction term also shows a positive coefficient. This suggests that female students from more affluent families tend to receive higher grades from teachers compared to their male counterparts with similar socioeconomic backgrounds (results not reported and available upon request). An increase of one standard deviation in ESCS student status leads to an approximately 0.05 increase in grades assigned by math teachers and a 0.02 increase in grades assigned by language teachers to female students.

As previously discussed, the observed tendency of teachers to assign higher grades to females compared to males may be influenced by various factors. Apart from potential gender bias among teachers, other considerations might contribute to this phenomenon. Teachers may take into account student behavior, and the tendency to address and sanction disruptive behaviors, which studies suggest are more prevalent among males (see, for instance, Matthews et al., 2009; Duckworth and Seligman, 2006). It could also be that females and males perform differently to the two types of test, leading to a different gender gap in teachers' assessments and standardized tests. Lastly, our findings may be indicative of teachers attempting to counter perceived discrimination against females by adopting a gender-specific "easy grading" policy (Hinnerich et al., 2011; Mechtenberg, 2009; Bonesrønning, 2008; Breda and Ly, 2015).

Whatever the ultimate reason, lower teachers' grade can potentially account for the lower likelihood of attending university that characterize males. This is particularly relevant for low SES males, for whom both dimensions of the bias (gender and SES) matter.

The observed pattern of higher grades for females in both math and language suggests that grades given by teachers may not be the primary factor influencing the low enrollment of females in STEM fields. As shown by Carlana (2019) and Carlana and Corno (2022), a closer examination of other dimensions of teachers' stereotypes, along with the consideration of the impact of parents and peers, might be very important to understand the gender gap in STEM.

Carlana (2019) focuses on teacher stereotypes as measured by the Gender-Science Implicit Association Test (IAT) [12] - a reliable predictor of choices and behaviors[13]. Her study, conducted in a sample of Italian schools, draws on diverse data sources, including information on teachers' IAT. The findings reveal that the gender gap in math performance on standardized tests significantly increases when students are assigned to teachers with stronger stereotypes. This effect is driven by female students, with no significant impact on their male counterparts. A notable consequence of teacher bias is the inclination of female students to opt for less challenging high-school tracks, aligning with biased teachers' track recommendations. This fact suggests that teacher bias, as measured by IAT, not only affects immediate academic performance but also shapes long-term educational trajectories. In analyzing the mechanisms behind the negative impact of teacher bias on student achievement, the study finds that biased math teachers activate negative self-stereotypes and induce females to believe that they are worse at math than what would be expected given their achievements.

Carlana and Corno (2021) explore the parental and peer influence on students' academic interests and choices. At this purpose the authors conducted an experiment (involving more than 2000 Italian pupils attending high school) with five different treatments. Three treatments focus on parental influence: Mothers' Recommendation, Fathers' Recommendation, and Disclosure to Parents. These experimental conditions aim to isolate and enhance the salience of parental recommendations by asking students to think about whether their mother/father would recommend them to choose math or literature and by telling them that their choice may be revealed to their parents. Another two treatments, Disclosure to Peers and Interactions with Peers explore the impact of peer influence on students' choices. In the first of these conditions students are informed that their choice could be observed by their classmates. In the second students collaborate in a task with the classmates who chose the same subject, either math or literature, in order to test whether the desire to avoid interactions with opposite-gender peers contributes to gender segregation in fields of study.[14]

As regards parental influence, the research reveals that when mothers' recommendations become more salient, it amplifies the gender gap, resulting in a decreased likelihood of females choosing math. Fathers' recommendations have a negative impact on females' inclination towards math but

[12]The IAT is based on the categorization of words either to the left or right of a computer or tablet screen. It utilizes reaction time to measure the intensity of the connection between two concepts, namely gender and scientific/humanistic subjects. The underlying premise is that individuals exhibit quicker and more accurate responses when there is a closer association between gender and specific academic fields.

[13] For instance, higher stereotypes, measured by gender IAT correlate with lower female performance in math during college and decreased interest in STEM careers (Cvencek et al., 2011; Nosek et al., 2002; Kiefer and Sekaquaptewa, 2007) and predict employer bias against female math performance (Reuben et al., 2014).

[14] The study also collects information on students' subjective beliefs about their own abilities (students were asked to select the subject in which they expect to give a higher number of correct answers in a test including questions in both domains)[14] and survey data on high school track interests, friendship networks, socio-economic background, and actual parental recommendations.

positively affect males. Turning to peer influence, the study finds that both females and males are indifferent to the public disclosure of their field of interests to classmates. However, female students are influenced by peer interactions, with a notable 9-percentage-point decrease in the probability of choosing math when collaborating with classmates opting for the same subject.

The presented findings indicate that teachers' evaluations display less generosity toward certain student groups, specifically those with low socioeconomic status (SES) and male students. Interestingly, female students, on the one hand, tend to receive higher grades from their teachers both in math and language, which should encourage them to purse STEM fields. Conversely, existing research shows that teachers' implicit stereotypes (as assessed by the IAT) produce adverse effects on female performance in math, whereas they exhibit no discernible impact on male students. Clearly teachers' explicit evaluations differ from their implicit biases and while explicit evaluations (grades) might show no gender bias or even favor female students, implicit biases might still exist and negatively affect female performance in math and their educational choices. As shown in a study by Alesina et al (2018), particularly effective can be policies designed to inform teachers about their behavior and about the potential biases they may unknowingly hold.

Section 4. Results of information provision

Information biases may contribute to explain the persistence of intergenerational inequality and gender segregation. In this context, the provision of ready to use, reliable, evidence-based information on the costs, benefits and chances of success of different educational options may constitute an effective intervention towards making optimal choices as well as levelling the playing field.

In the last years, an increasing number of studies have analyzed the impact of information campaigns on HE enrolment decisions. While rather homogeneous in terms of research strategy (usually based on randomized controlled trials), this literature differs considerably in terms of both the treatments administered and of the outcomes investigated. The evidence reported is also mixed in terms of measured effects and, typically, only refers to short-term outcomes.

Focusing on interventions that provide information about HE's costs, some studies find a positive effect on enrolment, especially among low-income students (Avery, 2010; Bos, Berman, Kane, and Tseng, 2012; Castleman, Meyer, Sullivan, Hartog, and Miller, 2017; Jensen, 2010; Loyalka, et al., 2013; Peter, Spiess, and Zambre, 2018), while others report small to null effects (Hastings, Neilson, and Zimmerman, 2015; Rosinger, 2015). A recent literature review by Herbaut and Geven (2020)

indicates that change in behavior typically occurs when procedural support is provided along with information. This result clearly emerges also in the study by Bettinger, Long, Oreopoulos, and Sanbonmatsu (2012). Positive effects on enrolment were observed only in the group that received personal assistance in addition to information. The evidence of this strand of literature, however, is concentrated in countries where enrolment in HE imposes a considerable financial burden and, at the same time, financial aid measures are widespread (e.g. UK, US).

As regards interventions that provide information on returns to HE there is little evidence of their effectiveness. Several contributions consistently showed that information significantly increased the intention to enroll (e.g. Baker, Bettinger, Jacob, and Marinescu, 2018; Bleemer and Zafar, 2018; McGuigan, McNally, and Wyness, 2016; Oreopoulos and Dunn, 2013; Peter and Zambre, 2017). However, the change in student intentions did not automatically translate into actual enrolment decisions. Some programs effectively increased enrolment (Avitabile and De Hoyos, 2018; Peter et al., 2018), but many others proved to be ineffective regardless of whether information on costs was included or not (Bonilla, Bottan, and Ham, 2017; Pekkala Kerr et al., 2020). A possible explanation for this seeming ineffectiveness is that interventions were usually rather short, lasting from 20 min to one hour. In such a limited time spell, information on expected returns cannot be detailed enough to take into account individual heterogeneity and the different possible career choices.

Ballarino et al. (2022) significantly contributes to the literature in several respects. First, they provide evidence about a country (Italy) where both the tuition fees and the chance of receiving financial support are relatively lower, so that opportunity costs – rather than direct costs – take the lion's share. Second, they investigate the effect of informative campaigns on both the vertical and the horizontal stratification, i.e. the analysis of the FoS, of the educational system. FoS entail different expected economic returns, and their composition is heterogeneous in terms of both gender (OECD, 2016) and family background (Kim, Tamborini, and Sakamoto, 2015; OECD, 2019b; Webber, 2014). Only a few studies approach the issue of the FoS (Baker et al., 2018; Conlon, 2021; Pekkala Kerr et al., 2020; Pistolesi (2017); Wiswall and Zafar, 2015). All these contributions find that information on FoS returns affects the probability of Major choice, but the evidence is confined to bachelor students, already enrolled in HE. Third, the experiment of Ballarino et al. (2022) investigates the effects of information campaigns beyond the enrolment decision. With the exception of Hastings et al. (2015), who link survey data with administrative records for university careers, and Peter et al. (2018), who assessed treatment effects on enrolment decisions one year after the intervention, there is no evidence about the persistence of the effects of information campaigns. Assessing them beyond enrolment decisions is instead of paramount importance from an efficiency perspective. While increasing enrolments in HE and rebalancing the composition of students across FoS may constitute desirable

policy goals, it is crucial to assess that these effects do not backfire in terms of students' later negative academic outcomes. Convincing students to undertake HE, or to choose a more rewarding but possibly also more difficult FoS may not be a good idea if the marginal student affected by the information campaign is doomed to fail. Ballarino et al. (2022) investigate both academic and labor market outcomes, observing the participants almost two years after the intervention. Last but not least, the experiment of Ballarino et al. (2022) has a sufficient statistical power to investigate possibly heterogeneous effects of the information campaign among treated students. Thanks to the large sample size they can break down the sample jointly by gender and family background.

The information campaign in the field experiment of Ballarino et al. (2022) produces two main effects. The first is a decrease in university enrolment that mainly concerns male students coming from relatively low SES. This effect can be considered an unexpected result at first glance, at least against the background of positive or null effects reported in the literature. The authors attribute the result to a different structure of the Italian labor market as compared to that of Anglo-Saxon countries, where most of the previous studies have been conducted. The labor market in Italy is characterized by small firms in the manufacturing and other low value-added sectors (OECD, 2019a), granting comparatively low returns to HE. Hence, in contexts where the investment in HE is poorly rewarding, information campaigns providing transparent information on these low returns can determine a negative impact on enrolment. In terms of lifetime earnings, in fact, returns have a much larger impact than costs. Interestingly, the bulk of the decrease of the enrolment rate is observed in the provinces where the labor market is tighter, i.e. the opportunity cost of HE is higher. Ballarino et al. (2022) also find, consistently, that the counterpart of the lower enrolment rate among treated students is a significantly higher probability of employment one year after high school.

The second effect of the information campaign is a shift towards fields of study that are occupationally more rewarding either after the bachelor or with a subsequent master degree, in line with previous studies that take this dimension into consideration (Hastings et al., 2015; Pekkala Kerr et al., 2020; Pistolesi, 2017). The effect in this case is observed mainly among females coming from a family with more educated parents. When provided with detailed and reliable information on labor market returns to university degrees, these students moved out from the humanities and social sciences, opting instead for fields providing better occupational opportunities (such as Economics or Law). This effect does not extend with the same strength to occupationally stronger fields (Medicine and other health fields, Engineering and ICT), possibly due to higher selectivity and, in case of Medicine, also to numerus clausus rule and longer duration.

Effect of information on the intention to enroll

The treatment effect on the intention to enroll is weak. Table 11 refers to the treated only and underscores that the SES gap significantly widens. However, it should be noted that the change in the intention is the sum of the effect of the treatment and what would happen spontaneously. The controls (not reported) also display a qualitatively similar pattern, though less pronounced. As a result, the net effect of the treatment does not turn out to be significant.

Table 11. Change in the intention to enroll of the treated

	Low SES	High SES	Total	
Males	-0.071	0.072	-0.004	P.val = .134
Females	-0.072	-0.041	-0.058	
Total	-0.072	0.164	-0.030	
	P.val < .001			

Note: Treated students report on a Likert scale 1-4 scale their intention to enroll in HE. The change in the intention to enroll is computed as the difference after-before the treatment. High SES: students with both parents holding at least a high school degree. P-values computed with non-parametric Mann-Whitney test.

Table 12 presents the distribution of expected fields of study by gender, comparing treated and control groups. The distribution of expected fields of study between genders remains stereotypical, with males more inclined towards STEM and females towards Health and Humanities. However, there is evidence of a treatment effect. Information has an impact on the females' field of study. In particular, there is a sizable decrease in interest in the humanities among the treated females. The treated group of females shows a notable increase in the interest in medium fields (like Law, Economics, Business, etc.), and to a lower extent to health-related fields.

Table 12. Distribution of expected field of study by gender

	Males		Females	
	Treated	Controls	Treated	Controls
STEM	36.9	35.2	10.7	11.1
Health	15.2	14.6	26.4	24.5
Medium	29.0	31.9	29.8	24.5
Humanities	18.9	18.2	33.1	39.9
Total	100.0	100.0	100.0	100.0
P.val	0.749	-	0.031	-

Note: STEM: Science, Technology, Engineering and Mathematics; Health: Medicine, Pharmacy, Dental studies, Nursing, Therapy and Rehabilitation, Veterinary; Medium: Law, Economics, Business, Architecture, Agriculture, Nutrition; Humanities: Psychology, Education, Social Sciences, Languages, Philosophy, Literature, Arts. For each group of treated respondents the P-value refers to a non-parametric Wilcoxon test for matched observations at the individual level in Wave 1 (before the treatment) and Wave 2 (after the treatment).

This shift could be due to various factors, but there is no evidence in the data of a significant treatment effect on the expected wage. All the participant to the study tend to have more correct expectations (i.e. lower expected wages, and a lower gender gap than those presented above in Table 3) in Wave 2 than in Wave 1, but without a differential treatment effect. Note that this result is not surprising

even in light of the shift of females out of humanities, as this effect regards a small fraction of the whole sample. Moreover, the information campaign covers other relevant dimensions beyond wages, such as duration of first job search, risks of over-education and risks of horizontal mismatch between job and degree. There is indeed evidence that these other dimensions matter. Table 13 displays how much the respondents in Wave 2 agree with the statement "it' easier to find a good job with a bachelor in sciences than in humanities." In this case the treatment shows a significant effect both for females and for males.

Table 13. Evaluation of effectiveness of sciences vs humanities to find a good job

	Controls	Treated	
Males	6.69	7.07	P.val < .001
Females	6.67	7.18	P.val < .001

Note: Students in Wave 2 report on a Likert scale 1-10 scale how much they agree with the statement "it' easier to find a good job with a bachelor in sciences than in humanities". P-values computed with non-parametric Mann-Whitney test across treatment conditions separately for males and for females.

To shed light on what explains the females' change of intentions we rely upon a multivariate approach. Table 14 present a set of linear probability models in which the dependent variable is a dummy that takes a value equal to one when the (female) respondent reported Humanities as her favorite field of study in Wave 1, and a different field in Wave 2. The dummy takes a value equal to zero when the intention of enrolling in Humanities is instead confirmed in Wave 2.

Table 14 Intention not to enroll in Humanities

	(1)	(2)	(3)
	No Humanities	No Humanities	No Humanities
Treatment	0.038*	0.030	0.027
	(0.021)	(0.022)	(0.021)
Effectiveness Sc vs. Hum	-	0.011*	0.012**
		(0.006)	(0.006)
Lower expected wage Hum	-	0.022*	0.021*
		(0.012)	(0.012)
Humanities preferred	-	-	-0.115***
			(0.029)
Observations	974	974	974
R-squared	0.002	0.008	0.022

Note: Linear probability estimates using a sample of 4th year female students who certainly or likely will proceed with HE. The dependent variable is a dummy equal to one when the (female) respondent reported Humanities as her favourite field of study in Wave 1, and a different field in Wave 2. The dummy takes a value equal to zero when the intention of enrolling in Humanities is instead confirmed in Wave 2. Effectiveness Sc vs.Hum: how much the respondents in Wave 2 agree with the statement "it' easier to find a good job with a bachelor in sciences than in humanities." Lower *expected wage Hum* is the amount of the decrease in expected wage in humanities between Wave 1 and Wave 2. *Humanities preferred* is a dummy equal to one if the favorite subject in high school belongs to humanities. Standard errors in brackets. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

The regression shows that the intervention has a significant effect overall (Column 1). As regards the channel, Column 2 shows a significant effect of the economic characteristics of the field of study chosen. Both a stronger effectiveness of science in finding a good job and a decrease in the expected wage of Humanities increase the probability to opt out from Humanities. Notably, both variables are part of the information campaign and in fact the treatment dummy decreases in magnitude and loses significance. As already noted in Section 3, early academic preferences seem to take the lion's share: A preference for humanities in high school strongly correlates with the intention to maintain the choice of this field of study, while the other variables remain virtually unchanged (Column 3).

Section 5. Concluding remarks

This chapter investigates the role played by information and stereotypes in the Schooling-Tertiary Education Transition. In particular, two stylized facts are investigated:

(i) Students with a lower socio-economic family background enroll less often in higher Education than their more advantaged counterparts;

(ii) Females disproportionately choose less occupationally rewarding FoS and are under-represented in the so-called STEM disciplines.

We provide several pieces of evidence concerning the role played by socio-economic background. First, the quality of information matters. Respondents from high SES perceive the quality of information about tertiary education received by their parents to be significantly better. Second, students from more educated families report a significantly higher value placed on tertiary education by their parents. Third, low SES students suffer from negative stereotypes, receiving downward biased signals about their ability from their secondary school teachers.

These factors cannot rationalize the unbalanced distribution of choices along a gender dimension. In fact, females display a significantly better situation than males in both the quality of information and the importance attached to HE by their parents. The signals received in secondary schools are also upward biased. Two different factors seem to matter in this case:

- a gender gap in the expected wages that increases with the strength of the field of study
- a pronounced difference in the preference for humanities at high school. Students who have such a preference are much less likely (-36%) to enroll in a strong field of study, and this variable has a clear gender connotation.

The latter result should be interpreted with care because consistent with two explanations that are non-mutually exclusive, but with opposite policy recommendations. On the one hand, such preferences may signal that HE has a genuine component of consumption value. On the other hand,

what appears to be an exogenous preference at first sight may also subconsciously reflect social norms about gender roles. Further research is needed to shed light on this issue.

We use the data of a large scale field experiment to investigate the effects of information provision. We find that the effect on the intention to enroll of low SES student is not significantly affected. Ballarino et al. (2022) indeed claim that the effect is even significantly negative particularly where the labor market is tight, i.e. where the outside option is higher.

The distribution of expected fields of study between genders remains stereotypical. However, there is evidence of a treatment effect. There is a sizable decrease in interest in the humanities among the treated females. The treated group of females shows a notable increase in the interest in medium fields (like Law, Economics, Business, etc.), and to a lower extent to health-related fields. There is no evidence in the data of a significant treatment effect on the expected wage. This result is not surprising even in light of the shift of females out of Humanities, as this effect regards a small fraction of the whole sample. Moreover, the information campaign covers other relevant dimensions beyond wages, such as duration of first job search, risks of over-education and risks of horizontal mismatch between job and degree. There is indeed evidence that these additional dimensions matter.

Focusing on the subsample of females who changed their intended field of study out of Humanities, early academic preferences seems to maintain the lion's share: A preference for humanities in high school strongly correlates with the intention to maintain the choice of this field of study, while the effect of other variables remain virtually unchanged.

References

Akerlof, G. A., and Kranton, R. E. (2000). Economics and identity. *Quarterly Journal of Economics*, 115(3), 715–753.

Akerlof, G. A., and Kranton, R. E. (2002). Identity and schooling: Some lessons for the economics of education. *Journal of Economic Literature*, 40(4), 1167–1201.

Alesina, A., Carlana, M., Ferrara, E. L., and Pinotti, P. (2018). Revealing stereotypes: Evidence from immigrants in schools. Technical report, National Bureau of Economic Research.

Avery, C. (2010). The effects of college counseling on high-achieving, low-income students: Technical Report, National Bureau of Economic Research.

Avitabile, C., and De Hoyos, R. (2018). The heterogeneous effect of information on student performance: evidence from a randomized control trial in Mexico. *Journal of Development Economics*, 135, 318–348.

Azzolini, D. (2011). A new form of educational inequality? What we know and what we still do not know about the immigrant-native gap in Italian schools. *Italian Journal of Sociology of Education*, *3*(Italian Journal of Sociology of Education 3/1), 197-222.

Azzolini, D., and Barone, C. (2012). Tra vecchie e nuove disuguaglianze: la partecipazione scolastica degli studenti immigrati nelle scuole secondarie superiori in Italia. *Rassegna italiana di sociologia*, *53*(4), 687-718.

Baker, R., Bettinger, E., Jacob, B., and Marinescu, I. (2018). The effect of labor market information on community college students' major choice. *Economics of Education Review*, 65, 18–30.

Barban, N., and White, M. J. (2011). Immigrants' children's transition to secondary school in Italy. *International Migration Review*, *45*(3), 702-726.

Barber, B. M., and Odean, T. (2001). Males will be males: Gender, overconfidence, and common stock investment. *Quarterly Journal of Economics*, 116(1), 261–292.

Ballarino, G., A. Filippin, G. Abbiati, G. Argentin, C. Barone, A. Schizzerotto (2022) "The effects of an information campaign beyond university enrolment: A large-scale field experiment on the choices of high school students," *Economics of Education Review*, 91, 102308

Barone, C., Schizzerotto, A., Assirelli, G., and Abbiati, G. (2019). Nudging gender desegregation: A field experiment on the causal effect of information barriers on gender inequalities in higher education. *European Societies*, 21(3), 356–377.

Becker, G. S. (1964). Human capital: a theoretical and empirical analysis, with special reference to education. University of Chicago Press.

Belzil, C., and Leonardi, M. (2013). Risk aversion and schooling decisions. *Annals of Economics and Statistics/Annales D'économie et de Statistique*, 35–70.

Bertozzi, R. (2016). Transizioni e scelte formative. Opportunità per gli allievi stranieri nelle diverse aree territoriali. In *Alunni con cittadinanza non italiana. La scuola multiculturale nei contesti locali. Rapporto nazione As 2014/15* (Vol. 1, pp. 81-108). Fondazione Ismu.

Bettinger, E. P., Long, B. T., Oreopoulos, P., and Sanbonmatsu, L. (2012). The role of application assistance and information in college decisions: Results from the HandR block FAFSA experiment. *Quarterly Journal of Economics*, 127(3), 1205–1242.

Bleemer, Z., and Zafar, B. (2018). Intended college attendance: Evidence from an experiment on college returns and costs. *Journal of Public Economics*, 157, 184–211.

Bonesrønning, H. (1999). The variation in teachers' grading practices: Causes and consequences. *Economics of Education Review*, *18*(1), 89-106.

Bonilla, L., Bottan, N. L., and Ham, A. (2017). Information policies and higher education choices: Experimental evidence from Colombia. Available At SSRN 2546835.

Bonizzoni, P., Romito, M., and Cavallo, C. (2016). Teachers' guidance, family participation and track choice: the educational disadvantage of immigrant students in Italy. *British Journal of Sociology of Education*, *37*(5), 702-720.

Bordalo, P., Coffman, K., Gennaioli, N., and Shleifer, A. (2019). Beliefs about gender. *American Economic Review*, 109(3):739–73.

Borgonovi, F., Choi, Á., and Paccagnella, M. (2021). The evolution of gender gaps in numeracy and literacy between childhood and young adulthood. *Economics of Education Review*, *82*, 102119.

Bos, J. M., Berman, J., Kane, T. J., and Tseng, F. M. (2012). The impacts of SOURCE: A program to support college enrollment through near-peer, low-cost student advising. In Association of public policy analysis and management annual conference.

Boudon, R. (1974). Education, opportunity, and social inequality: Changing prospects in western society. In ERIC.

Breda, T., and Ly, S. T. (2015). Professors in core science fields are not always biased against females: Evidence from France. *American Economic Journal: Applied Economics*, *7*(4), 53-75.

Breen, R., and Goldthorpe, J. H. (1997). Explaining educational differentials: Towards a formal rational action theory. *Rationality and Society*, 9(3), 275–305.

Carlana, M. (2019). Implicit stereotypes: Evidence from teachers' gender bias. *Quarterly Journal of Economics*, 134(3):1163–1224.

Carlana, M. and Corno, L. (2021). Parents and peers: Gender stereotypes in the field of study. CEPR Discussion Papers.

Card, D. and Payne, A.A. (2021). High School Choices and Gender Gap in STEM. Economic Inquiry, 59: 9-28.

Castleman, B. L., Meyer, K. E., Sullivan, Z., Hartog, W. D., and Miller, S. (2017). Nudging students beyond the FAFSA: The impact of university outreach on financial aid behaviors and outcomes. *Journal of Student Financial Aid*, 47(3), 2.

Charles, M., and Bradley, K. (2009). Indulging our gendered selves? Sex segregation by field of study in 44 countries. *American Journal of Sociology*, 114(4), 924–976.

Charness, G., and Gneezy, U. (2012). Strong evidence for gender differences in risk taking. *Journal of Economic Behaviour and Organization*, 83(1), 50–58.

Checchi, D. and Peragine V. (2010). Inequality of opportunity in Italy, *Journal of Economic Inequality*, 429-50.

Checchi, D. (2010), Percorsi scolastici e origini sociali nella scuola italiana, *Politica Economica*, 3, 359-388

Checchi, D., Fiorio C. and Leonardi M. (2013). Intergenerational Persistence of Educational Attainment in Italy, *Economics Letters*, 118: 229-232

Conlon, J. J. (2021). Major malfunction a field experiment correcting undergraduates beliefs about salaries. *Journal of Human Resources*, 56(3), 922–939.

Contini, D., and Azzolini, D. (2016). Performance and decisions: Immigrant–native gaps in educational transitions in Italy. *Journal of Applied Statistics*, *43*(1), 98-114.

Cornwell, C., Mustard, D. B., and Van Parys, J. (2013). Noncognitive skills and the gender disparities in test scores and teacher assessments: Evidence from primary school. *Journal of Human resources*, *48*(1), 236-264.

Croson, R., and Gneezy, U. (2009). Gender differences in preferences. *Journal of Economic Literature*, 47(2), 448–474.

Dardanoni, V., Modica, S., and Pennisi, A. (2009). The Simpson paradox of school grading in Italy. *Research in Economics*, *63*(2), 91-94.

Datta Gupta, N., Poulsen, A., and Villeval, M. C. (2013). Gender matching and competitiveness: Experimental evidence. *Economic Inquiry*, 51(1), 816–835.

De Benedetto, M. A., and De Paola, M. (2023). Immigration and teacher bias towards students with an immigrant background. *Economic Policy*, *38*(113), 107-154.

De Paola M., Gioia F. and Scoppa V. (2014), Overconfidence, omens and gender heterogeneity: Results from a field experiment, Journal of Economic Psychology, 45, pp. 237-252

DiPrete, C. Buchmann (2013). The Rise of Females: The Growing Gender Gap in Education and What it Means for American Schools, Russell Sage Foundation Press, New York.

Di Liberto, A., Casula, L., and Pau, S. (2022). Grading practices, gender bias and educational outcomes: evidence from Italy. *Education Economics*, *30*(5), 481-508.

Erikson, R., Jonsson, J., et al. (1996). Can education be equalized?: the Swedish case in comparative perspective. Westview Press.

Favara, M. (2012). The cost of acting girly: gender stereotypes and educational choices: *IZA Discussion Paper No. 7037*, Institute for the Study of Labor (IZA).

Fortin N.M., Oreopoulos P., Phipps S. (2015), Leaving Males Behind: Gender Disparities in High Academic Achievement, *Journal of Human Resources*, 50 (3), pp. 549-579.

Filippin, A., and Crosetto, P. (2016). A reconsideration of gender differences in risk attitudes. *Management Science*, 62(11), 3138–3160.

Gabay-Egozi, L., and Yaish, M. (2020). Short and long-term consequences of high-school tracks for earnings in Israel. *Acta Sociologica*, Article 0001699320920919.

Hanna, R. N. and Linden, L. L. (2012). Discrimination in grading. American Economic Journal: Economic Policy, 4(4):146–68.

Hastings, J., Neilson, C. A., and Zimmerman, S. D. (2015). The effects of earnings disclosure on college enrollment decisions. National Bureau of Economic Research.

Herbaut, E., and Geven, K. (2020). What works to reduce inequalities in higher education? A systematic review of the (quasi-) experimental literature on outreach and financial aid. *Research in Social Stratification and Mobility*, 65, Article 100442.

Hinnerich, B. T., Höglin, E., and Johannesson, M. (2011). Are males discriminated in Swedish high schools? *Economics of Education review*, *30*(4), 682-690.

ISTAT, 2023, Statistiche report;

Jensen, R. (2010). The (perceived) returns to education and the demand for schooling. *Quarterly Journal of Economics*, 125(2), 515–548.

Kim, C., Tamborini, C. R., and Sakamoto, A. (2015). Field of study in college and lifetime earnings in the United States. *Sociology of Education*, 88(4), 320–339.

Lavy, V. and Sand, E. (2018). On the origins of gender gaps in human capital: Short-and long-term consequences of teachers' biases. Journal of Public Economics, 167:263–279.

Lei, Z., and Lundberg, S. (2020). Vulnerable Males: Short-term and Long-term Gender Differences in the Impacts of Adolescent Disadvantage. *Journal of economic behavior and organization*, *178*, 424-448.

Lindahl, E. (2007). *Comparing teachers' assessments and national test results-evidence from Sweden* (No. 2007: 24). IFAU-Institute for Evaluation of Labour Market and Education Policy.

Loyalka, P., Liu, C., Song, Y., Yi, H., Huang, X., Wei, J., et al. (2013). Can information and counseling help students from poor rural areas go to high school? Evidence from China. *Journal of Comparative Economics*, 41(4), 1012–1025.

Malloy, L. C. (2015). Loss aversion, education, and intergenerational mobility. *Education Economics*, 23(3), 318–337.

McGuigan, M., McNally, S., and Wyness, G. (2016). Student awareness of costs and benefits of educational decisions: Effects of an information campaign. *Journal of Human Cap*ital, 10(4), 482–519.

Mechtenberg, L. (2009). Cheap talk in the classroom: How biased grading at school explains gender differences in achievements, career choices and wages. *The review of economic studies*, *76*(4), 1431-1459.

Mussino, E., and Strozza, S. (2012). The delayed school progress of the children of immigrants in lower-secondary education in Italy. *Journal of Ethnic and Migration Studies*, *38*(1), 41-57.

Nelson, J. A. (2016). Not-so-strong evidence for gender differences in risk taking. *Feminist Economics*, 22(2), 114–142.

Niederle, M., and Vesterlund, L. (2007). Do females shy away from competition? Do males compete too much? *Quarterly Journal of Economics*, 122(3),1067–1101.

OECD (2016). Education at a glance 2016. Editions OECD.

OECD (2019a). Economic policy reforms. In OECD economic outlook. Vol. 2008. (2). OECD (2019b). Education at a glance 2019. Editions OECD.

Oreopoulos, P., and Dunn, R. (2013). Information and college access: Evidence from a randomized field experiment. *Scandinavian Journal of Economics*, 115(1), 3–26.

Ors, E., Palomino, F., and Peyrache, E. (2013). Performance gender gap: Does competition matter? Journal of *Labor Economics*, 31(3), 443–499.

Papageorge, N. W., Gershenson, S., and Kang, K. M. (2020). Teacher expectations matter. *Review of Economics and Statistics*, 102(2):234–251.

Pekkala Kerr, S., Pekkarinen, T., Sarvimäki, M., and Uusitalo, R. (2020). Post- secondary education and information on labor market prospects: A randomized field experiment. *Labour Economics*, 66, Article 101888.

Peter, F. H., and Zambre, V. (2017). Intended college enrollment and educational inequality: Do students lack information? *Economics of Education Review*, 60, 125–141.

Peter, F., Spiess, C. K., and Zambre, V. (2018). Informing students about college: An efficient way to decrease the socio-economic gap in enrollment: evidence from a randomized field experiment: DIW Berlin Discussion Paper.

Pistolesi, N. (2017). Advising students on their field of study: Evidence from a French university reform. *Labour Economics*, 44, 106–121.

Rosinger, K. O. (2015). How does information in financial aid award notifications affect enrollment and borrowing decisions?: evidence from a randomized controlled trial (Ph.D. thesis), University of Georgia.

Sprietsma, M. (2013). Discrimination in grading: Experimental evidence from primary school teachers. *Empirical economics*, 45(1):523–538.

Timmermans, A. C., and Rubie-Davies, C. M. (2018). Do teachers differ in the level of expectations or in the extent to which they differentiate in expectations? Relations between teacher-level expectations, teacher background and beliefs, and subsequent student performance. *Educational Research and Evaluation*, *24*(3-5), 241-263.

Van Ewijk, R. (2011). Same work, lower grade? Student ethnicity and teachers' subjective assessments. *Economics of Education Review*, 30(5):1045–1058.

Webber, D. A. (2014). The lifetime earnings premia of different majors: Correcting for selection based on cognitive, noncognitive, and unobserved factors. *Labour Economics*, 28, 14–23.

Wiswall, M., and Zafar, B. (2015). Determinants of college major choice: Identification using an information experiment. *Review of Economic Studies*, 82(2), 791–824.

Zafar, B. (2013). College major choice and the gender gap. *Journal of Human Resources*, 48(3), 545–595.

Tracking and academic prospects

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1. Introduction

The transition from secondary to tertiary education is typically socially selective in countries where secondary education is organized by tracks. Italy is an interesting example in this respect since transition rates are significantly differentiated by tracks despite universal admission to universities for anyone successfully completing upper secondary education. In the most recent report on Italian universities (ANVUR 2023), we can compute some interesting statistics on the average educational careers of Italian youngsters (see table 1, based on flow data reported in table A.1 in the Appendix). Irrespective of the age of attainment, the fraction of the population obtaining a secondary school degree that allows the enrolment in higher education (HE) is equal to 77% for the cohort born in 2001. This percentage is on a rising trend, when we consider that for the generation ten years older the same percentage was 50%.[1] When we compare these statistics to the graduation rate of regular students, the same statistics drops to 67%.[2] This suggests that a significant fraction of Italian students complete secondary education at a later age than foreseen by the law due to irregular careers (later entry, differential year of admission for non-citizen students, retentions). If we stick to regular students, the vast majority enroll in universities: 87% of the 19-year-old graduates (rough estimate of regular students) enroll in universities.[3]

These transitions can be appropriately studied using longitudinal administrative data, which are unfortunately not yet available for research purposes in Italy. In their absence, one can rely on gross rates, namely graduation and enrollment in the same year, irrespective of the age of the individuals. Under the assumption of a constant share of irregular careers, these gross rates constitute a reasonable estimate of transition rates. Going back to table 1, almost 60% of all secondary school graduates make a transition to HE, but this average hides huge differences associated with school tracks: the same transition rate is 76% for students coming from high schools (*licei*), 46% from technical schools (*istituti tecnici*) and 24% from vocational schools (*istituti professionali*). If we take into account an estimate of the drop-out rate between the first and second year of enrollment (bottom part of table 1),

[1] Statistics computed by the authors on SILC survey sampled in 2021.
[2] The Italian educational cycles last 13 years (5 in primary education, 3 in lower secondary and 5 in upper secondary), with an entry age at 6. Thus, a regular student who has not experienced any failure should complete secondary education at the age of 19.
[3] As a result of the ratio between 0.589 transition rate and 0.673 graduation rate.

we end up with an estimated transition and survival rate of 50%, ranging from almost 70% in high schools to 20% in vocational schools.

Table 1 – Relevant transition rates in secondary education – Italy – year 2022

graduation rate of population born in 2001 observed in 2021 (from SILC 2021)	0.770
graduation rate of regular students - 19 year old in 2022 - born in 2003 (from administrative data)	0.673
transition rate of regular students - 19 year old in 2022	0.589
transition rate of repeating students - older than 19 in 2022	0.612
gross transition rate - high schools (enrolled/graduates) in 2022	0.766
gross transition rate - technical schools (enrolled/graduates) in 2022	0.462
gross transition rate - vocational schools (enrolled/graduates) in 2022	0.246
gross transition rate (enrolled/graduates) in 2022	0.595
drop-out rate (end 1st year) - graduate from high schools - in 2021	0.093
drop-out rate (end 1st year) - graduate from technical schools - in 2021	0.211
drop-out rate (end 1st year) - graduate from vocational schools - in 2021	0.268
drop-out rate (end 1st year) - in 2021	0.145
estimated survival rate (start of second year) - graduate from hgh schools - in 2022	0.694
estimated survival rate (start of second year) - graduate from technical schools - in 2022	0.365
estimated survival rate (start of second year) - graduate from vocational schools - in 2022	0.180
estimated survival rate (start of second year) - in 2022	0.509

Source: ANVUR 2023, figures 1.2.11-1.2.12-1.2.15

We can summarise previous evidence by saying that out of 100 members of the recent birth cohorts, 23 do not gain the possibility of accessing tertiary education, 31 choose not to enroll, and 46 enter a BA course, but more than 6 abandon after one year.[4] The potential achievers of a BA in the recent cohorts is 39%, well below the European Lisbon 2030 target of 45% HE graduates in the population aged 25-34.[5] From this perspective, the Italian educational system is rather selective, especially when compared to other educational systems where the fraction of HE graduates exceeds half of the population. The real problem is whether it is excessively selective: according to EC (2023 - see figure 27), Italy is the country with the lowest HE attainment in the adult population after Romania. In 2022 the fraction of the population aged 25-34 was 29% against a European average of 42% and countries like France or Spain at 50%. In addition, the Italian educational system is at risk of social selectivity (Ballarino and Panichella 2021). In the sequel of the present paper, we will explore the extent of social selectivity, along four mechanisms: track allocation and track attendance, using longitudinal information on student testing (INVALSI 2013 and 2018 survey); track allocation and aspiration to college, using crosse sectional data on students (PISA 2018 survey); college admissions via ability testing (TOLC test at the University of Milan). The next three sections deal with each of these mechanisms, while the concluding section draws some policy implications.

[4] These number are obtained as follow: 23 comes from $100 \times (1 - 0.77)$, the fraction of population without a secondary degree; 31 is the difference between 77 (potential applicants) and $77 \times 0.595 = 45.8$ (effective applicants); and 6 is the fraction of drop-outs as result of $45.8 \times 0.145 = 6.6$. The survivors are then $45.8 - 6.6 = 39.2$.

[5] See EC 2023 and also their website https://op.europa.eu/webpub/eac/education-and-training-monitor-2023/en/comparative-report/chapter-5.html.

2. Is vocational tracking detrimental to prospective academic careers?

The Italian educational system is organized into two cycles: a comprehensive segment including 5 years of primary and 3 years of lower secondary, followed by a tracked segment of 5 years of upper secondary education. Education is compulsory until the age of 16, including the first cycle and the initial years of the second cycle (Eurydice Italia 2014). The tracking is usually classified as tripartite (academic, technical and vocational), but the distinction has become blurred in recent years since many technical schools have been converted into high schools.[6] Successful completion of 5 years of upper secondary education allows the enrolment in any university courses.

In order to properly answer the question of the title (*Is vocational tracking detrimental to prospective academic careers?*), we would need an exogenous (random) assignment to track of otherwise almost identical pupils, who are then followed in their development of cognitive and non-cognitive abilities. Since random assignment is opportunely precluded in democratic societies, it is very likely that pupils will be sorted across school tracks according to their observable and unobservable characteristics, like parental education, teacher evaluation, peer pressure, and the like. However, we can still infer some of the effects of the treatment (i.e., of tracking) by comparing the differences between the treated before and after the treatment. In order to do so, we have made use of Italian student test scores linking them across different survey years, in order to obtain longitudinal information. We collected information on test achievement of the entire population of Italian pupils in grade 8 (before the track allocation) and in grade 13 (at the end of a 5-year treatment of being allocated to a specific track). Given the longitudinal nature of our data and taking into account non-random attrition, we can shed additional light on the impact of differences associated with track allocation, which then matter in the HE transition.

Italian students are tested in their literacy and numeracy competencies by INVALSI, the national testing agency, in grades 2, 5, 8, 10 and 13. Since 2012-13 INVALSI has introduced a unique identifier for each pupil in order to track them in their educational career. It is, therefore, possible to use their survey conducted in school year 2013-14 on 8th graders, matched on individual identifiers with the survey conducted in school year 2018-19 on 13th graders. Given the non-negligible retention rate during the initial years of upper secondary school, it would have been advisable to add data collected in the school year 2019-2020 for grade repeaters, but unfortunately this survey did not take place due to the Covid pandemic. More recent surveys are then contaminated by the effects of Covid, and we have preferred to limit ourselves to pre-Covid data, convinced that these phenomena are persistent across years.

[6] See the discussion in Ballarino and Panichella 2021, pg.154-166.

Over a population of 512 876 8th graders in 2013-14, we are able to trace 67.2% five years later in grade 13th. One-third of our initial sample has either been retained or has dropped out of school. Conversely, if we consider that in grade 13th, one-fourth of the students do not have a match in five years earlier data, we may conclude that our population of interest is clearly positively self-selected since the weakest students have been either retained at least once during secondary education or have abandoned their schools.[7] This is confirmed by comparing the descriptive statistics of the matched sample against the unmatched ones (see column 2 of table 2). Girls are over-represented, as are pupils in their modal year of birth (2000). The fraction of natives is ten percentage points higher when compared to first- or second-generation migrants. By construction, almost all report a regular career, without retention (97%). Pupils of the matched sample are also characterized by more educated parents, working more frequently in non-manual occupations.[8] Consistently with these observables, the matched sample exhibits higher test scores both in literacy and numeracy, when compared to the unmatched samples.[9] Statistical evidence of these claims is reported in table A.2 in the Appendix, where we estimate a linear probability model of the correlates to disappearing from 8th graders five years later (columns 1 and 2) as well as to appearing among 13th graders, coming from older age cohorts (columns 3 to 5).

[7] The early school leaving rate in the population aged 118-24 for Italy provided by Eurostat for these years goes from 15% in 2013 to 14.7% in 2018 (https://ec.europa.eu/eurostat/databrowser/view/sdg_04_10/default/table?lang=en&category=t_educ.t_educ_outc).

[8] Over the years, Invalsi has changed the information collected on family background. In the initial years they collected information on parental education and occupation, while in more recent years they expanded the list of items in order to include number of books at home and other educational resources. Based on these pieces of information, they replaced parental education and occupation with a synthetic index of cultural and socio-economic condition (ESCS), which is standardized with zero mean and unitary standard deviation. In both cases, this information is missing in almost 30% of the observations.

[9] INVALSI presents three measures of student achievements: the raw score (corresponding to the count of correct answers to items), the Rasch estimate of the inner ability of each student (that takes into account the different difficulty of each item as well as the number of correct answer of each pupil) and a corrected Rasch estimate (accounting for potential cheating of teachers, according to similarities in the classes – see Bertoni et al 2013). Since we ignore the potential bias introduced by cheating, we have preferred to adopt the second measure (the uncorrected Rasch estimate) as proxy for student ability.

Table 2 – Descriptive statistics – Invalsi 2013-14 (8th graders) and 2018-19 (13th graders

	grade 8th not found in grade 13th	grade 8th matched in grade 13th	grade 13th without match in grade 8th
observations	168 100	344 776	117 499
gender:			
female	0.418	0.537	0.404
birth year:			
<=1997	0.006	0.000	0.094
1998	0.044	0.003	0.145
1999	0.166	0.026	0.474
2000	0.711	0.858	0.260
2001	0.072	0.112	0.025
>=2002	0.000	0.000	0.000
citizenship:			
native	0.818	0.939	0.882
born abroad from foreign parents (G1)	0.104	0.026	0.057
born inland from foreign parents (G2)	0.075	0.033	0.061
school career:			
regular or anticipatory	0.784	0.970	0.286
at least one retention year	0.216	0.030	0.714
Parental education (highest in the couple):			
illiterate or primary education	0.034	0.007	
lower secondary	0.400	0.211	
vocational degree	0.112	0.081	
high school degree	0.335	0.456	
tertiary degree	0.119	0.245	
Parental occupation (highest ISCO):			
manager	0.002	0.005	
entrepreneur	0.008	0.010	
professional	0.030	0.058	
self-employed	0.065	0.068	
white collar	0.127	0.268	
blue collar	0.215	0.173	
unemployed/housewife/retired	0.553	0.418	
Socio-economic status (ESCS)		0.132	-0.119
		0.996	*1.028*
Test scores (Rasch without cheating correction)			
Literacy grade 8th	181.18	212.11	
	(35.65)	*(37.83)*	
Numeracy grade 8th	184.13	212.59	
	(35.53)	*(38.89)*	
Literacy grade 13th		204.47	179.00
		(40.91)	*(40.90)*
Numeracy grade 13th		206.75	185.48
		(40.03)	*(37.84)*

We now focus on the matched sample, described in the second column of table 2. Thanks to the match, we know the final track allocation of these 344,776 students, which does not necessarily correspond to the initial track allocation since students may change track during their career, typically towards less academically oriented tracks. If we compare administrative data on total enrolment in 9th grade (which includes repeating students) with total enrolment in 13th grade five years later (which also includes repeaters - see table 3), we can notice the differential dropout rate that increases when

passing from high schools to vocational schools.[10] When compared to our matched sample, we confirm the evidence of non-random attrition, with a larger share of students from high schools (58.4%) and a minority share of students who have "survived" in the vocational track (12.8%).

Table 3 – Track enrolment – comparison with administrative data

	9th grade enrolment 2014-15 (MIUR data)	%	13th grade enrolment 2018-19 (INVALSI data)	%	implicit drop-out from admin. data	13th grade enrolment 2018-19 (matched sample)	%
High schools (licei classici/scientifici)	116 044	21.6	108 763	23.5	6.3%	95 354	27.6
High schools - applied (licei scientifici scienze applicate/ linguistici/ scienze umane/ musicale/ artistico/ europeo)	151 502	28.2	131 103	28.3	13.5%	106 321	30.8
Techincal schools (istituti tecnici economico/tecnologico)	165 471	30.8	142 860	30.9	13.7%	98 899	28.7
Vocational schools (industria/artigianato/servizi/sussidiarietà)	104 225	19.4	79 549	17.2	23.7%	44 202	12.8
	537 242	100.0	462 275	100.0	14.0%	344 776	100.0

Source: first column from administrative data on enrolment from MIUR (2014) Focus "*Le iscrizioni al primo anno delle scuole primarie, secondarie di primo e secondo grado del sistema educativo di istruzione e formazione*" Anno Scolastico 2014/2015 – second column from INVALSI 2018-19 sample – third column from match of 2013-14 and 2018-19 INVALSI data

Track allocation is chosen by parents during 8th grade, taking into account the teachers' suggestions (*consiglio orientativo*). As a consequence, track choice is based on school results (driving teachers' advice) but also determined by the social origins of the students (via opinion/expectations of parents). In table 4. we report the estimates of a statistical model predicting the track allocation of pupils based on their observable characteristics: the highest parental education and the socio-economic status in the couple are negatively correlated to the choice of technical or vocational tracks (column 1). However, the choice is also negatively correlated to school marks, as witnessed by the improvement of the predicting ability of the model (according to the pseudo-R^2 statistics). Parents and teachers do not observe the literacy and numeracy test scores, which are correlated to school marks (0.60 for Italian/literacy and 0.59 for Mathematics/numeracy). If, however, we add this piece of information, which is likely to reflect part of the unobservable abilities of the students, we observe a negative correlation with track allocation and a modest improvement in the goodness of fit. We can, therefore, infer that track allocation reflects social origin, school performance and unobservable ability in proportions that are hard to quantify.

Despite the non-random selection into tracks, we may wonder whether such treatment (track assignment) modifies the level of competences of students. We have two measures of competencies: the teachers' marks and the test scores. The former indicator corresponds to the subjective evaluation

[10] Invalsi provides a fourfold classification of upper secondary schools, distinguishing from traditional high schools (intended to college enrolment without any professional content: *licei classici* and *licei scientifici*) and recently introduced high schools (with some applied contents: *licei scientifici scienze applicate*, *licei linguistici*, *licei delle scienze scienze umane* - formerly teaching schools -, *licei musicali* – conservatoire -, *licei artistici* - academy of arts- and *licei europei*). This second group attracts students that are rather similar to students attending technical schools (as evident in the sequel) and could therefore be grouped with them. However, since PISA survey utilizes a tripartite classification (50.2 % in high schools, 29.8% in technical schools and 20% in vocational ones) we have kept them separate.

of teachers, which may reflect their biases due to stereotypes. The latter is a more objective measure (in its Rach estimate, it incorporates the different degree of difficulty of each question) that is comparable across all students. We, therefore, compare students in terms of their relative test score position before the entry into secondary education and at the exit five years later. Suppose we find that the relative position of those at the bottom of the distribution has improved (and conversely, that relative positions at the top have worsened). In that case, we might conclude that tracks are not detrimental in terms of student competencies since they reduce differences created by social selection into tracks. On the contrary, if spending five years in different tracks, learning different contents and forming different aspirations yields a widening of the preexisting test score differences, then we could argue that tracks contribute to amplifying skill differences that are not independent of social origin.

Table 4 – Probability of track allocation – ordered probit model

	1	2	3
dependent variable: track allocation (%)			
1.high schools (classico/scientifico)	*29.54*	*29.40*	*29.40*
2.other high schools	*30.28*	*30.22*	*30.22*
3.technical schools	*29.02*	*29.14*	*29.14*
4.vocational schools	*11.17*	*11.23*	*11.23*
highest parental education=primary	0.588***	0.443***	0.422***
highest parental education=lower secondary	0.390***	0.297***	0.286***
highest parental education=vocational	0.314***	0.245***	0.233***
highest parental education=high school	0.033***	0.043***	0.044***
highest parental education=non academic tertiary	-0.074***	-0.077***	-0.073***
highest parental education=BA or MA	-0.339***	-0.262***	-0.240***
ESCS (cultural-socio-economic conditions)	-0.253***	-0.206***	-0.197***
Marks in Italian (oral)		-0.227***	-0.171***
Marks in Mathematics (oral)		-0.262***	-0.201***
Literacy test score			-0.003***
Numeracy test score			-0.004***
Observations	253 786	224 138	224 138
Pseudo R^2	0.064	0.142	0.151

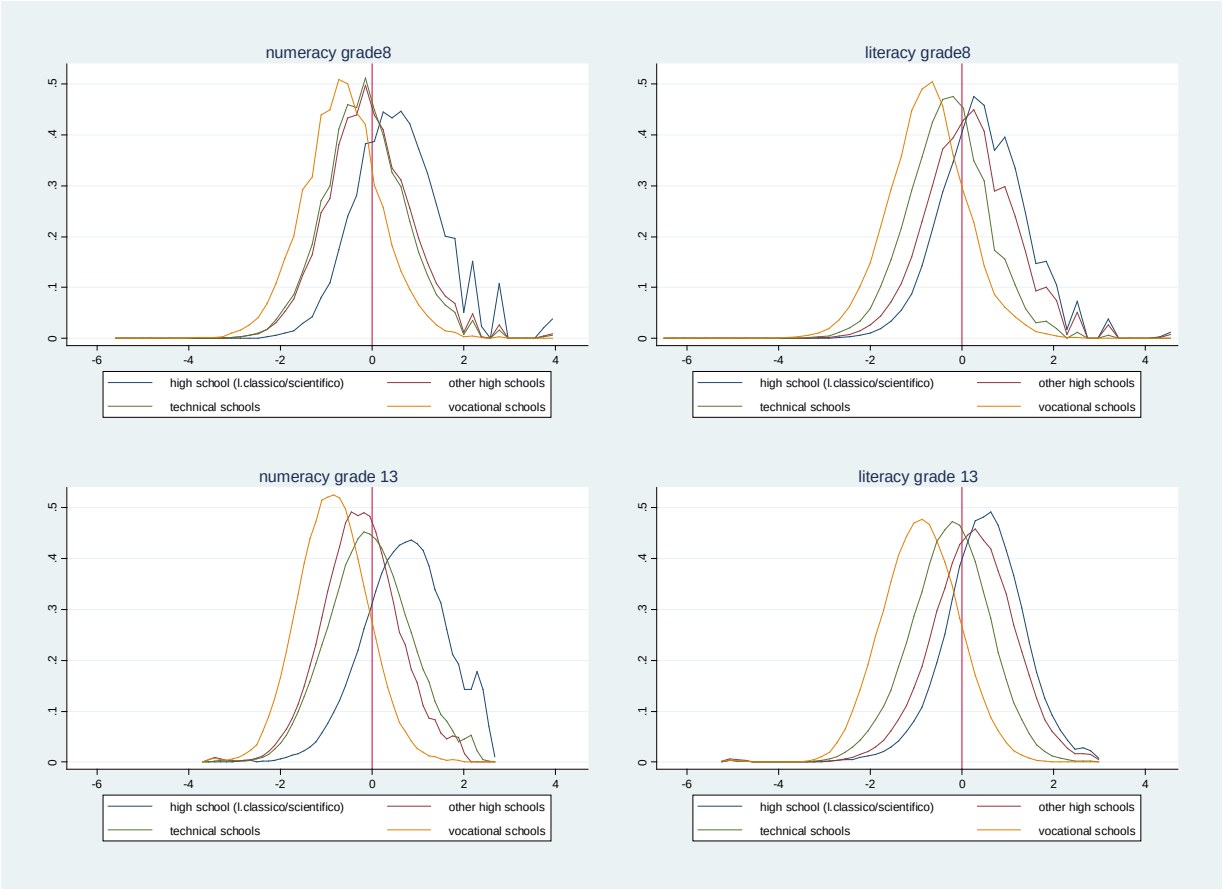
Robust standard errors in parentheses - *** p<0.01, ** p<0.05, * p<0.1
Controls include gender, birth year, citizenship and macro-region of residence –
full model is reported in Table A.3 in the Appendix

Figure 1 plots the kernel densities of numeracy and literacy test scores in grade 8 (before the track allocation – top panels) and in grade 13 (at the end of five years of track treatment – bottom panels) for the same population of the matched panel. Recall that because of the non-random attrition, weaker students, often allocated to vocational tracks, are underrepresented in these graphs (since they constitute the unmatched samples), and therefore the distributions appear more compressed than they actually are. Test scores have been standardized in order to have zero mean and unitary standard deviation.

Two comments are at hand. The first one is that track allocation does indeed reflect differences in students' competencies since (expected) high school students possess, on average, a higher level of competencies before entry into upper secondary education. However, track differences are not overwhelming, since there are high skill students assigned to vocational tracks and conversely low-

ability students assigned to high-skill tracks.[11] Five years later, the differences among tracks have widened, but it is still possible to find high-skill students in vocational schools and low-skill ones in high schools.

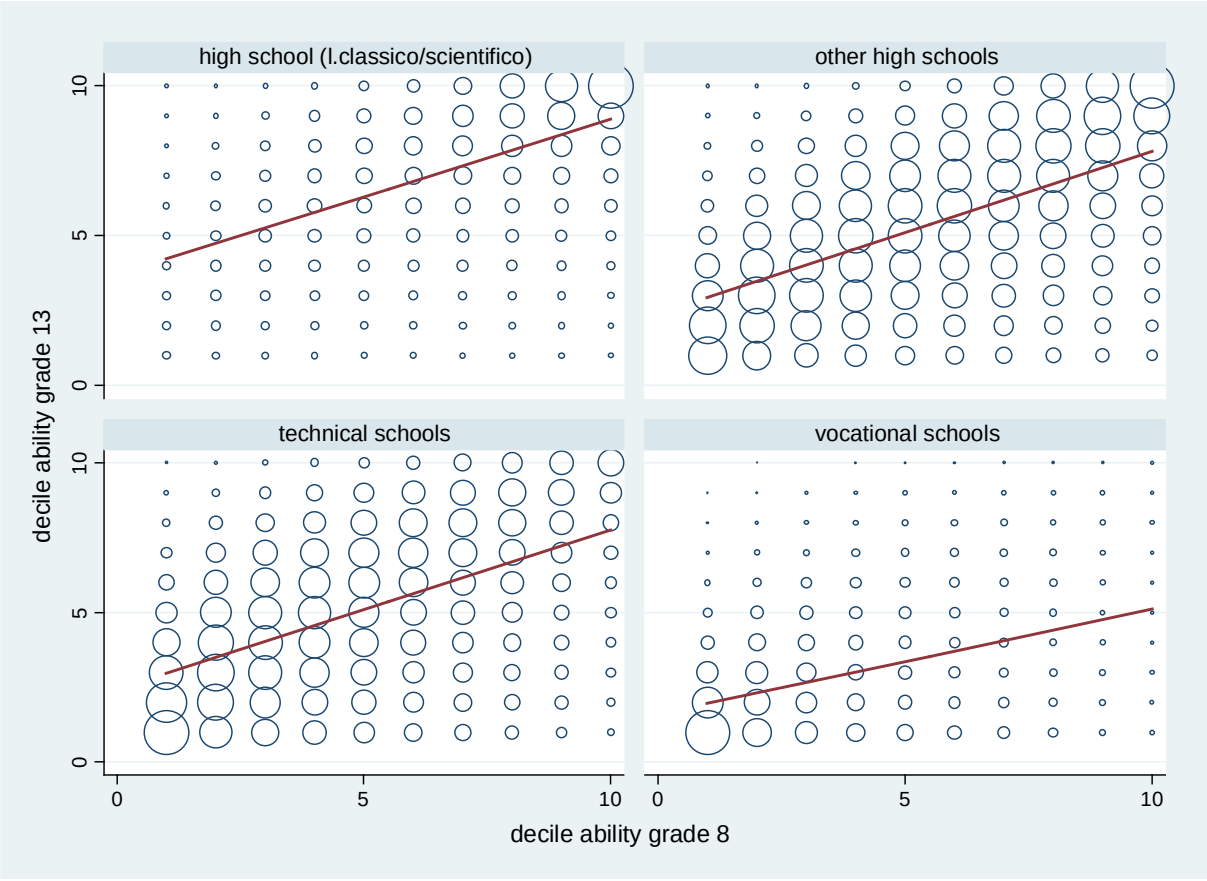
Figure 1 – Distribution of test score – Invalsi matched sample (2013-14 and 2018-19)



In order to appreciate the mobility in the relative position of each student, we have proxied *individual ability* with the standardized sum of literacy and numeracy test scores, both in the 8th and 13th grades and then we have partitioned each distribution into deciles. We can, therefore, build a "curricular" mobility matrix, where each row corresponds to the test score distribution in 8th grade, and each column corresponds to the arrival decile in grade 13. A graph corresponding to this curricular mobility matrix by track is depicted in figure 2, where one can visualize the distribution of students by tracks since the size of each circle is proportional to the frequency of cases. All circles above the (ideal) 45-degree line represent cases where the students improve their relative position in the distribution, while the opposite applies to cases below a 45-degree line.

[11] The comparison between track allocation in Italy and Germany using this type of graphs is originally presented in Checchi and Flabbi 2013.

Figure 2 – Individual mobility in relative score position during five years of tracking – Invalsi matched sample (2013-14 and 2018-19)



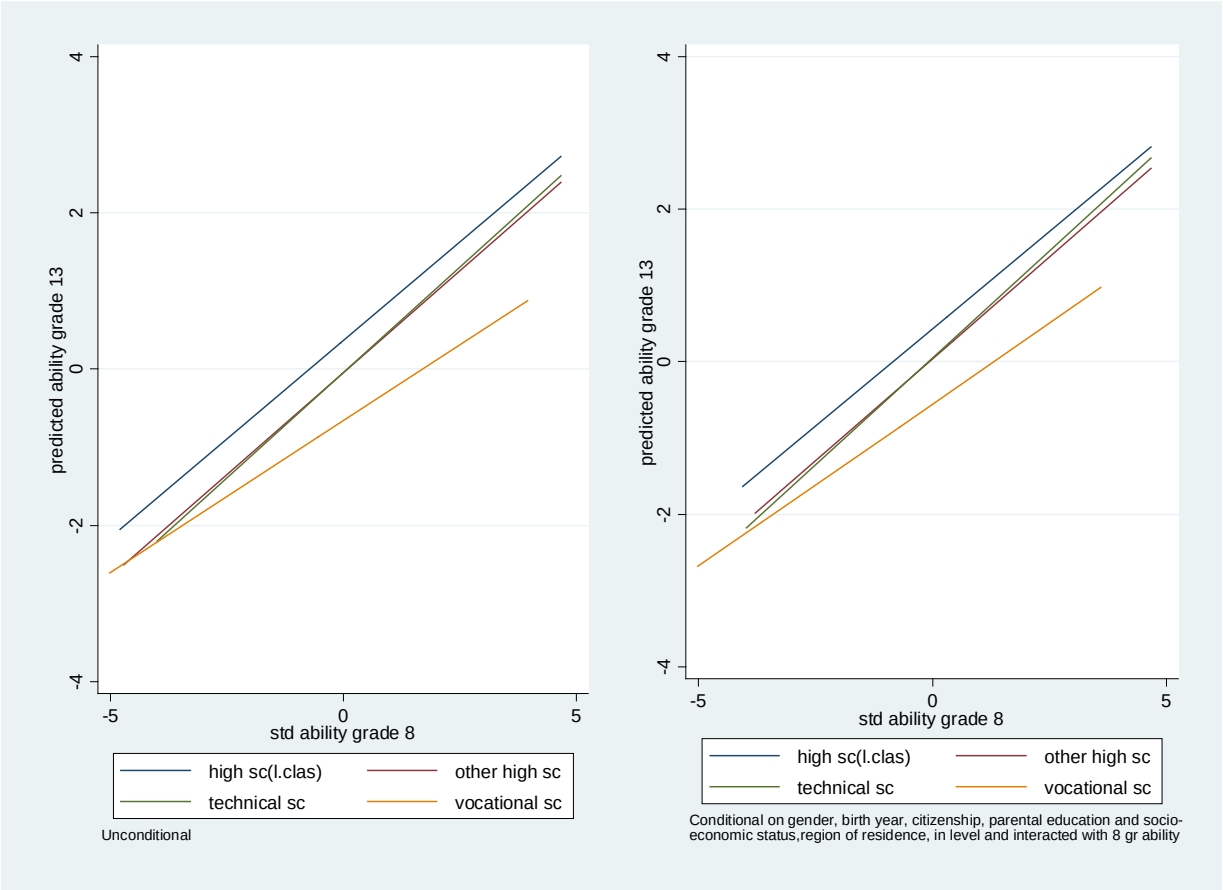
It is apparent that attending a high school is associated with upward curricular mobility, given that the regression line lies crosses the bisector at a higher decile than in the other school types. Conversely, the vocational track corresponds to downward curricula mobility, as fewer students who were in the top deciles in 8th grade end up in the bottom decile five years later.

One potential objection to this approach is that students are inherently different in terms of social origins. However, even when we take these effects into account, differences in track effectiveness persist. In figure 3, we have regressed ability in grade 13 onto ability in grade 8, separately by track. In the left panel, the regressions are unconditional, while in the right panel, we control for observables (gender, birth year, parental background and region of residence). In both cases, it is evident that attending vocational schools is associated with slower progress in ability, the detrimental effect being more apparent in numeracy than in literacy (see figure A.1 in the Appendix).[12] Since this is true irrespective of the social origins of the students, we may infer that this detrimental effect has to be associated with what occurs within the classes: teaching contents (which are statutorily different), class climate, teacher selection and motivation, peer effects and more generally school environment.

[12] Using the economist jargon, we can say that competence score exhibits β-convergence (i.e. regression to the mean), but not σ-convergence (i.e. the dispersion among tracks widens over the school years).

We do not have adequate information on all these dimensions, but we can claim that they are independent of the students' willingness to learn. Thus, being assigned to a high school track or to a vocational track makes a significant difference in the level of skills achieved by each student, irrespective of their level of initial ability and their social origins. If university admissions are based on tests correlated to numeracy or literacy, then two identical students in terms of initial ability and family background who are assigned to two different tracks would experience different ex-post probabilities of being admitted to HE institutions.

Figure 3 – Cumulative effects of tracking



3. Aspirations by tracks

Test scores are not the unique variable driving student choices. Unfortunately, Invalsi does not collect information from 13th graders about their intention to pursue further education. For this reason, we have been forced to rely on a different survey that contains this information, though collected among 10th graders. The OECD PISA survey conducted in 2018 surveys 15-year-old students born in 2003 and includes information on students' literacy, numeracy, and science abilities, as well as aspirations over further education and occupations (PISA 2019). Parents are also interviewed about their aspirations about their children's prospects. An extensive array of items allows for precise measures of the socio-economic background of students, including parental education and occupation, books at home and a summary indicator of socio-economic and cultural conditions. After excluding 15-year-old students still in lower secondary, we are left with 11,710 student observations randomly drawn from 508 schools, which are representative of tracks in secondary education. Given their selection rule, we encounter in the sample both a fraction of 13% of repeaters (therefore attending 9th grade) and a smaller fraction of 7% of students who entered primary education one year earlier than usual (thus attending 11th grade). PISA survey gathers all high schools into a single group, making up half of the sample. Students in technical schools add another 30%, and vocational schools add the complementary 20%. These shares are entirely consistent with the administrative data of earlier years reported in table 3.

Table 5 – Italian PISA sample (weighed) - 2018

	repeaters 9th graders	regular 10th graders	early student 11th grade	Total	%
high school	346	4910	622	5877	50.19%
technical schools	571	2726	192	3489	29.80%
vocational schools	679	1569	95	2343	20.01%
Total	1596	9205	910	11710	100.00%

Table 6 – Descriptive statistics (weighed) – Italy – PISA 2018

	high school	technical schools	vocational schools	Total	# cases	std.dev.	min	max
female	0.60	0.29	0.47	0.48	11710	0.50	0.00	1.00
age	15.78	15.77	15.74	15.77	11710	0.28	15.25	16.33
ESCS index	0.11	-0.39	-0.73	-0.21	11401	0.91	-5.92	3.07
Highest occup.prestige	54.07	42.89	36.74	47.42	10991	21.28	11.74	88.96
numeracy	522.17	482.00	409.75	487.70	11710	88.00	191.82	746.77
literacy	521.05	457.52	397.65	477.43	11710	93.34	175.34	754.42
science	502.70	460.19	398.01	469.08	11710	84.98	128.31	742.00
Child expects HE	0.87	0.64	0.46	0.72	11262	0.45	0.00	1.00
Parents expect HE	0.82	0.58	0.35	0.66	11528	0.47	0.00	1.00

When looking at the descriptive statistics of this sample (table 5 and table A.4 in the Appendix), it is evident that high schools gather the best students both in terms of cognitive skills (literacy, numeracy and science) and social background (parental education and occupation, educational resources). Girls and natives are overrepresented in high schools, while boys concentrate in technical schools and non-citizens in vocational schools.

The PISA survey investigates students' and families' aspirations regarding future educational careers. Based on their answers, we have created two dichotomous variables, one elicited from students[13] and the other from their parents.[14] Aspiration to HE are rather different across tracks: while on average, almost three out of four (72%) 15-year-old students declare their intention to progress to HE three years later, this percentage varies from 87% in high schools to 46% in vocational schools. Parental aspirations are lower but ordered in similar ways (see again table 6).

In this section, we aim to study why college aspirations markedly differ among tracks and whether there is a genuine contribution of the tracks in shaping these aspirations. In Figure 4, we introduce a summary measure of student skills by averaging the three scores in literacy, numeracy and science.[15] The distribution of this measure, which we term "student ability", is displayed by school track. We distinguish between students in high school (academic track, black line), technical schools (red line), and vocational track (green line). The figure clearly shows that the three distributions are different: students in high school generally have higher abilities than those in technical schools, who are, in turn, followed by vocational school students. Differences in abilities between students across tracks can be traced down to (i) differences in family and parental background, (ii) differential sorting into tracks by ability, and (iii) the differential effect of each school track on students' ability. We remove the effect of family background and selection on observable characteristics in the school track by regressing individual ability on student and family characteristics and studying the residuals of this regression, which we denote as "residual ability."[16]

[13] The question ST225 in the student questionnaire lists all ISCED attainment and asks "Which of the following do you expect to complete?". We have identified as student aspiring to HE those who answer ISCED 4 or ISCED 5B or ISCED 5A or ISCED 6.

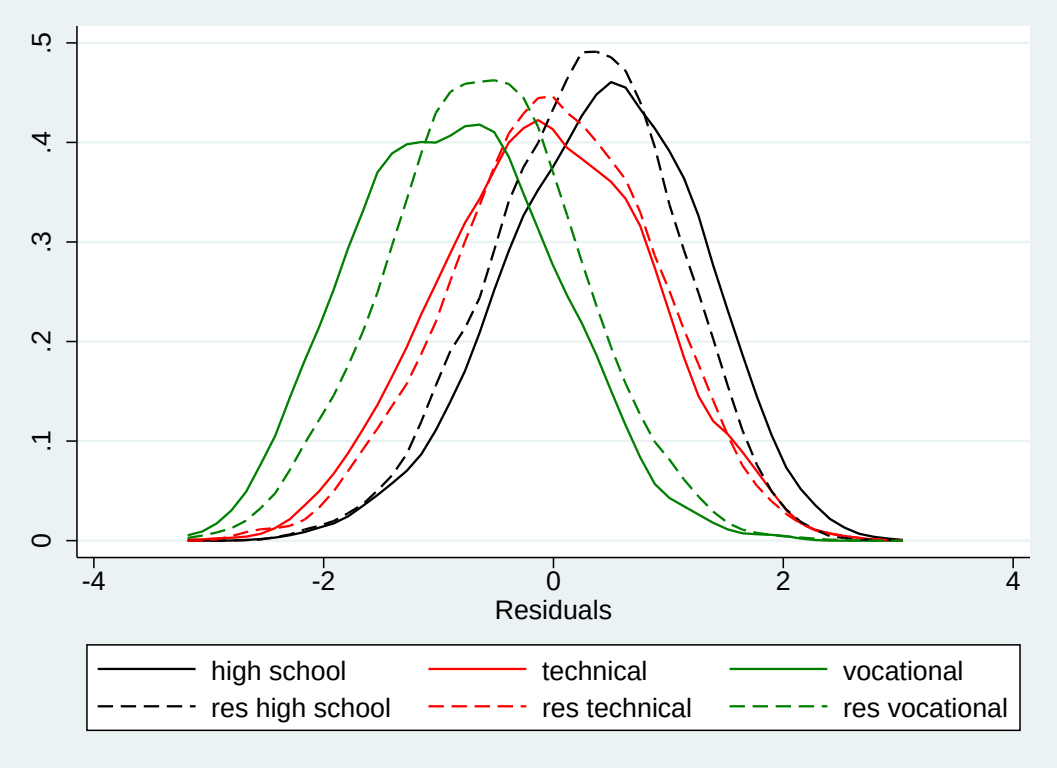
[14] The question PA172 in the parent questionnaire lists all ISCED attainment and asks "Which of the following do you expect your child to complete?" We have identified as parents aspiring their children progressing to HE those who answer ISCED 4 or ISCED 5B or ISCED 5A or ISCED 6.

[15] To be more precise, we have measured each skill (literacy, numeracy and science) by taking the mean value across their 10 plausible values. Then our measure of ability is the average score across these three skills, standardized in order to have zero mean and unitary standard deviation. The existence of 10 plausible values is used to obtain unbiased estimate of the standard errors in regressors, but given the descriptive nature of the present exercise we have decided not to follow bootstrap techniques in order to produce the present statistics.

[16] Specifically, we include the following students' characteristics: age, gender, and immigrant status, where the latter is captured by a set of dummies that identify native students (who have at least one parent born in the country), first-generation students (those born abroad from foreign-born parents) and second-generation ones (those born in Italy but whose parents were born abroad). Family characteristics, instead, include the PISA index of economic, social, and cultural

The kernel density estimates of the distribution of residual ability by school track, reported as dashed lines in Figure 4, are closer to each other than the distributions of actual ability: the distribution of residual ability for students in high school (vocational schools) has shifted to the left (to the right) relative to the actual one. This indicates that parental and family background and individual observable characteristics explain part of the differences in ability. The remaining differences are partly due to the selection of students across school tracks based on unobservable characteristics and partly due to the effect of school track (as we have argued in the previous section). Under the assumption of no selection on unobservables, all differences in residual ability distribution are driven by the effect of the specific track choice; thus, two students with initially the same "innate" ability (proxied in this case by residual ability) end up with differences in their measured ability as a result of different tracking,

Figure 4 - Actual and residual ability by school track



Our data provide a snapshot of the student population at age 15 and do not have a longitudinal dimension, so we cannot observe which students will apply for admission to a university program upon completing secondary education or whether they will do so for an open-access or restricted-access degree. However, PISA has information about students' and parents' expectations about

status (ESCS), a composite index that jointly accounts for parental education, occupational status, and home possessions; a set of dummies for the number of books at home; the highest parents' socio-economic index (HISEI); and the highest education of parents, measured on the ISCED classification (HISCED). The relevant regression is in table A.5 in the Appendix.

attendance at HE programs, which we use to construct as a proxy for potential university application. Specifically, we define students as potentially applying for university if both they and their parents expect them to receive tertiary education.

Table 7 – Child aspirations to HE, by "ability" or "residual ability" – Italy – PISA 2018

decile of ability	high school	technical schools	vocational schools	Total	decile of residual ability	high school	technical schools	vocational schools	Total
1	0.486	0.229	0.166	0.224	1	0.681	0.313	0.175	0.337
2	0.666	0.325	0.161	0.350	2	0.706	0.413	0.203	0.470
3	0.607	0.318	0.273	0.407	3	0.647	0.392	0.217	0.460
4	0.650	0.381	0.296	0.485	4	0.726	0.364	0.286	0.535
5	0.701	0.408	0.246	0.534	5	0.706	0.382	0.168	0.497
6	0.689	0.525	0.189	0.590	6	0.741	0.476	0.255	0.594
7	0.725	0.557	0.331	0.642	7	0.740	0.490	0.415	0.639
8	0.788	0.427	0.399	0.673	8	0.778	0.465	0.348	0.660
9	0.791	0.544	0.455	0.732	9	0.811	0.499	0.139	0.681
10	0.889	0.687	0.497	0.855	10	0.873	0.540	0.307	0.774
Total	0.738	0.415	0.220	0.543	Total	0.753	0.426	0.222	0.560

In table 7, we report the share of students who intend to go to university by national decile of ability (columns 1-3) or residual ability (columns 5-7) and by school track. The table shows that school track matters above and beyond ability in determining one's probability of going to university. In fact, among students in the top decile of the national ability distribution, 89% of those attending a high school intend to apply to university. However, the corresponding share is 69% for those in the technical track and only 50% for those in vocational schools. Likewise, in all residual ability deciles (i.e. at the same level of ability, gross or net of family background), the share of students planning to apply for tertiary education is highest for those in high schools and lowest for those in vocational education. If the goal of an efficient university admission mechanism is to select the highest-ability students, then table 7 shows that the system leaves inefficiently out of tertiary education some high-ability students in vocational and technical tracks while admitting instead lower-ability high-school students. Since measured ability is also determined by tracking, this implies that the inefficiency is even higher, as some "initially high ability" students will experience a decline in their ability because of tracking, as we have shown in the previous section.

A different way of assessing the influence of track choice on the probability of enrolling in tertiary education is to compute the likelihood of applying to university by school track. We do this in column (1) of table 8, which shows that 74% of high school students will apply to university, whereas the share is almost half as large for technical school students (42%) and about one-third as large for students in vocational education (22%). These differences by school track reflect differences in

ability, family background, observable and unobservable individual characteristics of students, as well as the causal effect of attending a specific school track.

In column (2) of the same table, we instead report the average probability of applying for college by school track if the probability of applying to college was only determined by individual characteristics and family background (obtained through a probit regression – see table A.6 in the appendix). Also, in this case, the probability of applying for university has a clear gradient across school tracks, which reflects a positive selection of students into the more academically oriented tracks, but the cross-track differentials are smaller. Based only on their pre-determined characteristics, high school students' probability of going to college would be 60%. In contrast, the corresponding probability for students in technical and vocational schools would be 45% and 40%, respectively. In other words, based on their own and their families' observable characteristics, the probability of vocational school students applying to university would be almost twice as high as the actually observed probability.

Table 8 - Actual and predicted probability of going to university by school track

School track	Actual probability of going to college	Predicted probability of going to college
high schools	0.738	0.596
technical schools	0.415	0.447
vocational schools	0.220	0.401

In order to assess the relative contribution of groups of covariates, we apply a Gelbach decomposition (Gelbach 2016) to the differential probability of college attendance between school tracks into a part due to individual characteristics, a part driven by family background, and a part due to ability. In table 9, we compute the differential probability of going to college between high school and technical school students relative to vocational training students, unconditional and conditional on individual and family characteristics and ability. For instance, in the case of high school vs vocational one, the unconditional difference in college application probability is 0.53 (that is the estimated coefficient associated with attending a high school track versus the excluded case, the vocational track). When we include the other covariates, the conditional difference in college application declines to 0.32 since differences in individual characteristics (gender, age, and immigrant status) explain 1% of the decline, differences in family background (ESCS, HISEI, parental education and books at home) explain 16% and differences in ability explain 22% of the decline in the gap. Overall observables of the students account for 39% of differences in college aspirations, the remaining part being attributable to unobserved individual characteristics and to the track (teaching contents, teacher selection, peer effects and the like).

Table 9 – Gelbach decomposition of track differences in college aspirations, against vocational

child and parent aspiration to college	Coefficient	Std. err.	Initial differences	% explained
High School			0.5308	
individual	0.0067	0.0023		1%
family of origin	0.0853	0.0058		16%
ability	0.1176	0.0070		22%
Unexplained			0.3211	61%
Technical			0.2037	
individual	-0.0188	0.0024		-9%
family of origin	0.0374	0.0035		18%
ability	0.0666	0.0044		33%
Unexplained			0.1186	58%

If all university programs were open access, then these predicted probabilities would represent the actual shares of students in each track that would attend tertiary education. In reality, however, many university programs restrict access to only "the best" students, i.e., those who perform better in some types of standardized tests (sometimes considering them alongside other factors such as the GPA in secondary school). Since these standardized test scores somehow resemble those administered in PISA, we can gain insights into the effects of a policy that restricted access to university only to the top performers of all university applicants on the selection of students from different secondary school tracks. We have seen in section 2 that in Italy, about 60% of all students graduating from upper secondary schools enrol in a university degree. For this reason, we can simulate the effect of a policy that gave access to tertiary education only to students in the top 50% of the ability distribution measured by PISA.

In table 10, we have partitioned the student ability into 20 percentile intervals (ventiles), and we have provided the distribution of the expected choice of applying or not to college by tracks attended by the students. Column (1) of table 10 shows the share of students (and their parents) not intending to go to college (which corresponds to the complement of column (4) in table 7), whereas columns (2) to (4) provide the distribution by tracks of those intending to go to college. As an example, among the top performers in the 20th ventile, 91.3% intend to go to college: this share is obtained as the sum of 81% from high schools, 10% from technical and 0.2% from vocational ones. Conversely, in the bottom ventile, only 19.1% expect to go to college, and these potential applicants originate mainly from vocational schools (10.8%). In column (6), we provide the cumulated frequency from the highest to the lowest ventile of those intending to apply for college, while columns (7) to (9) report the partition by tracks of the applicants. If we now suppose that the admission policies of universities

intending to restrict access were to admit students with a test performance above the median, we would obtain the situation in the grey area of table 10. The cumulated share of applicants in the top half of the test distribution would be 70% at the median, but they would reach 35% of the total population if the bottom half were prevented from applying since they would not pass the test. Cumulating the choices of the applicants by track, 79% would be attending high schools, 19% technical schools, and only 2% vocational ones. However, if applications were granted on the basis of applicants' ability "pre-tracking," i.e., based on their residual ability after accounting for their personal and family characteristics, then the shares of admitted students across school tracks would be slightly more equalized, even though high school students would still be substantially more likely to enter tertiary education. In fact, if only applicants in the top 50% of the distribution of residual ability were admitted, this would lead to 76% of successful applications from high schools (a 3% reduction), 2% of successful applications from technical schools (a 6% increase), and 3.6% of successful applications from vocational schools (an increase of 50%) (see table A.7 in the Appendix). A benevolent government, intending to respect students' and families' aspirations, as well as tolerating selective admission policies of universities, would put pressure on universities to lower the admission threshold. If the policy target were 40% of the total population, according to table 10 (and abstracting from college drop-out), the admission threshold should be lowered to the 8th ventile (since $67.1 \times 0.60 = 40.3$). If the target were 50% of the population, the threshold should be even lower, at the 4th ventile (since $61.5 \times 0.80 = 49.2$), which would make the admission test almost irrelevant.

Table 10 – Share of students that would be admitted to college if the admission threshold would have been the median performance (weighed) – Italy – PISA 2018

cross-sectional frequency distribution						cumulated from bottom (highest ventile in ability)			
ventile in the distribution of actual ability	child and parents not expecting application to college – all schools (1)	child expecting application to college - high school (2)	child expecting application to college - technical school (3)	child expecting application to college - vocational school (4)	Total (5)	child and parents expecting application to college – all schools (6)	child expecting application to college - high school - incidence among applicants (7)	child expecting application to college - technical school - incidence among applicants (8)	child expecting application to college - vocational school - incidence among applicants (9)
1	80.9	4.1	4.3	10.8	100.0	54.9	69.9	22.6	7.4
2	73.8	9.0	7.9	9.3	100.0	56.8	70.8	22.6	6.6
3	69.5	14.0	10.0	6.4	100.0	58.5	71.7	22.5	5.8
4	60.3	19.1	15.2	5.4	100.0	60.2	72.5	22.1	5.4
5	62.1	19.6	10.8	7.5	100.0	61.5	73.4	21.5	5.1
6	56.8	22.5	14.4	6.4	100.0	63.0	74.3	21.2	4.5
7	58.6	24.5	9.3	7.6	100.0	64.4	75.4	20.6	4.0
8	44.7	34.0	16.5	4.8	100.0	66.2	76.2	20.6	3.3
9	50.8	31.3	13.6	4.3	100.0	67.1	77.2	19.9	2.9
10	42.7	39.5	15.1	2.7	100.0	68.7	78.1	19.4	2.5
11	44.6	39.1	14.1	2.2	100.0	69.9	78.8	18.8	2.3
12	37.4	41.5	19.8	1.3	100.0	71.5	79.5	18.3	2.2
13	38.4	43.6	15.6	2.4	100.0	72.6	80.9	16.8	2.2
14	33.0	46.8	16.7	3.5	100.0	74.2	82.1	15.8	2.0
15	34.3	52.0	11.4	2.3	100.0	75.4	84.0	14.5	1.6
16	31.0	56.1	11.6	1.4	100.0	77.3	84.8	14.0	1.2
17	27.5	56.7	13.5	2.4	100.0	79.4	85.5	13.4	1.1
18	26.0	65.9	7.6	0.4	100.0	81.7	87.7	11.9	0.4
19	20.2	68.0	11.3	0.5	100.0	85.6	87.1	12.5	0.4
20	8.7	81.0	10.1	0.2	100.0	91.3	88.8	11.1	0.2
Total	45.7	37.8	12.4	4.2	100				

4. The effect of testing

We have shown that using standardized tests to decide on admissions to restricted-access bachelor programs gives high school students an advantage relative to those in technical and – especially - vocational tracks. However, our analysis so far has been based on data from INVALSI or PISA, neither of which directly measures students' performance in university admission tests or has information on university outcomes.

We repeatedly tried without success to gain access to the test-taking data from CISIA, the leading Italian test provider.[17] Eventually, we ended up obtaining administrative data on students enrolled in

[17] CISIA stands for Consorzio Interuniversitario Sistemi Integrati per l'Accesso (https://www.cisiaonline.it/area-tematica-cisia/home-cisia/), an association of 62 Italian universities created in the 90's to coordinate admissions to the engineering schools. They began offering online tests in 2012. In their latest report (Filippi and Falco 2024) they provide the following data: in 2023 263.923 students took a test from CISIA, for a total of 329.274 tests (since 18.8% of the participants takes the test at least twice). The mostly frequently accessed are entry tests for engineering, economics, psychology and humanities.

restricted-access bachelor programs at the University of Milan in the academic year 2022/2023. This anonymised dataset contains information on the bachelor program they enrolled in, the type of secondary school they graduated from (classical or scientific high school; other high schools; technical school; vocational school; foreign institutions) and the final marks obtained at the end of secondary school.[18] Table 11 presents descriptive statistics of this sample. This is clearly a selected sample since it contains the applicants that were admitted (first selection) and that actually enrolled (second selection). Unfortunately, the University does not possess information on other applicants, either those who did not pass the admission threshold or those who passed it but eventually chose to enrol in a different university. Nevertheless, these data allow us to study the correlation between observables (and, in particular, the test score)[19] and possible outcomes. Unsurprisingly, most of the admitted and enrolled students are from high schools, but their graduation marks seem undistinguishable from a statistical point of view. On the contrary, High school graduates obtain higher scores and perform better during the initial year of BA courses (more exams, better GPA and lower drop-out rates). Notice that there are 2,660 students (corresponding to 26% of our sample) who did not obtain any ECTS during the first year. Even assuming that all the students who drop out after the first year originate from this group, there is still a 5% of the students who keep on enrolling without taking exams.

Table 11 – Descriptive statistics – Student enrolled in restricted access BA courses - University of Milan – academic year 2022-23

	high school (clas/scie)	other high schools	technical schools	vocational schools	foreign schools	Total	# cases	sd	min	max
secondary school attended	33.41%	37.88%	22.14%	4.72%	1.85%	100.0%	9993			
female	0.54	0.65	0.38	0.54	0.57	0.55	9993	0.50	0	1
graduation marks	82.83	82.06	80.52	81.14	45.79	81.26	9986	14.54	0	100
admission test score	31.90	27.83	23.79	21.12	21.28	27.86	9993	9.10	-5	50
ECTS obtained in the 1st year (if ECTS>0)	57.98	54.76	50.55	42.41	45.53	54.47	7333	26.93	3	194
GPA obtained in the 1st year (if ECTS>0)	25.84	25.36	24.44	23.90	23.94	25.27	7333	2.56	18	30
drop-out	0.18	0.21	0.22	0.32	0.17	0.21	9353	0.41	0	1

We focus on three outcomes: whether they dropped out of the program before entering the second year of study, the number of ECTS obtained during the first year, and the GPA obtained. These data allow us to study whether students' performance is correlated with their performance in the admission

[18] We thank the Rector of the University of Milan (marina Brambilla) for making the data available to us.

[19] It is important to remind that the admission scores are not strictly comparable across BA programs, since they mix contents in different proportions. However, this is dealt with in regression by using BA program fixed effects.

tests and whether such a correlation varies across different school tracks. Specifically, we run regressions of the type:

$$y_i = \alpha + \beta ltest_i + \sum_{t=2}^{5} \gamma_t track_{it} + \sum_{t=2}^{5} \delta_t ltest_i \times track_{it} + \theta female_i + \mu_p + u_i$$

Where y_i is, alternatively, a dummy for dropping out of the program, or for students who did not drop out, the number of ECTSs completed, or the GPA of student *i*; $ltest_i$ is the logarithm of the score obtained in the university admission test, recentered so that it has mean zero in each regression; $track_{it}$ are four dummies denoting the type of secondary school attended (with high school being the reference category), $female_i$ is a dummy that identifies female student; and μ_p are dummies identifying the bachelor program students have enrolled into.

Of particular interest in our research are the estimates of β, which quantify the relationship between the score on admission tests and students' outcomes for high school graduates. We also focus on δ_t, which indicates how this relationship differs for students in other school tracks. These estimates are crucial to understanding the predictive power of admission test scores on future outcomes and how this impact varies across different educational backgrounds.[20]

Column (1) of table 12 reports estimated coefficients when the dependent variable is a dummy that identifies students who dropped out of their study program before enrolling in the second year of study. There are no significant differences across school tracks in the probability of dropping out, except for students from vocational schools, who are 9.4 percentage points more likely to drop out than students from high schools. This is a sizable difference since the dropout rate in the whole sample is less than 20%. A higher score on the admission test is associated with a lower dropout probability: a 10% increase in the admission test score leads to a 1.6 p,p, lower dropout probability. The effect is homogeneous across all secondary school backgrounds, except for students holding a foreign degree, for whom the test score has no significant effect on dropout probability.

Column (2) shows results when the dependent variable is the number of ECTSs obtained at the end of the first year of university studies for students who did not drop out. The number of ECTSs obtained at the end of the first year is higher (58 on average) for students from classical and scientific high schools. It is 3.2 points lower for students from other high schools, 8.1 points lower for students from technical schools, and 10.8 lower for students from vocational schools. The score on the admission test is positively correlated with a higher number of ECTSs completed: for students who

[20] Cisia (2017) studies the predictive ability of the TIP (*test in presenza*) for students enrolled in the engineering schools using the same outcomes. Using contour plots, it shows that test scores and graduation marks both correlates with outcomes. In our data the rank correlation among the twos is relatively low (0.25), suggesting that these signals offer different rankings if used as alternative predictors of initial careers.

come from any high school, a 10% increase in the admission test score is associated with 2.1 more CFU completed. However, such a relationship is weaker for students from technical and, especially, vocational schools. For these students, a 10% higher admission test score is associated with an extra 2 and 1.9 CFU, respectively.

Finally, in column (3), we show OLS results for students' GPA at the end of the first year for students who did not drop out, where the GPA is set to zero for students who have acquired no CFUs. These regressions paint a similar picture to those of column (2): not only do we observe the same gradient in terms of secondary school type, but also a 10% higher score on the admission test is associated with a 7.2 higher GPA for high school graduates (the mean GPA across all students is 25.27). Additionally, the association between entry test scores and GPA is lower for graduates of technical and vocational schools. For these students, a 10% higher test score is associated with a 5.5 and 4.7 lower GPA, respectively.

All in all, these results suggest that standardized test scores are a worse predictor of university program performance for students from vocational schools than for students from other secondary school tracks.

Table 12 – University outcomes and test scores

dependent variable:	Dropout	ECTS	GPA
Other high	0.012	-1.667*	-0.287***
	(0.011)	(0.702)	(0.067)
Technical	0.025	-3.357***	-0.649***
	(0.013)	(0.871)	(0.083)
Vocational	0.094***	-6.758***	-1.070***
	(0.027)	(1.891)	(0.181)
Foreign school	0.002	-8.610**	-1.323***
	(0.038)	(2.876)	(0.275)
log test score	-0.164***	21.346***	3.266***
	(0.028)	(1.819)	(0.174)
other high # log test score	0.042	-2.860	-0.775***
	(0.032)	(2.069)	(0.198)
technical # log test score	0.050	-4.038	-1.048***
	(0.035)	(2.254)	(0.215)
vocational # log test score	0.064	-0.386	-1.180***
	(0.047)	(3.633)	(0.347)
foreign # log test score	0.239***	-17.032***	-1.967***
	(0.043)	(4.367)	(0.417)
female	0.015	1.920**	0.391***
	(0.009)	(0.622)	(0.059)
Obs	9.346	7.330	7.330

The table reports regressions results from regressions where the dependent variable is, alternatively, a dummy for dropping out of the bachelor program after the first year (column 1), the number of ECTS obtained at the end of the first year for students who have not dropped out (column 2), and the GPA at the end of the first year for students who have not dropped out (column 3). All regressions include fixed effects for the BA program they are enrolled in. Sample: students enrolled in the first year of restricted access programs at the University of Milan in the academic year 2022/2023. Heteroscedasticity-robust standard errors in column 1. * p<0.05, ** p<0.01, *** p<0.001

5. Conclusions and policy suggestions

This paper examines the impact of secondary school tracking on the transition to tertiary education of Italian students. We start by examining longitudinal data on the cohort of students born in the year 2000, observed in junior high school before tracking choice in 2014, and for those who survived at the end of 5 years of upper secondary education in 2019. We use INVALSI data that contain measures of competencies (literacy and numeracy) as well as information on family background. We show that track assignment implies a different evolution of competencies during secondary education: apart from non-random attrition (those who drop-out are negatively selected), "surviving" students in vocational schools lose positions in the distribution of ability vis a vis students in high schools who gain ranks. We argue that, other things constant, differences in tracks (in terms of teaching contents and teacher selection) are detrimental for students who are already weaker on learning grounds.

Since INVALSI data do not provide information on students' intentions to proceed further to tertiary education, we resort to another source of information, which is the PISA survey conducted in 2018 among 15-year-old Italian students. In this case, we possess analogue information on student competencies (literacy, numeracy, and science) and family background, but we can also measure aspirations to college from students and separately from their parents. Even though the intersection of college aspirations between students and their families may represent a rough proxy for future decisions, we can study the role of measured ability and family background in forming these aspirations. We show that tracks affect college aspirations since students in vocational tracks, other things constant (including ability net of family background), are less likely to apply for college. By studying the distribution of intention to apply across tracks over the percentiles of ability, we can also simulate what could be the likely effect of setting a threshold of ability in college admission. Consequently, we provide evidence that the existence of admission tests to college makes the life of vocational students even harder since they lose positions in the ability distribution and have lower aspirations but are admitted on an equal basis of test scores.

In a partial equilibrium analysis, the choice of selective admissions by universities pays back in terms of signaling in the tertiary education market since it makes them more attractive for high-ability students who aim to self-select with similar peers. Bratti et al. (2024) study the switch from open access to selective admissions (19.2% of programs undertake this change in the period 2010-2022) and from selective admissions to open access (15.7% undertake this change over the same period). They conclude that selective access reduces the number of students, improves average student quality at entrance, and also students' university performance. However, they do not consider the aggregate consequences of these transitions. Admission tests, when adopted by universities intended to switch

to selective admissions, either set a very low threshold or hinder the ability of the country to make the Lisbon 2030 target of reaching 40% of the young population with tertiary education.

Finally, we focus on the usefulness of admission tests as predictors of academic career. We make use of selective admissions in one large university in Milan to study the correlation of three outcomes (probability of drop-out during the first year, number of ECTS obtained, and GPA, both at the end of the first year. We find that the admission score is correlated to these outcomes in a very similar way as the graduation marks (*voto di maturità*). However, the admission score works worse for students from vocational schools than for students from other tracks, possibly because students from vocational schools have other interior strengths that help them navigate the system despite discouragement and lack of information. So even when admitted to selective courses, the small minority of students from vocational schools does not obtain recognition for their actual efforts.

Once they succeed in graduating from college, they still suffer the "scar" of vocational education, as already found in the literature. Agarwal et al (2021) estimate the returns to college by secondary school type attended in Italy, finding that returns are lower for vocational than for academic high school graduates in terms of employment probability (−4%), hourly wages (−3.1%), and the probability of finding the first job less than 1 year after graduation (−9.2%).[21]

We have provided additional new evidence that students attending vocational schools are in a disadvantaged position, even when they start with the same level of potential as students attending high schools: their competencies grow less, their aspirations are contained, and they end up underrepresented among the students admitted to universities, especially under selective admissions. If we were to improve the equity in accessing tertiary education[22] we cannot abstract from students attending vocational education. There are different policy options that are not mutually exclusive, even though they require different time horizons. The most radical one would be de-tracking secondary education (following the comprehensive movement that crossed Europe fifty years ago), replacing current curricula with optional majors and minors, such that students can compose their portfolio of skills according to their inclinations and not according to the school orientation chosen by their parents and children when they were 14-year-old. A less radical reform, undertaken in the 90's, would be to extend the comprehensive junior high school until grade 10, postponing the track choice by two years and ensuring the same teaching contents to everyone. However, these choices are hotly debated since different political orientations support different alternatives. A third

[21] The wage penalty associated with high school vocational education is lower when they consider college majors such as engineering and economics and business, for which the complementarity with the vocational skills developed in high school is presumably higher.

[22] Let us remind that SDG 4 (Sustainable Development Goals proposed by United Nations) calls for "*Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all*".

alternative would be revising the teaching curricula in vocational education giving more space to theoretical approaches, thus making students more adaptable to a changing world.

If previous options require Ministerial involvement and parliamentary actions, universities could undertake actions at the local level to encourage applications from students in vocational tracks. They could design orientation modules stressing the complementarities of some university programs with subjects taught in this track. But if universities intend to attract the best students from vocational tracks who are discouraged by their lower level in admission tests, they could either introduce different admission thresholds by track of origin or adopt compensatory scores in admission for students from vocational schools in recognition of the cumulated disadvantage associated with such attendance. These solutions raise equity issues, and universities adopting one of these compensatory measures would likely encounter the opposition of students (and their voicey families) who would end up excluded despite a higher admission score.

Another alternative would be the replacement of admission tests with the graduation marks obtained at the exit of secondary education, or the test score measured by INVALSI during 13th grade. Both measures have analogous predictive power on future careers but have the advantage of being universally available, thus removing the informational (and economic) barrier of test taking. Thus, a student interested in tertiary education could observe the admission mark (or score) for each selective admission program in the previous year and decide whether to apply or not, without the uncertainty (and the cost) of test taking.[23]

[23] Just to give an idea of the business of test administration, if we multiply the number of tests undertaken at CISIA last year (329.274) by the individual cost (30 euros), we obtain almost 10 million euros that are disbursed by applicants to colleges.

References

Agarwal, Lisha, Giorgio Brunello and Lorenzo Rocco, 2021. The Pathways to College. *Journal of Human Capital*, vol. 15(4), pages 554-595.

ANVUR 2023. Rapporto sul sistema della formazione superiore e della ricerca 2023

Ballarino, Gabriele and Nazareno Panichella. 2021. *Sociologia dell'istruzione*. Mulino

Bertoni, Marco, Giorgio Brunello and Lorenzo Rocco. 2013. When the cat is near, the mice won't play: The effect of external examiners in Italian schools. *Journal of Public Economics.* Volume 104, August, 65-77

Bratti, Massimiliano Daniel Kreisman and Enrico Lippo. 2024. Open the flood gates or skim the cream? Selective vs. open enrollment policies and the race for talent in Italy. mimeo

Checchi, Daniele and Luca Flabbi. 2013. Intergenerational mobility and schooling decisions in Italy and Germany. *Rivista di Politica Economica* VII-IX, 7-60

CISIA 2017.Orientamento e accesso all'università. mimeo

European Commission, Directorate-General for Education, Youth, Sport and Culture. 2023. *Education and training monitor 2023 – Comparative report*, Publications Office of the European Union, https://data.europa.eu/doi/10.2766/936303

Eurydice Italia 2014. The Italian educational system. I quaderni di Eurydice n.30 (https://eurydice.indire.it/pubblicazioni/the-italian-education-system/)

Filippi, Giorgio and Vincenzo falco. 2024. I risultati delle prove TOLC 2023. mimeo

Gelbach Jonah B. 2016. When Do Covariates Matter? And Which Ones, And How Much? *Journal of Labor Economics*, Vol. 34, No. 2, Part 1, pp. 509-543

OECD 2019, *PISA 2018 Assessment and Analytical Framework*, PISA, OECD Publishing, Paris, https://doi.org/10.1787/b25efab8-en.

Appendix

Table A.1 – Population, graduates and enrolled in universities – Italy – year 2022

population aged 19 in year 2022	568 972
secondary school graduates - regular students - aged 19 in 2022	383 099
secondary school graduates - repeating students - older than 19 in 2022	125 375
secondary school graduates - in 2022	508 474
university enrolment (1st year) - 19-year old in 2022	225 819
university enrolment (1st year) - older tan 19 in 2022	76 693
university enrolment (1st year) in 2022	302 512
secondary school graduates - high schools (licei) - in 2022	255 458
secondary school graduates - technical schools (ist.tecnici) - in 2022	161 264
secondary school graduates - vocational schools (ist.professionali) - in 2022	91 752
secondary school graduates - in 2022	508 474
university enrolment (1st year) - graduate from high schools - in 2022	195 595
university enrolment (1st year) - graduate from technical schools - in 2022	74 557
university enrolment (1st year) - graduate from vocational schools - in 2022	22 602
university enrolment (1st year) - graduate from not available - in 2022	9 758
university enrolment (1st year) - in 2022	302 512

Source: ANVUR 2023, figures 1.2.11-1.2.12

Table A.2 – Probability of absence of matching – linear probability model

	1	2	3	4	5
dependent variable:	not matched in grade 8	not matched in grade 8	not matched in grade 13	not matched in grade 13	not matched in grade 13
female	-0.088***	-0.052***	-0.029***	-0.024***	-0.019***
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
birth year < 1997	0.126***	0.177***	0.830***	0.978***	0.978***
	[0.047]	[0.049]	[0.023]	[0.009]	[0.010]
birth year = 1998	0.097**	0.142***	0.943***	0.958***	0.956***
	[0.046]	[0.049]	[0.023]	[0.008]	[0.009]
birth year = 1999	0.03	0.074	0.926***	0.863***	0.861***
	[0.046]	[0.048]	[0.023]	[0.008]	[0.009]
birth year = 2000	-0.250***	-0.159***	0.187***	0.100***	0.101***
	[0.046]	[0.048]	[0.023]	[0.008]	[0.009]
birth year = 2001	-0.261***	-0.170***	0.176***	0.101***	0.101***
	[0.046]	[0.048]	[0.023]	[0.008]	[0.009]
birth year > 2001	-0.144**	-0.012	0.574***	0.611***	0.608***
	[0.066]	[0.069]	[0.053]	[0.060]	[0.064]
highest parental education=primary	0.158***	0.127***			
	[0.006]	[0.006]			
highest parental education=lower secondary	0.058***	0.034***			
	[0.002]	[0.002]			
highest parental education=vocational	0.002	-0.011***			
	[0.003]	[0.003]			
highest parental education=high school	-0.066***	-0.061***			
	[0.002]	[0.002]			
highest parental education=non academic tertiary	-0.054***	-0.052***			
	[0.004]	[0.004]			
highest parental education=BA or MA	-0.087***	-0.064***			
	[0.002]	[0.002]			
ESCS (cultural-socio-economic conditions)				0.004***	0.004***
				[0.001]	[0.001]
native	-0.081***	-0.085***	-0.305***	-0.117***	-0.124***
	[0.016]	[0.018]	[0.003]	[0.010]	[0.011]
foreign born to foreign parents	0.006	0.011	-0.475***	-0.293***	-0.302***
	[0.017]	[0.018]	[0.005]	[0.011]	[0.011]
born inland to foreign parents	0.043***	0.030*	-0.316***	-0.126***	-0.135***
	[0.017]	[0.018]	[0.004]	[0.010]	[0.011]
macroregion: North-East	-0.034***	-0.030***	-0.025***	-0.022***	-0.022***
	[0.002]	[0.002]	[0.001]	[0.001]	[0.001]
macroregion: Center	-0.069***	-0.080***	-0.031***	-0.025***	-0.024***
	[0.002]	[0.002]	[0.001]	[0.002]	[0.002]
macroregion: South	-0.088***	-0.096***	-0.063***	-0.053***	-0.052***
	[0.002]	[0.002]	[0.001]	[0.001]	[0.002]
macroregion: Islands	-0.010***	-0.027***	-0.073***	-0.064***	-0.063***
	[0.002]	[0.002]	[0.001]	[0.002]	[0.002]
Literacy test score	-0.002***	-0.001***	-0.001***	-0.001***	-0.001***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Numeracy test score	-0.002***	-0.001***	-0.001***	-0.000***	-0.000***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Grade in Italian (oral)		-0.059***			-0.005***
		[0.001]			[0.001]
Grade in Mathematics (oral)		-0.056***			-0.002***
		[0.001]			[0.000]
Constant	1.504***	1.714***	0.494***	0.355***	0.387***
	[0.046]	[0.048]	[0.023]	[0.013]	[0.014]
Observations	512 876	451 572	454 265	317 450	295 947
R^2	0.226	0.271	0.584	0.567	0.567

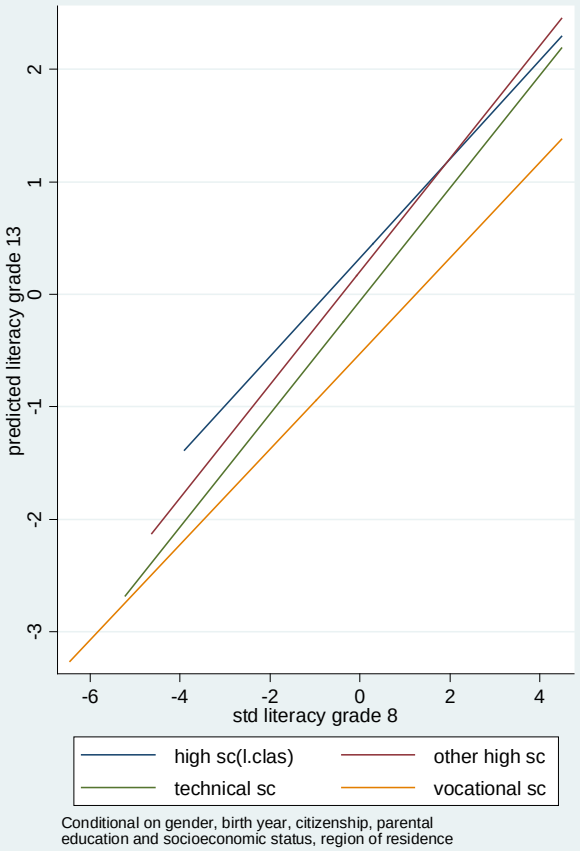
Robust standard errors in parentheses - *** p<0.01, ** p<0.05, * p<0.1 –
Except than in the case of macro-regions, the excluded case is given by the missing observation case

Table A.3 – Probability of track allocation – ordered probit model

	1	2	3
dependent variable: track allocation (%)			
1.high schools (classico/scientifico)	*29.54*	*29.40*	*29.40*
2.other high schools	*30.28*	*30.22*	*30.22*
3.technical schools	*29.02*	*29.14*	*29.14*
4.vocational schools	*11.17*	*11.23*	*11.23*
female	-0.106***	-0.008	-0.054***
	[0.004]	[0.005]	[0.005]
birth year < 1997	0.364	0.255	0.193
	[0.260]	[0.292]	[0.292]
birth year = 1998	0.344	0.226	0.181
	[0.215]	[0.248]	[0.247]
birth year = 1999	0.169	0.069	0.056
	[0.211]	[0.243]	[0.243]
birth year = 2000	-0.463**	-0.303	-0.287
	[0.211]	[0.243]	[0.243]
birth year = 2001	-0.534**	-0.399	-0.382
	[0.211]	[0.243]	[0.243]
birth year > 2001	-0.27	-0.051	-0.06
	[0.292]	[0.326]	[0.326]
native	-0.113	0.012	0.022
	[0.078]	[0.087]	[0.087]
foreign born to foreign parents	-0.02	0.07	0.042
	[0.079]	[0.088]	[0.088]
born inland to foreign parents	-0.028	-0.008	-0.02
	[0.079]	[0.088]	[0.088]
highest parental education=primary	0.588***	0.443***	0.422***
	[0.030]	[0.033]	[0.033]
highest parental education=lower secondary	0.390***	0.297***	0.286***
	[0.008]	[0.009]	[0.009]
highest parental education=vocational	0.314***	0.245***	0.233***
	[0.010]	[0.011]	[0.011]
highest parental education=high school	0.033***	0.043***	0.044***
	[0.006]	[0.007]	[0.007]
highest parental education=non academic tertiary	-0.074***	-0.077***	-0.073***
	[0.016]	[0.017]	[0.017]
highest parental education=BA or MA	-0.339***	-0.262***	-0.240***
	[0.008]	[0.009]	[0.009]
ESCS (cultural-socio-economic conditions)	-0.253***	-0.206***	-0.197***
	[0.003]	[0.003]	[0.003]
macroregion: North-East	0.112***	0.116***	0.109***
	[0.006]	[0.007]	[0.007]
macroregion: Center	-0.086***	-0.185***	-0.196***
	[0.007]	[0.007]	[0.007]
macroregion: South	-0.098***	-0.185***	-0.197***
	[0.006]	[0.007]	[0.007]
macroregion: Islands	-0.080***	-0.132***	-0.126***
	[0.009]	[0.010]	[0.010]
Marks in Italian (oral)		-0.227***	-0.171***
		[0.003]	[0.003]
Marks in Mathematics (oral)		-0.262***	-0.201***
		[0.003]	[0.003]
Literacy test score			-0.003***
			[0.000]
Numeracy test score			-0.004***
			[0.000]
/cut1	-1.243***	-4.611***	-5.201***
	[0.207]	[0.243]	[0.243]
/cut2	-0.374*	-3.625***	-4.200***
	[0.207]	[0.243]	[0.243]
/cut3	0.712***	-2.393***	-2.952***
	[0.207]	[0.243]	[0.243]
Observations	253786	224138	224138
Pseudo R^2	0.064	0.142	0.151

Except than in the case of macro-regions, the excluded case is given by the missing observation case

Figure A.1 – Cumulative effect of tracking, by competences



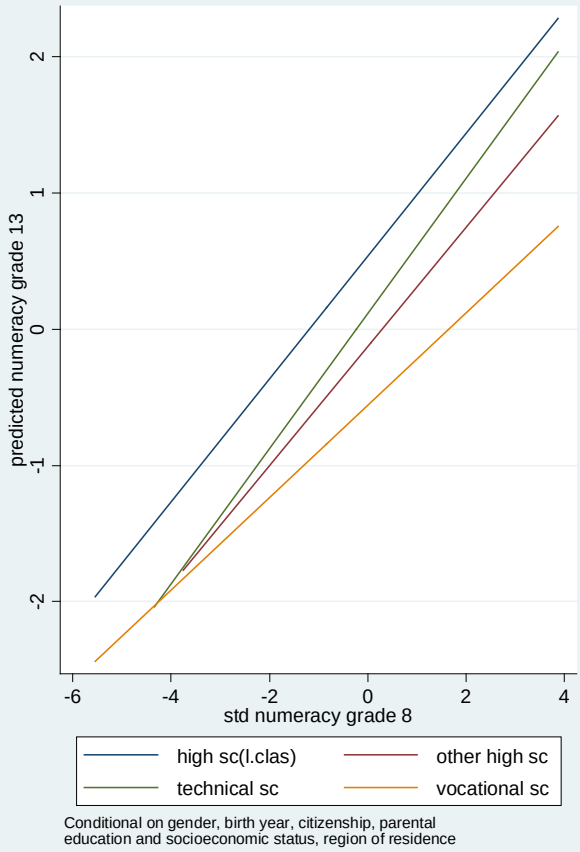


Table A.4 – Additional descriptive statistics – Italy – PISA 2018

citizenship	high school	technical schools	vocational schools	Total	# cases
Native	93.99	88.57	84.25	90.47	10207
First-Generation	2.50	4.73	7.75	4.19	473
Second-Generation	3.52	6.70	7.99	5.34	602
Total	100.00	100.00	100.00	100.00	11282
books at home	high school	technical schools	vocational schools	Total	# cases
0-10	5.04	14.31	27.07	12.17	1385
11-25	12.72	24.79	23.86	18.52	2108
26-100	28.69	31.13	26.31	28.94	3295
101-200	22.63	17.07	12.11	18.89	2151
201-500	20.08	8.46	5.84	13.80	1572
More than 500	10.84	4.23	4.81	7.68	874
Total	100.00	100.00	100.00	100.00	11385
highest parental education	high school	technical schools	vocational schools	Total	# cases
None	0.00	0.18	0.40	0.14	16
ISCED 1	0.25	0.35	1.29	0.48	55
ISCED 2	9.16	19.80	25.10	15.49	1761
ISCED 3B-3C	3.41	4.13	3.86	3.71	422
ISCED 3A-4	35.83	39.10	35.70	36.77	4179
ISCED 5B	5.89	7.34	8.75	6.89	783
ISCED 5A-6	45.47	29.11	24.90	36.52	4150
Total	100.00	100.00	100.00	100.00	11366

Table A.5 – Correlates of ability (average of numeracy/literacy/science) – Italy – PISA 2018

female	-0.033
	[0.017]*
age	0.192
	[0.030]***
First generation immigrant	-0.143
	[0.045]***
Second generation immigrant	-0.036
	[0.041]
Index of economic, social and cultural status	0.207
	[0.032]***
11-25 books at home	0.254
	[0.035]***
26-100 books at home	0.524
	[0.033]***
101-200 books at home	0.685
	[0.036]***
201-500 books at home	0.817
	[0.039]***
more than 500 books at home	0.765
	[0.045]***
Index highest parental occupational status (HISEI)	0.006
	[0.001]***
1. Highest Education of parents: ISCED 1	-0.068
	[0.272]
2. Highest Education of parents: ISCED 2	0.14
	[0.241]
3. Highest Education of parents: ISCED 3B-3C	0.254
	[0.247]
4. Highest Education of parents: ISCED 3A-4	0.257
	[0.244]
5. Highest Education of parents: ISCED 5B	-0.217
	[0.249]
6. Highest Education of parents: ISCED 5A-6	-0.101
	[0.249]
Constant	-3.781
	[0.540]***
Observations	10779
R^2	0.19

Standard errors in brackets - * significant at 10%; ** significant at 5%; *** significant at 1%

Table A.6 – Probability of enrolling in HE (probit model) – Italy – PISA 2018

Dependent variable: child and parent expect enrolment in HE	0.520	0.520
	(1)	(2)
female	0.367	0.407
	[0.026]***	[0.027]***
age	0.086	0.012
	[0.045]*	[0.046]
First generation immigrant	-0.024	0.039
	[0.070]	[0.072]
Second generation immigrant	0.08	0.109
	[0.062]	[0.064]*
Index of economic, social and cultural status	0.624	0.598
	[0.050]***	[0.051]***
11-25 books at home	0.214	0.126
	[0.054]***	[0.055]**
26-100 books at home	0.356	0.163
	[0.051]***	[0.052]***
101-200 books at home	0.441	0.192
	[0.056]***	[0.058]***
201-500 books at home	0.507	0.204
	[0.061]***	[0.063]***
more than 500 books at home	0.479	0.199
	[0.069]***	[0.072]***
Index highest parental occupational status (HISEI)	-0.003	-0.006
	[0.001]**	[0.001]***
1. Highest Education of parents: ISCED 1	-0.794	-0.854
	[0.464]*	[0.482]*
2. Highest Education of parents: ISCED 2	-1.106	-1.235
	[0.408]***	[0.424]***
3. Highest Education of parents: ISCED 3B-3C	-1.413	-1.616
	[0.416]***	[0.432]***
4. Highest Education of parents: ISCED 3A-4	-1.297	-1.489
	[0.412]***	[0.428]***
5. Highest Education of parents: ISCED 5B	-1.688	-1.72
	[0.418]***	[0.435]***
6. Highest Education of parents: ISCED 5A-6	-1.629	-1.711
	[0.420]***	[0.436]***
standardised ability (mean of literacy+numeracy+science)		0.399
		[0.016]***
Constant	-0.151	1.419
	[0.840]	[0.865]
Observations	10284	10284
Psedo R^2	0.097	0.145

Standard errors in brackets - * significant at 10%; ** significant at 5%; *** significant at 1%

Table A.7 – Share of students that would be admitted to college by different level of **residual ability** (weighed) – Italy – PISA 2018

cross-sectional frequency distribution						cumulaated from bottom (highest ventile in ability)			
ventile in the distribution of actual ability	child and parents not expecting application to college – all schools (1)	child expecting application to college - high school (2)	child expecting application to college - technical school (3)	child expecting application to college - vocational school (4)	Total (5)	child and parents expecting application to college – all schools (6)	child expecting application to college - high school - incidence among applicants (7)	child expecting application to college - technical school - incidence among applicants (8)	child expecting application to college - vocational school - incidence among applicants (9)
1	69.6	13.1	7.8	9.6	100.0	56.4	70.5	22.5	7.0
2	62.9	19.4	11.2	6.5	100.0	57.8	71.3	22.4	6.3
3	52.9	29.9	12.7	4.5	100.0	59.0	72.0	22.1	5.9
4	53.1	26.9	12.5	7.5	100.0	59.7	72.3	21.9	5.8
5	55.0	26.2	12.4	6.3	100.0	60.5	73.1	21.6	5.3
6	53.0	28.7	14.6	3.8	100.0	61.5	73.8	21.4	4.9
7	46.7	37.2	11.6	4.6	100.0	62.5	74.5	20.8	4.7
8	46.4	37.5	9.9	6.3	100.0	63.2	74.8	20.8	4.4
9	49.4	35.1	11.6	4.0	100.0	64.0	75.1	20.9	3.9
10	51.3	31.7	14.9	2.1	100.0	65.2	75.5	20.8	3.7
11	41.7	40.3	15.6	2.5	100.0	66.9	76.3	20.1	3.6
12	39.6	43.5	12.1	4.8	100.0	67.8	77.0	19.5	3.6
13	38.0	45.7	10.8	5.6	100.0	68.8	77.5	19.4	3.1
14	34.3	46.9	16.0	2.8	100.0	69.8	78.0	19.6	2.3
15	35.2	47.7	13.6	3.6	100.0	70.4	79.1	18.9	2.0
16	32.8	53.1	13.3	0.9	100.0	71.5	80.1	18.5	1.4
17	32.7	52.1	14.6	0.7	100.0	72.6	80.3	18.2	1.4
18	31.1	55.1	12.6	1.3	100.0	74.4	81.2	17.2	1.6
19	27.6	57.0	13.8	1.6	100.0	77.1	81.8	16.7	1.4
20	18.1	69.3	12.0	0.6	100.0	81.9	84.6	14.7	0.7
Total	43.98	39.36	12.64	4.03	100				

Financial Constraints and University Attendance in Europe: Can Financial Institutions Lend a Hand?

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Please Do Not Circulate Without Permission

Abstract

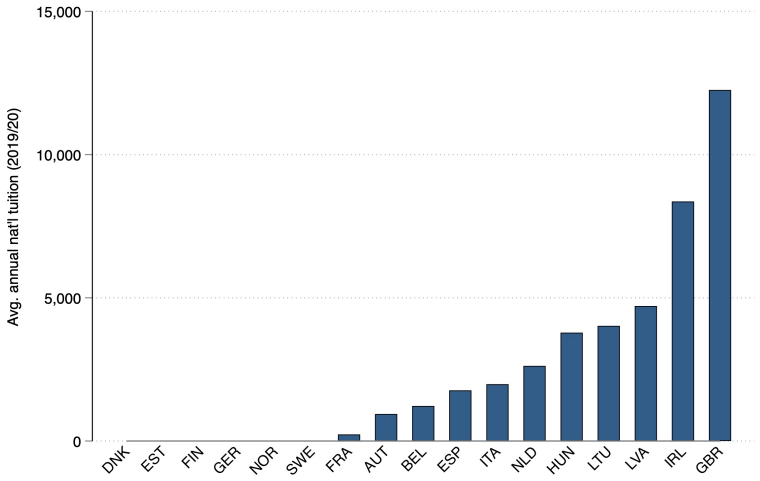
This chapter considers the role university costs play in attendance in the European context, and what role private financial institutions can play in easing cost burdens for families. We begin by asking to what degree tuition or other costs are a limiting factor for European students, in particular those from less wealthy families. We demonstrate that in Europe, the largest financial barrier to university comes from housing – few countries charge a meaningful tuition and many provide progressive income supports. We then consider role private financial institutions can play, drawing on research from the US, UK, and European contexts, focusing on two mechanisms: loans and savings accounts. We determine private loans are not a good candidate as they have demonstrated too little effectiveness and come with meaningful downside risks for families and lenders. We suggest that the development of a youth educational savings product has far fewer risks and meaningful potential upside, though prior efforts have demonstrated that effective schemes are difficult to design. We conclude with what a product would look like in the Italian context, including simulations of account balances and costs.

1 Overview

The purpose of this "chapter" is to answer two questions. First, are too few students in Europe attending university because of the cost? Second, if so, are there potential solutions in financial products? To address the former, we seek evidence of the relationship between the cost of university (in Europe, broadly defined) and university attendance and completion rates. Both data and causal evidence of this relationship are rare. In the following we rely on data from the OECD's Education at a Glance and Programme for the International Assessment of Adult Competencies (PIAAC), in addition to relevant studies.

To frame the discussion, we begin by demonstrating in Figure 1 that the majority of European countries charge either no or small tuition fees. For students not living with family, with exception for the UK, living costs almost certainly outweigh tuition and fees as a barrier to university enrollment; possibly in the UK as well.

Figure 1: Tuition in select European countries ($USD)



Source: OECD (2022), Table C5.1 (`https://www.oecd.org/education/education-at-a-glance/EAG2022_X3-C.pdf`).

We go on to show that neither university attendance nor the gap in expectations for university attendance between wealthy and disadvantaged students is correlated in cross-sectional data with tuition prices. Within countries though, ample evidence exists that students from wealthier households are more likely to attend college. In Italy, for example, more than 75% of children from households in the top quarter of the income distribution attend college, compared with less than 40% among those in the bottom-quarter. Given near zero tuition in many of these countries, the gaps are most likely attributable to factors such as pre-university preparation, and to non-tuition costs, such as housing. By way of example we simulate university costs in Italy, where the fee structure is progressive and where the majority of students face virtually no tuition price in public universities. For student attending university in Milan who came from a family with income at the country's median, only 17% of the estimated direct cost is due to fees and supplies, the rest is living expenses. Given our focus on financial barriers, we pay particular attention to the role living costs play.

To address the second question – whether there is evidence of promising financial products – we consider two prospects: student loans and child savings accounts. Concerning the

former, much of the evidence on loan effectiveness comes from countries with comparatively high tuition costs, for which loans are primarily used. Even in these countries, the evidence of loan effectiveness is mixed. From the few examples in the European context, we find little evidence that access to student loans increases enrollment or graduation. Evidence from the US, where the loan market is largest, including a robust market for private loans, suggests that this would be a risky solution for a private lender. This is due to the fact that human capital loans are unsecured, and by nature, risky. More, the loans would largely be used for living expenses, which are hard to quantify, as opposed to tuition. Ample evidence exists that loan repayment rates are low in countries where they are prevalent, even when the government is the originator, when interest rates are low, and the state has extreme latitude to enforce collections. As a final point, given the high likelihood that many borrowers would have difficulty repaying, as in those countries heavily reliant on loans, the reputational cost from recouping these loans from distressed borrowers would be high. For these and other reasons clarified below, we do not recommend private educational loans as a promising avenue to pursue.

Our second approach is to consider educational savings accounts. These are normally tax-deferred investment vehicles set up for minors to be used for their education. These offer several features that loans do not, including incentive effects, integration into the financial community, and the ability to design progressivity into the product. Yet, designing an effective campaign has proven difficult, as less wealthy families are least likely to enroll, creating potential for further wealth distortion due to tax incentives. We draw on evidence from schemes in the US, UK, and Canada to show strengths and weaknesses. A successful product would likely require automatic enrollment, an initial seed grant, and strong tax incentives, each of which we believe is achievable.

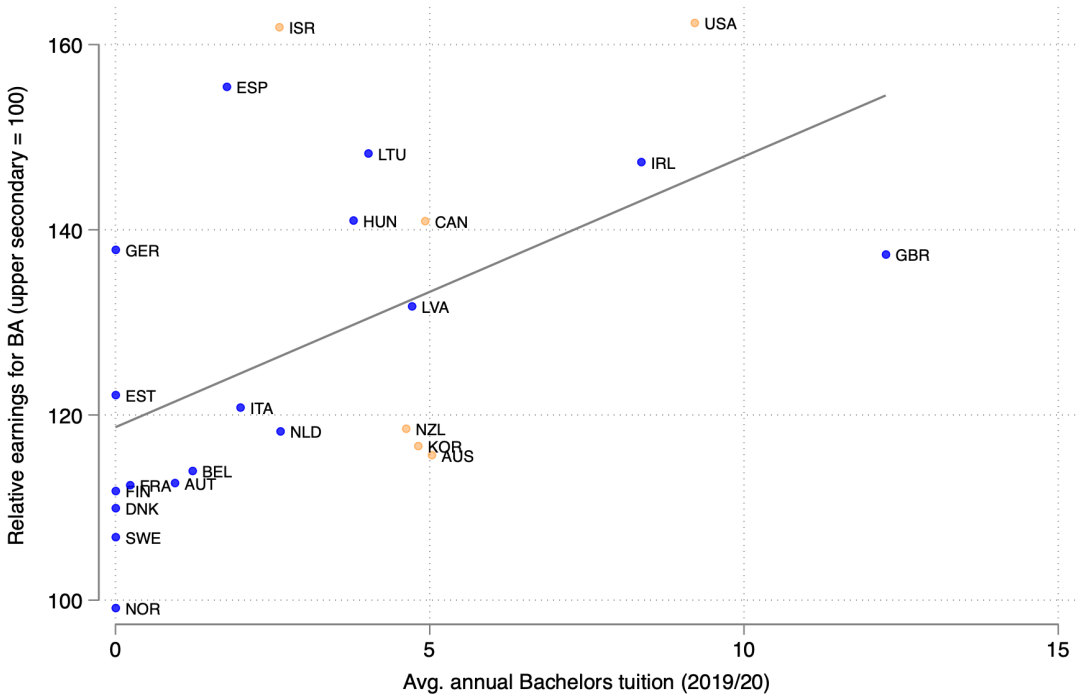
We conclude by simulating such a product in the Italian context assuming families could automatically apply payments from the existing Universal Child Allowance, which has a progressive structure. We show that contributing between approximately 25% and 50% of the monthly subsidy would cover the full cost of tuition and living expenses for the lowest income families, under reasonably conservative assumptions. Additionally, we believe this provides potential for the financial sector to provide a missing product with low risk to families or providers.

2 The Problem: Under-representation of low income students in University

Our modern societies are founded on the ideal of the equality of opportunity, with educational playing a central role in aspirations of a level playing field. Across all OECD countries, the majority of primary and secondary students attend government funded schools, with large government investments aimed at increasing social mobility. While public investments are large for both primary and secondary education in all OECD countries, their approaches to non-compulsory higher education varies widely. For example, despite the fact that the majority of university students in the U.S. attend a public school (around 81%), they face relatively high tuition costs, even with existing public subsidies for low-income students in the form of Pell grants. About half of all bachelors degree recipients leave school with student loan debt. The university system in the U.K. is increasingly taking on this flavor. In continental Europe, on the other hand, students often face little if any price in terms of tuition and fees. Costs are primarily due to housing and foregone earnings.

Despite vastly different approaches, cross-country college completion rates are largely unrelated to the tuition cost students face. Roughly an equal share of Americans earn

Figure 2: College Premia and Average Tuition Fees Across OECD Countries



Notes: Figure plots (y-axis) the relative earnings of workers compared to those with upper-secondary attainment (set equal to 100) by average annual tuition fees. Tuition data are from OECD (2022), Table C5.1 (`https://www.oecd.org/education/education-at-a-glance/EAG2022_X3-C.pdf`). Earnings are from, OECD Education at a Glance (2023) Table A4.1. (`https://doi.org/10.1787/d7f76adc-en`).

a college degree (who pay almost $10,000 on average per year in tuition alone) as do those in Spain (who pay $2,500), as do those in Denmark (who face $0 tuition fees). The UK is comparatively high in both price and graduation rates, while Germany and Italy are remarkably lower. The UK has an approximately 50% higher tertiary schooling rate than Germany, where a four-year degree would cost about $50,000 less. Notably, tertiary completion rates among the population are lowest in Italy.

To be sure, costs are not the only factor potential students consider. Rather, the benchmark comparison is the cost relative to the benefit. Figure 2 indeed shows that tuition are higher in OECD countries where college degree holders earn more. Given that college degrees remain valuable in the labor market, the key question is whether the upfront cost of attending university is limiting enrollment, and whether it is doing so disproportionately for students from less wealthy families.

2.1 Defining costs and benefits

In the following, it is important for us to clarify what we mean by costs, and why they might limit enrollment even if the long-term benefits less costs of a degree are positive. Consider two types of costs of attending university. The first is the "direct cost", which consists of tuition and fees, along with materials, and finally other costs such as rent and meals. The third of these is unique insofar as one consumes meals and pays rent regardless of school attendance. But the cost is different if students want to attend school away

from home, in which case they pay these out of pocket.[1] We will show later that for most European students, if they study away from home, this is the largest of the direct costs.

Second, students face "opportunity costs" by foregoing employment while studying. Students can work while in school, and many do, a fact we highlight in Italy later in the chapter. Regardless, working and studying is more difficult than doing only one of these alone. A third cost, which we do not cover here, is how difficult students perceive taking university courses, often called a "psychic cost", which is decreasing in their prior preparation.

The benefits come in increased earnings over the life-cycle, among other intangibles. If students believe that the net difference between the two is positive, they will attend. This, of course, assumes they can afford it. If they cannot, one solution is to borrow, hence large student loan markets in countries with high costs and high returns, such as the U.S. and the UK. But the investment, for both sides, carries considerable risk. Students may find that college is not for them, and leave with no degree and considerable debt. Lenders who issued these loans have no collateral, hence the price should take into account the risk pool of borrowers. To keep prices low, governments regularly subsidize and guarantee such loans.

Regardless, the immediate costs of attending university can be disproportionately limiting for students from less-wealthy families, even when borrowing is available and if the likely outcome of attending school would be net positive. This is because it carries significant risk that is more costly for students from less wealthy households. When coupled with the fact that these students are often also less-prepared academically, due to inequities in school quality at younger ages, and that they often face informational barriers about the college process, it is unsurprising to observe large university attendance and completing gaps within countries, but to observe little cross-sectional variation with price across them.

2.2 Tuition Fees and University Enrollment – Descriptive Evidence

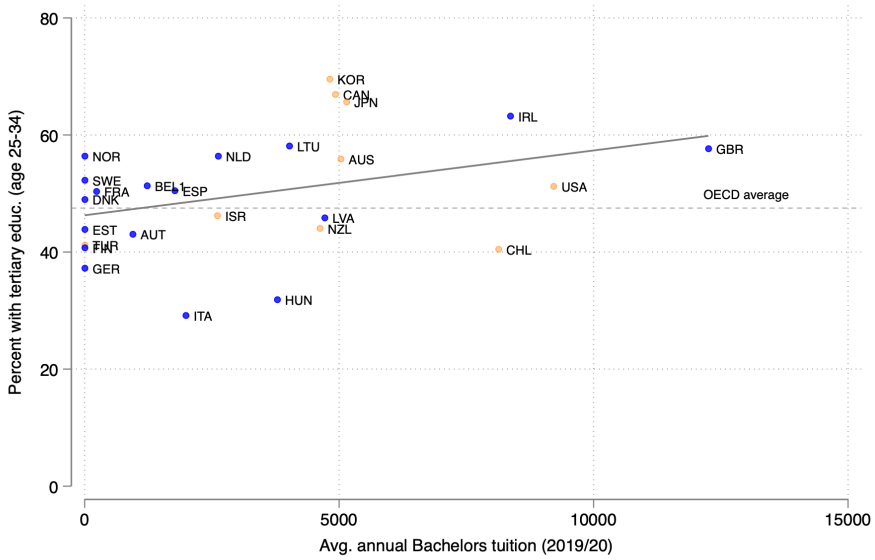
It is not unreasonable to expect that a public and low- (or zero-) tuition fee higher education system guarantees a more equitable access to university and increased social mobility. Yet evidence of this is not straightforward.

We begin by observing cross-country differences in tuition fees and university enrollment and completion rates for all students. If tuition costs are an important barrier, one would expect countries with lower or zero tuition rates to have higher university enrollment rates. However, Figure 3, which uses data from the OECD, shows the opposite. Even if one disregards the upward sloping relationship across countries with positive fees, there still exists wide variation in attendance among countries with zero fees.

OECD statistics also offer measures of high school students' expectations at age 15 of future college attendance and whether they came from a family that was economically disadvantaged, defined as those at top and bottom 25% of the OECD index of ""economic, social, and cultural status".In Figure 4, we plot the percentage-point difference in university expectations across these groups by each country's tuition separately for EU and non-EU countries. First we note the gap levels. In all countries economically advantaged students have far higher expectations of college attendance. For example, the top 25% of Italian students are over 40 percentage points more likely to say they expected to attend college than those in the bottom 25%. The slope of the lines imply that this gap is slightly widening as cross-country tuition increases. But the relationship is weak at best – college expectation

[1]This is a key distinguishing feature of the American system, where students are normally eligible for lower priced housing in dormitories.

Figure 3: Tuition and University Degrees across OECD countries



Notes: Tuition is from OECD (2022), Table C5.1. Share with tertiary education is from most recent reporting year for individuals age 25-34 from OECD (2024), Population with tertiary education (indicator). doi: 10.1787/0b8f90e9-en.

gaps between the wealthy and disadvantaged are barely wider (in percentage point terms) in countries with high and low, or even zero, tuition.

These cross-country statistics provide little *prima facie* evidence that tuition fees are the primary limiting factor in university enrollment, at least in the European context. Countries with zero tuition fees do not systematically have higher shares of college graduates. Likewise, countries with lower tuition do not have smaller gaps in college expectations between high and low income students. While university is undeniably an important tool for social mobility, it is far from clear that lowering or eliminating tuition would resolve the issue.

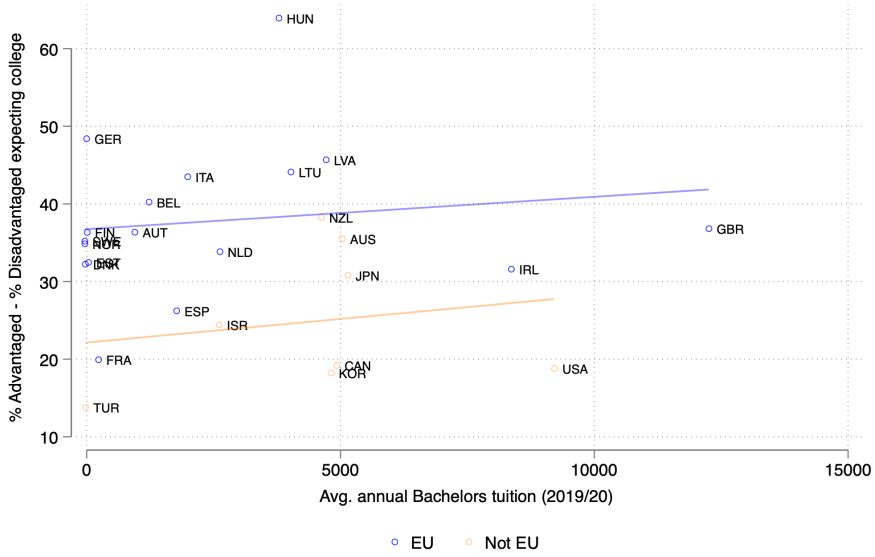
To narrow in on more direct measures of social mobility we compare two countries characterized by different tuition refimes – the U.S. and Italy. Students attending Italian public universities (representing 85% of university students) pay on average slightly less then $2,000 (in purchasing power parity), while students attending public (private) U.S. universities pay $9,200 ($31,800).[2] Tuition fees in Italy have a rather progressive profile such that the least advantaged 35% of all students pay no tuition, and another 15% pay a reduced fee.[3] In the U.S., students from low income families are eligible for Pell grants to cover costs, while all students are eligible for federally subsidized loans, which have a lower interest rate for sudents from low-income families.

In Figure 5 we likelihood of university attendance by family income. Data for Italy come from the Survey of Household and Living Conditions of the Bank of Italy, while we reproduced the graph from Chetty et al. (2020) using tax returns data for the U.S. While the intercepts of these graphs indicate the expected probability to attend university for the lowest income students, the slope of the interpolated line tracks the correlation between income and university attendance, with steeper lines indicating an increasing differential

[2]Source: OECD at a Glance 2022, Table C5.1, data relative to 2019/2020.

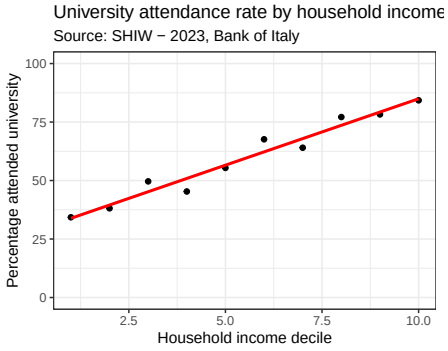
[3]Our elaboration using data from the Italian Ministry of Education - "Contribuzione e Interventi atenei", MUR (2022) for the 21/22 academic year

Figure 4: University Aspiration Gap and Tuition Fees

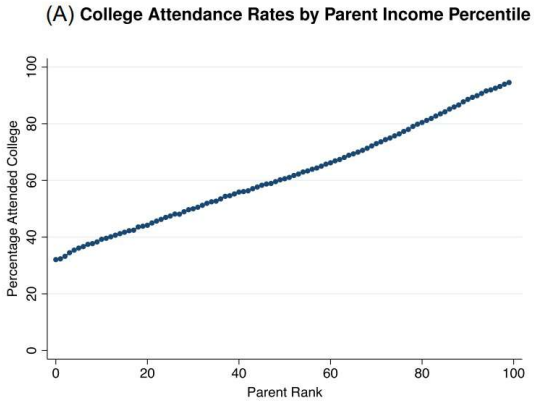


between high- and low-income families. A comparison of these two graphs shows a striking similarity in the relationship between household income and university attendance, despite large differences in tuition and fees.

Figure 5: University Attendance Rate by Parental Income



(a) Italy



(b) United States

Italian statistics from Survey of Household and Living Conditions of the Bank of Italy. U.S. statistics reproduced from Chetty et al. (2020).

2.3 Evidence from Countries that Changed Tuition Fee Subsidies

Several European countries have implemented substantial policy changes to higher education financing systems that have been exploited empirically to estimate the impact of changes in tuition fees on university enrolment and access to university.

The introduction of tuition fees in previously free college systems, such as the one of

Germany, offers a unique empirical setting. Several studies have estimated the impact of this fee introduction on different educational outcomes. Hübner (2012) and Bahrs and Siedler (2019) focus on university enrollment and suggest that the introduction of fees can deter low-income students from attending university. Bientenbeck et al. (2023) present a more complex picture, indicating that while fees may reduce initial enrolments (an extensive margin effect), they might also incentivize effort and completion rates among enrolled students (intensive margin effects). In Germany, these two effects appear to offset, resulting in a limited overall impact on educational attainment. Even focusing only on enrolment, no consensus emerges of a positive or negative impact of the introduction of tuition fees.[4]

In the late nineties, the UK transitioned from a free college system to one with some of the highest tuition fees globally. Murphy et al. (2019) offers the most comprehensive analysis of the effects of the reform, showing that the introduction of tuition fees increased average per student expenditures and enrolment rates without significantly impacting the educational attainment gap between high- and low-income students. The authors also note that the change not only introduced high tuition fees, but simultaneously introduced a system of income-contingent loans (ICLs), which allowed students to borrow to cover the increased cost and to repay only if their post-schooling income was above a certain threshold.

Finally, Gendre and Kabatek (2021) examine the impact of a student finance reform in the Netherlands that replaced universal public grants with income-contingent, low-interest public loans. They find that the reform significantly influenced secondary school students' educational choices. First, the reform has lead to a decrease in enrolment in college-preparing high-school tracks, signalling a drop in aspirations to attend college in response to the increase cost. Second, the reform has triggered an increase in students specializing in STEM subjects during high school, reflecting a potential shift of preferences for later university degrees that guarantee higher economic returns. Overall, these effects might in the medium term decrease university enrollment and potentially increase the enrolment divide between advantaged and disadvantaged students. Moreover, the reform led to changes in living arrangements for new college students, with more opting to live with their parents.

To summarize, studies of policy changes that increased tuition costs in Europe do not find meaningful evidence that higher tuition fees systematically reduced access to university.

2.4 Living Costs as Barriers to University Access

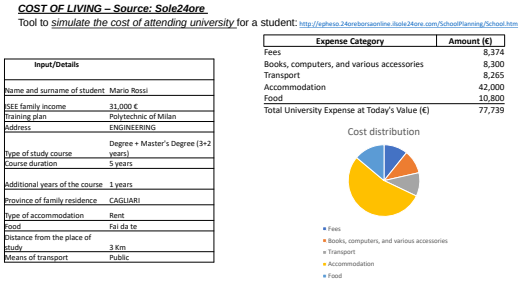
Tuition is only one component of the fixed costs students face when enrolling in university. liquidity constraint faced by disadvantaged students might be only partially determined by tuition fees. Many students attend university away from home, in particular those from rural locations. This means either paying rent and purchasing meals, often in costly cities, or forgoing educational opportunities to attend university near home. In countries such as Italy with a very limited supply of student housing, (there are fewer than 50,000 public and private student dorm spots available per more than 1.6 million students, so that only 3% of all students have access to public or private student dorms[5]) and sharp increases in private housing costs across cities where leading

[4]Bruckmeier and Wigger (2014) replicates the work by Hübner (2012) with an updated specification and did not observe a significant effect on overall enrolment rates post-fee introduction.

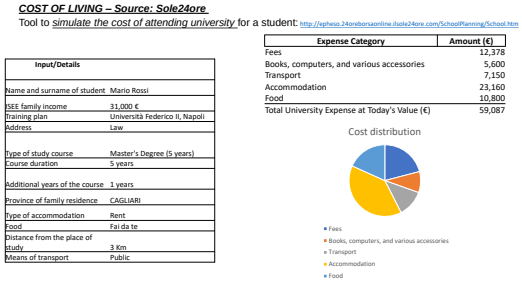
[5]Source is ANVUR (2023), Rapporto sul sistema della formazione superiore e della ricerca 2023, http://dx.doi.org/10.20367/9788832041040

universities are located, rent has quickly become the largest fixed cost students face.[6] Unsustainable living costs have indeed become the focus of major protests of Italian University students. (https://www.theguardian.com/world/2023/may/12/italy-students-protest-over-cost-housing-high-rents) A university cost scorecard created by Italy's leading economic newspaper (Il sole 24 ore) provides a tool for comparing costs university students face according to the city in which their university is located, their degree program and institution[7] To illustrate, in Figure 6 we consider six combinations of location, degree, and family income. Regardless of any of these factors, housing represents more than 50% of all costs in the most expensive cities.

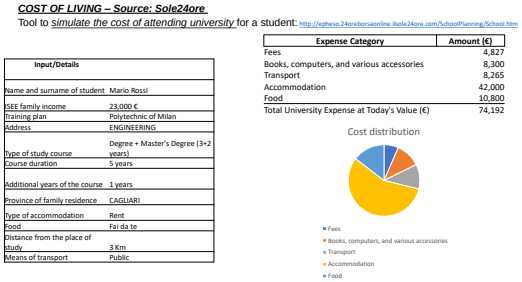
Figure 6: Illustration of Fixed Costs



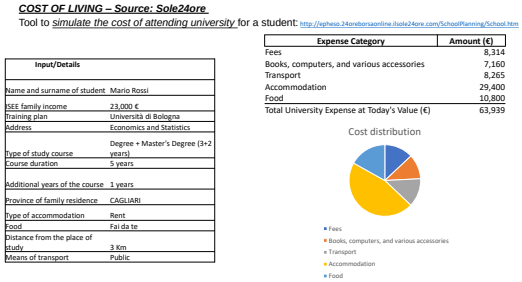
(a) Engineering in Milan - High Income



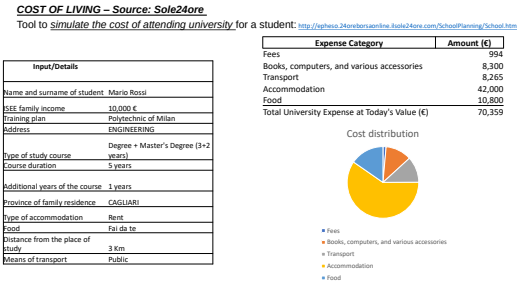
(b) Law in Naples - High Income



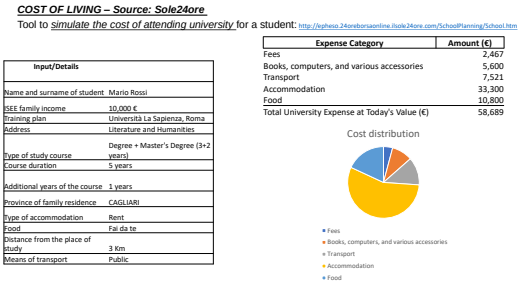
(c) Engineering in Milan - Middle Income



(d) Economics in Bologna - Middle Income



(e) Engineering in Milan - Low Income



(f) Humanities in Rome - Low Income

Source: Il Sole 24: http://epheso.24oreborsaonline.ilsole24ore.com/SchoolPlanning/School.htm

[6]The explosion of the short-term rental market is a leading cause of the shrinking supply and rent hikes of students' accomodations.

[7]Source: http://epheso.24oreborsaonline.ilsole24ore.com/SchoolPlanning/School.htm

Prohibitive living costs are not uniquely an Italian phenomenon. From the 2023 Student Cost of Living Insights Study (SCoLIS) in England, one finds that 49% of students reported experiencing financial challenges, and that out of those who had taken out student loans (68% of all students), 58% indicated these loans were insufficient for their living expenses, and 25% stated the loans barely met their minimum needs. Faced with increasing living expenses, 30% of students acquired new debts, a rise from 25% in early November 2022, primarily because 71% found their student loans inadequate for their living costs. Concerns about the impact of escalating living costs on academic performance were noted by 78% of students, with 35% less inclined to pursue further education after their current studies.

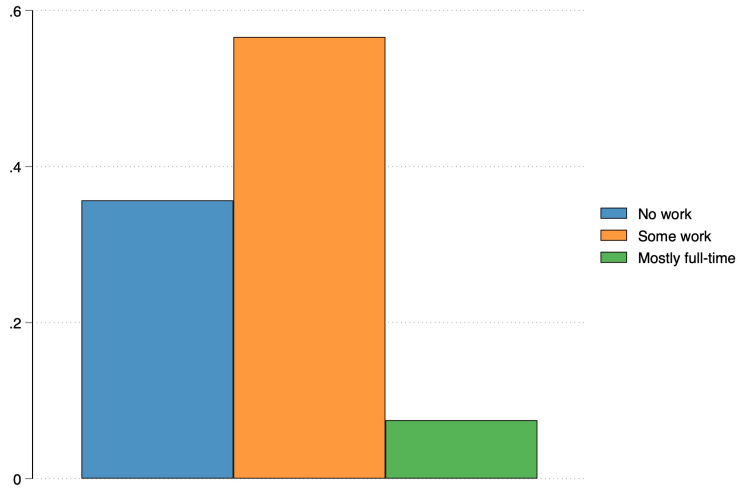
Increasing the supply of subsidized housing for students is unlikely, considering the urban nature of most European universities. Yet, that housing accounts for nearly half of the fixed cost of university for many students, and that living expenses are rising more rapidly than tuition, suggests that increasing access through financial mechanisms will have to focus on this reality. While increasing living costs affect everyone, not simply students, meeting those costs is more difficult for students. In the next section we provide some evidence that in order to meet schooling costs, students are increasingly turning to work.

2.5 Working While in School: The Italian Context

How, precisely, students pay for university is not always clear. This is in part due to the fact that many do not pay tuition. To glean insights, we turn to Italy's Alma Laurea data. The Alma Laurea is a very well populated survey of Italian university graduates that provides insight into their demographics, experiences, and expected work outcomes. Below, we focus on students' work experiences, and they relate to where they live, their family background, and educational experience. The data below come from 263,412 2022 graduates of first- and second-cycle degree programs, accounting for 93% of all undergraduate students.

Students in the survey report whether they worked during their degree program, and if so, whether they worker mostly full-time. This is to capture whether they are casual workers, or if work accounted for a meaningful share of their time as students. Figure 7 shows that roughly 64% of graduates reported having worked at all while studying, with the vast majority of those working less than full-time.

Figure 7: Share of Italian Graduates who Worked in School

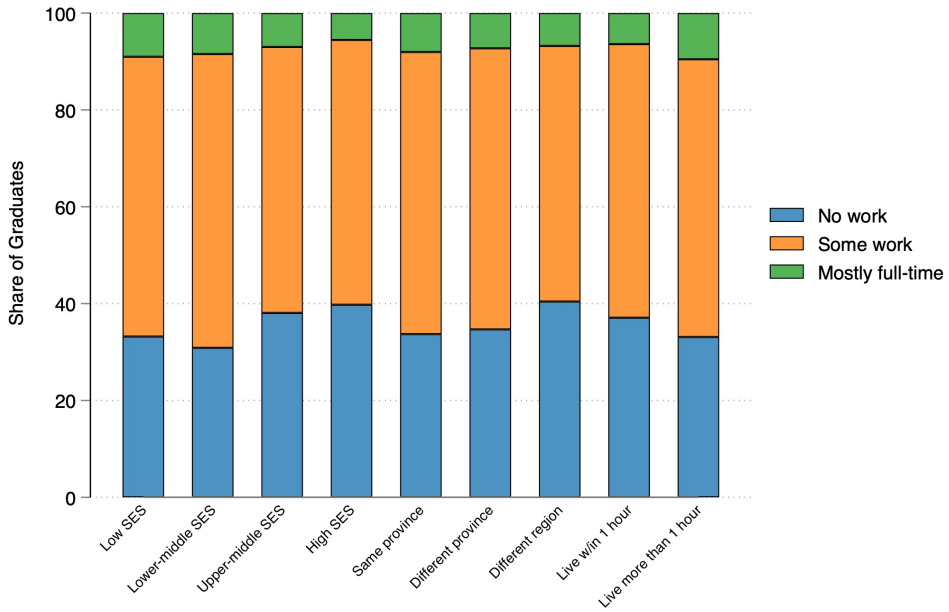


Source: Alma Laurea, graduates 2022.

In Figure 8, we parse which graduates were most likely to report working during school. Variation is relatively small across student characteristics. For example, students from higher SES households are only modestly more likely to report having worked. Similarly, while graduates attending school in a different province from their home are no more likely to report working, while those who enroll in a different region from their home, and are almost certainly not living at home, are more likely to report working. Finally, students living within or farther than one hour from university reported relatively similar rates of working. It is worth mentioning here that this is a survey of *graduates*, meaning we are only observing work status among students who both attended *and* graduated from university. This tells us less about the role work, or credit constraints, play in enrolling or graduating.

To make some headway in that direction, we observe differences in class attendance and scholarship receipt among working and non-working graduates. Workers were far more likely to report having attended at least 75% of their scheduled classes. Only 40% (of the 7% of students who worked full time) attended 75% or more of their classes. Even those who did casual work missed classes. Of the relatively small share of students receiving scholarship aid, working did not vary widely.

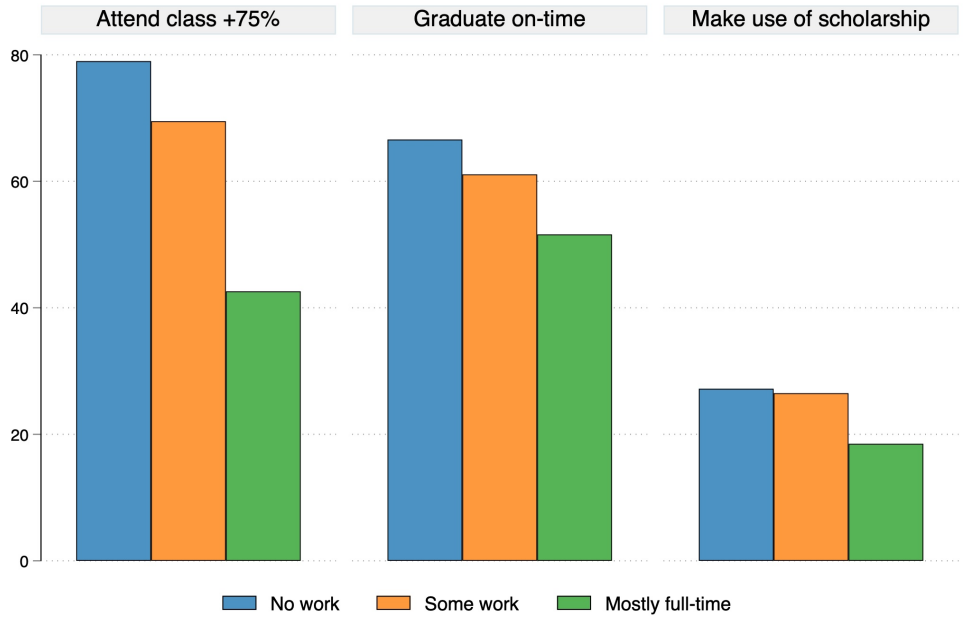
Figure 8: Who (in Italy) is Most Likely to Work in School?



Source: Alma Laurea, graduates 2022.

Despite these similarities, we find that students who worked were less likely to graduate on-time, to report having attended classes at least 75% of the time, and were marginally less likely to report having made use of a scholarship during their studies. Non-workers also reported slightly higher graduation marks (105 of a possibly 110) than did workers (who averaged approximately 103).

Figure 9: Scholarships, Work, and Attendance (in Italy)



Source: Alma Laurea, graduates 2022.

Approximately two-thirds of university graduates in Italy work, though only 7% work full-time. This suggests that many students are likely facing some liquidity constraint. Only 26% of graduates reported having made use of a scholarship (there is no question about loans or other financing).

In the next sections, we argue that savings might be a more effective tool than loans to relax this housing liquidity constraint, we present a simple saving design aimed at relaxing the liquidity constraint during university attendance and simulate its implementation in the Italian empirical context.

3 Financial Instruments to Boost College: Savings and Loans

Outside of providing grant aid, there are two broad ways to lower the financial burden of attending university for students. The first, and most common, is offering loans. While student loans are typically tax funded and issued by governments, private markets for these products also exist. Students loans are unique products as they typically have no collateral, though this is sometimes not the case for privately issued loans. Regardless, while there is some evidence that they are effective in increasing both college enrollment and completion, which we discuss below, this evidence primarily comes from countries with very high tuition costs (the U.S. and Chile) and is mixed. Further, in countries with the most active student loan markets, in particular the US and UK, repayment rates are low and defaults are high, with potentially long-lasting effects on future access to credit and high collection costs.

A second option that is far less utilized is to lower the cost of saving for college. Many of the same countries that offer student loans (the US, UK, and Canada) offer versions of what are often generically called child savings accounts (or CSA's). These function much like retirement accounts insofar as they provide tax-deferred investment vehicles families

can use to save for their children's schooling. These have several appealing properties. First they can have a motivation effect, as the funding is already set aside. Second, they avoid risk-aversion that accompanies borrowing for university. Third, they are less risky than loans. Finally, they introduce students to financial literacy and banking early on. Despite potential benefits, there is limited evidence of their effectiveness. This is in large part due to hurdles to getting families enrolled and investing. Families who use these accounts are more often wealthy, which when coupled with tax incentives could lead to regressive policies. Evidence from behavioral finance offers some insights that could increase uptake.

Our recommendation to financial institutions is that entering the private student loan market is risky, both financially and reputationally. While both options have risks and potential benefits, we believe that a well-designed, incentivized savings product is the most attractive option. We discuss both in turn.

3.1 Student Loans

Student loans are meant to solve a short-term liquidity problem for the many students who would benefit, financially and otherwise, from attending college but cannot afford to do so. Today, outstanding student loan debt in the United States is approaching $2T; in the UK it is nearly £206B. At its peak in 2020, U.S. student loan debt was equal to 8.3% of US GDP.[8] Both countries have what are among the highest tuition costs in the world, both also are economies that highly reward university degrees.

Approximately one-half of degree holders in the US borrowed for university; roughly 60% of college students borrow, though many do not complete degrees. The majority of loans (over 90%) issued in the US are federally subsidized loans. The fewer than 10% of loans that are private – meaning they are not federally issued debt and are subject to different borrowing and repayment rules and interest rates – account for less than 7% of student loan debt. Of note, loan default rates are very high. 11% of public loan borrowers default within the first year; 25% default within the first five years. Approximately 4 million Americans enter default each year, with meaningful consequences to their credit.[9]

A long line of research asks whether student loans fill the gap they are intended to (see Lochner & Monge-Naranjo, 2016, for an excellent summary). While there is evidence that access to loans can increase enrollment, this evidence largely comes from countries with high tuition costs. Possibly the best example of loan effects on college attendance comes from Chile. Solis (2017) exploits discontinuities in access to high education loans to estimate the effect of their availability on college attendance and completion. He finds large effects – students just above the eligibility threshold were 50 percent more likely to ever enroll in college. He concludes that loan eligibility "virtually eliminated" the income gap in college attendance. Yet, it is important to note that college in Chile is among the most expensive in the world. The author notes that for a family with income near the national median, one single year of tuition would cost between 46% and 76% of that median family's budget depending on whether the school is a low (46%) or high (76%) cost institution. Yet, in a follow-up study, Bucarey et al. (2020) show that labor market outcomes are unaffected across the same threshold.

In the US, Black et al. (2023) estimate enrollment, graduation and earnings effects from a 2007 and 2008 reform that increased the maximum amount students could borrow. In this sense, their study is not about loan access *per se*, but rather about the effect of increased

[8]Hanson, Melanie. "Student Loan Debt Statistics" EducationData.org, August 20, 2023, `https://educationdata.org/student-loan-debt-statistics`.

[9]Hanson, Melanie. "Student Loan Default Rate" EducationData.org, August 27, 2023, `https://educationdata.org/student-loan-default-rate`

Figure 10: Outstanding Public and Private Student Loan Debt in the US

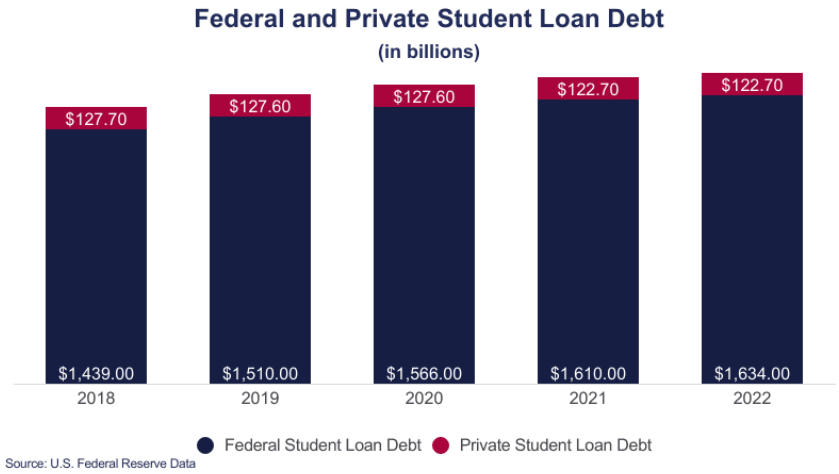


Figure from the Education Data Initiative, "Total Student Loan Debt."

loan maximums. They conclude that many students were in fact credit constrained, and that increasing the borrowing limit not only increased graduation but also reduced time working while in college, and had a positive effect on earnings beyond college. Results from an experiment by Barr et al. (2021) draw similar conclusions. Those authors randomized messages to students at a U.S. community college to provide them with information on the costs and benefits of borrowing and had a "modest emphasis" on avoiding high borrowing levels. Students receiving the texts borrowed $200 less on average (7%), and had slightly worse academic outcomes, though the authors did not find differential graduation effects. In contrast to these studies, others find no effect of student loans on later earnings. For example, Denning & Jones (2021) exploit a discontinuity in borrowing limits determined by the number of credit hours students are enrolled for. They find no effect on students' later earnings.

It is noteworthy that these examples concern public loans, which are most common in countries that are heavily dependent on loans, namely the U.S. and UK. This is because student loans have a unique feature – they are unsecured. Loan repayment relies on the borrower's future earnings. Should she not be able to make payments, the lender has little recourse, as no collateral exists. In the US, federal student loans are secured by the government, which has the power not only to garnish wages, but further to deduct from social security payments. In the US public student loans are serviced by private, not-for-profit loan servicers. Their servicing record has been poor, with complains and lawsuits ranging from incorrect or inaccessible information to failing to discharge loans or conveying incorrect balances and payments due.[10]

A recent paper from the Netherlands (Been & Knoef, 2023) tests effects in the European context, with contradictory results. The authors exploit a 2009 policy that changed the default amount students would take in student loans. Tuition fees in the Netherlands are typically around 2,000 euros. Dutch students are entitled to financial aid in the form of an allowance, and in addition to that, they can take a government loan to cover additional costs should they choose. Only about 25% of students borrowed while receiving the allowance.

[10]The Consumer Financial Protection Bureau collects complaints. The most recent (2023) report can be seen here: `https://files.consumerfinance.gov/f/documents/cfpb_annual-education-loan-ombudsman-report_2023.pdf`

After four years of studying, the allowance ends. In the pre-reform era, after the fourth year, students were automatically assigned to the maximum loan amount. In 2009 the default amount was lowered to be equal to the allowance. On average, students borrowed 129 euros less per month, a 24% reduction. But, this did not affect their academic performance, contradictory to evidence in the US. Notably, students could have requested the full amount, but did not, though this is in part due to the importance of the default option in the student loan context.[11] Regardless, the reduction in borrowing was compensated for by increased family support and decreased leisure spending on the part of students. Student earnings during school was unaffected. The authors conclude that these results are likely driven by the fact that student loans in the Netherlands are primarily used for living expenses, as opposed to tuition and fees.

3.1.1 The Market for Private Student Loans

Private student loans are a small share of all student borrowing in the US (and elsewhere), accounting for approximately 10% of all student loans; their share of the U.S. market is shrinking. Virtually all U.S. students are eligible for public student loans (called Stafford Loans). These feature either a subsidized or unsubsidized interest rate, today at around 5% and 7% respectively, though historically they have been lower (closer to 3% and 6%); subsidized loans also do not accrue interest while students are enrolled. Whether students are eligible for subsidized loans depends on their family's wealth. While these loans cover the cost of tuition and fees at most public universities there are limits and students may have costs that exceed them either by attending costly private universities, attending a public school out of their home state (at which they pay a higher "out of state" tuition), or due to other costs they face, for example housing. Today, dependent students (listed as dependents by their parents for tax purposes) are limited to $31,000 in total for their undergraduate education ($23,000 of which can be subsidized). Independent students are allowed $57,500 in total. Students can borrow more if they attend graduate or professional school. Average annual in-state tuition and fees at public four-year universities in the US is approximately $9,000. Room and board (food and housing) adds another $11,600 annualy.[12]. On average, students in fact pay much less. The U.S. has federal Pell grants, available to students from low-income households, in addition so multiple state-sponsored grant aid programs.

Still, many students and their families take private loans. These are distinct from federal student loans as the terms depend on a variety of factors, such as a borrower's (or borrower's parents') credit score and where they attend college. Often lending institutions, typically commercial banks or increasingly credit unions, require a cosigner, typically a parent. While statistics are hard to come by, recent estimates suggest that more than 90% of undergraduate borrowers had a co-signer.[13] Private loans typically feature higher interest rates, and despite the fact that they require a cosigner who can be responsible in the case of non-repayment, like federal loans, with very few exceptions, they are not dischargable in bankruptcy.

It is unclear how these portfolios affect lenders bottom line. Federal loans are generally preferable to private, not only due to lower interest rates, but likewise due to generally favorable repayment plans, though most students do not avail themselves of the most useful due to poor program design (Cox et al. 2021). Private markets have likewise arisen for loan

[11] See Cox et al. (2020) and Abraham et al. (2020) for examples.

[12] Hanson, Melanie. "Average Cost of College by State" EducationData.org, November 23, 2023, `https://educationdata.org/average-cost-of-college-by-state`

[13] Lochner & Monge-Naranjo (2019).

consolidation. While students can avail themselves of better interest rates, they also often lose access to protections and potential forgiveness available to those with federally held and serviced loans. Whether these services are positive or negative on net is unclear as little if any research exists.

3.1.2 Recouping Loans

Possibly most important issue is the terms of the loan repayment scheme. In the countries that heavily feature student loans (US, UK, Canada, Australia) whether the loans are "affordable" to students depends heavily on the repayment terms. So to does whether the loan scheme itself is solvent from a fiscal standpoint, whether for the taxpayer or a private lending institution.

Most countries now favor an income contingent repayment scheme. This means that whether and what a borrower repays of her initial loan depends on what she earns. For example, the U.S., UK and Australia each set minimum earnings levels below which no payment at any time is required. Once above these thresholds, borrowers are then required to pay what is often an increasing share of their earnings up to a cap. Typically under these schemes borrower repay for a fixed number of years or until the loan is fully repaid.

In the U.S., collections have been outsourced to not-for-profit student loan servicers. Due to poor programatic design, the US default repayment scheme is a fixed mortgage-style repayment over 10 years, despite efforts to enroll more borrowers in one of the income contingent schemes.[14] Most countries in fact have an income contingent repayment plan as the *only* repayment option. Further, these countries do not outsource collections, rather repayments are calculated directly by the government and taken directly from paychecks.[15] The problem is that often the terms set, for example in Australia and the UK, are sufficiently generous that the governments do not expect to recoup what is lent. The subsidy then falls to the taxpayer. As a piece of evidence, the Biden Administration forgave $132B in student loan debt.

3.2 Child Savings Accounts

Whereas student loans are designed to ease a liquidity constraint, child savings accounts are designed to help smooth consumption. They do this by using incentives, both behavioral and financial, that encourage long-term savings at the cost of present day consumption. One simple question is, why do so few families begin saving for college early on? First, they may not be able to afford it. While in the U.S. these families may be eligible for financial aid transfers should students attend college, such as Pell Grants, students in the European context see fewer need-based aid. This is in part due to the fact that the cost of college in Europe is largely due to housing, as opposed to tuition and fees as it is in the U.S. Second, families may be uncertain as to whether their children will want to attend college when they come of age. Fourth, the opportunity cost of investing can be high, in particular for families with low-income. Finally, financial literacy, in addition to barriers to entry into the financial community, create additional hurdles to overcome. There are several examples of child savings accounts (CSA's) to draw from. The U.S. and UK are two examples of very different models.

[14] See Herbst (2023) and Kreisman (2023).

[15] Australia and New Zealand have fully implemented income contingent repayment plans, and the UK, Canada, Germany, and South Africa feature them prominently, as do Vietnam and Thailand (Kreisman, 2023).

3.2.1 The US: 529 Plans

The United States has what are called 529 plans (there are other types of savings plans, such as Roth IRA's, but the 529 plans are most comparable to what we discuss here). In general, 529 plans are "tax advantaged savings plans." These are investment vehicles for which earnings are tax-free as long as the resulting funds are used for approved educational purposes. In the U.S. there exists a large variety of these plans; in fact, each state has at least one of its own. There are also Coverdell Educational Savings Accounts. These are similar to 529's, though they have annual investment limits around $2,000, are limited to households with adjusted gross incomes[16] less than about $220,000, have lower fees, and offer a virtually unlimited range of investment options, as opposed to 529 plans which are limited to the specific options. We will primarily discuss 529 plans here as they are more common and, in principle, quite similar.

There are in two broad categories of 529 plans in the U.S. The first, and most common, are "educational savings plans." Under these plans, families invest in actively managed portfolios (a mix of equity and fixed income, typically a mutual fund with low fees). They can also choose from different static or individually managed portfolios. In some cases, these are targeted toward a goal and date. The second type are called 529 "pre-paid plans." These plans, which are less common, allow families to pre-pay tuition and fees for public universities in their state, but not other costs, in advance. A few details are worth mentioning about U.S. plans in general. Focusing on educational savings plans, funds need to be used for educational expenses. This can include tuition, fees, books, computers, and room and board. There are limits to each, for example, room and board are fixed at the price of provided university housing. Funds can also be used to pay off student loans. While amounts vary across states, there are limits to the amount families can invest in each child's account, though these are relatively high, typically exceeding $250,000. Funds can typically be transferred across family members, for example from one child to another. If funds are not used for educational purposes, withdrawing them makes the earnings subject to state and federal income tax, in addition to any other applicable taxes, plus an additional 10% penalty. A new feature instituted by the Biden Administration beginning in 2024 now allows unused 529 plans to roll-over into Roth IRA's (which are tax-deferred retirement accounts).

Because researchers do not have access to 529 plans, there is in fact little research into how effective these have been. There are approximately 16 million 529 savings accounts in the United States, with average account balances of between $25,000-$26,000. Recent accounting suggests that about 18% of children have one of these accounts in the U.S.[17] Returns on 529 plans naturally vary widely and no comprehensive statistic that we know if exists.[18] To take one example, New York's suite of approximately 13 plans offered beginning in 2003 had a median average annual return of 7.72%. Current fees there are 0.12%. Returns from Fidelity's suite of 529 plans are similar. 529 plans are generally similar to mutual fund portfolios. Take for example of Georgia's 529 plan with a target date of 2040/41. This plan is dominated by equity index funds and bond market indicies, in addition to a small amount of inflation protection. As the target date approaches, the share of the portfolio that is in equity decreases and the share dedicated to fixed income and capital preservation increases. Families who use them have children who enter college more often and with more savings, but these are poor indicators. Families who use 529 plans are also

[16] Income less some standard deductions.

[17] `https://www.savingforcollege.com/article/number-of-children-with-529-plans`

[18] Hanson, Melanie. "College Savings Statistics" EducationData.org, August 7, 2023, `https://educationdata.org/college-savings-statistics`

wealthier and likely expecting college already. Still, a large share of Americans save for college through other investment vehicles, such as traditional savings accounts or non-tax deferred investments which lack the benefits of 529's.

There are very few evaluations of 529's in the US due to limited access to data. One example is an evaluation of Oklahoma's 529 plan (Nam et al., 2013). Oklahoma's 529 plan allowed for up to $20,000 in annual contributions which were deductible for state income taxes. Funds could be used at most US universities with typical non-eligible withdraws subject to taxes and penalties. Through a partnership with RTI, a research organization, SEED OK was developed with additional financial incentives for a randomly selected treatment group for purposes of evaluation. The treatment group for the experiment were given an automatic $1,000 invested in OK 529 at a child's birth (they called this the "state owned" account). They were also encouraged to open a "participant held" 529 account and were given a $100 incentive to do so. Any savings they invested in their participant owned 529 account would be partially matched and invested in the state owned account.

The researchers found that 16% of the treatment group opened a participant held 529, while only 1% of the control group did so. Thus while it appears that the incentives did increase individual contributions, the overall rate was still relatively low. That said, account openings for the unincentivized control group were close to zero, suggesting that the incentives did meaningfully increase 529 savings. While the $100 incentive and additional information did increase account openings and investments, the researchers found smaller if any effects on the matching funds. The study time frame did not allow researchers to follow up on college attendance or final accumulated savings.

3.2.2 The UK: the Child Trust Fund and Junior Individual Savings Accounts

Beginning in 2005 the UK established the Child Trust Fund (CTF) for all children born after September 1, 2002 whose families received a child benefit. Children received an initial seed amount of either £250 or £500 depending their family's wealth. Parents were responsible for establishing accounts for their children, though accounts were created for those whose parents did not open accounts. A second deposit of equal value was made on children's 7th birthday.[19]

Three types of accounts were available: traditional savings accounts; stakeholder accounts, which invested in a low-risk portfolio with decreasing risk exposure as children age; and a non-stakeholder account, which are similar without risk-exposure protections. Annual limits of £1,200 were imposed and investments were made in traditional banks who competed for customers. Unlike 529's in the US, these are not educational accounts – once children turn 18 they were free to use the funds however they wished, but not before.

Prabhakar (2010) undertook one of very few analyses of the program to ask why participation was low – a common occurrence in CSA's. The author found that between 2005 and 2008, 26% of parents failed to open an account for their child. Official statistics showed that opening rates were higher in wealthier constituencies. The wealthiest had opening rates well above 80% while poorer areas averaged between 55% and 60%. The author undertook focus groups to understand what could be improved. The main reason parents failed to open accounts was, "confusion over the information received from financial providers." They also noted being "overwhelmed by the information received from competing providers."[20]

[19] see Prabhakar (2010)

[20] Those who did open accounts raised issues concerning "hidden" charges. It is likely these were not hidden, but rather typical fees. Nonetheless, that these would incur may not have been conveyed to recipients.

Figure 11: Child savings (£) by CTF eligibility (from McKay et al., 2023)

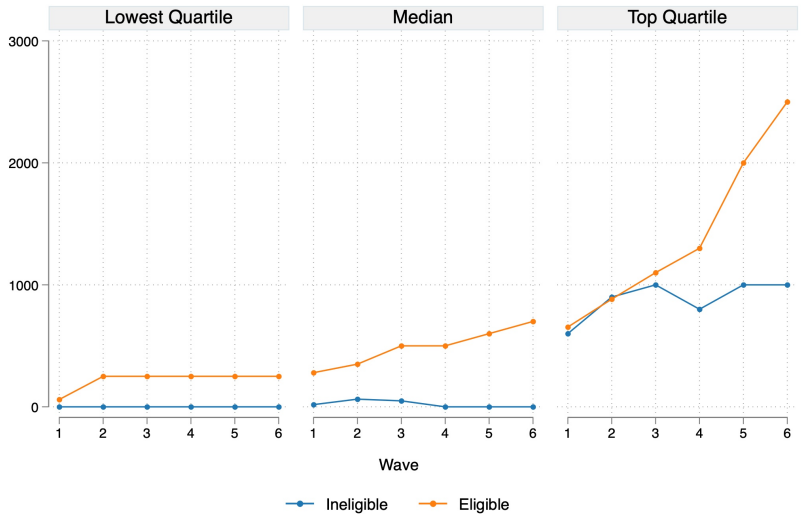


Figure reproduced from McKay et al. (2023), Table 2. Shows accumulated child savings.

Little exists in terms of evaluation of the program. McKay et al. (2023) provides some of the best evidence. The use nationally representative data from the UK's Wealth and Assets Survey, covering over 30,000 individuals over several waves. The compare across cohorts of children who were and were not eligible for the program. They found that 85% of eligible families had opened an account. They also find that wealthier families were more likely to open the accounts, and put more in them. But, the effect of eligibility on savings was relatively larger for low- and middle-income families. The authors' results are reproduced in Figure 11 below. Non-eligible families in the lowest wealth quartile reported zero average savings for children while eligible families averaged £250 – exactly equal to the initial seed amount. Ineligible median income families saved fewer than £50 on average, while eligible families accumulated more than £500. Both ineligible and eligible families saved among the wealthiest quartile, with eligible families saving about £600 more on average.

The UK Child Trust Fund was terminated in 2010 as part of an austerity package. Now, the UK offers Junior Individual Savings Accounts. These are tax-free accounts available for children. These can either be simple interest bearing savings accounts, or one that includes a portfolio of assets where capital growth and/or dividends are un-taxed. Parents are responsible for opening these accounts, which are serviced in the private market. Annual contributions are limited to £9,000 (in 2023/24). Children cannot withdraw funds until they are 18 years old, though use of the funds is unrestricted.

3.2.3 Italy: Experimental Evidence in Turin

One experimental study, fortuitously in Italy, provides valuable insight. The experiment was based on an EU funded program called Affording College with the Help of Asset Building (ACHAB), and was run between 2014 and 2017 in the Italian city of Turin. ACHAB was built on the existing framework of *Percorsi* a matched savings account program that existed in Turin since 2010 and was run by Compagnia di San Paolo. That program was established with the goal of assisting families in Turin who were affected by the financial crisis in the

late 2000's in paying for their children's college (Martini et al., 2021). Martini et al. (2021) provide an evaluation of the program.

The program was available for low-income students who were in the final two years of high school, with an income threshold of 25,000 euro, or approximately 1.5 the poverty level at the time for a family of four. To sign up, students needed only to express interest and fill out an online application form. Overall, 1,185 students applied, of whom researchers excluded 469 who were determined would either attend (or not attend) college regardless of participation in the program. Among the remaining 716 applicants, approximately 40%, were randomly assigned to the treatment group.

Program participants were offered to open a dedicated bank account and were expected to deposit between 5 and 50 euros per month for a maximum of six years; they were not allowed to skip more than two consecutive months, and were further required to attend three modules of financial literacy training. The maximum deposit was capped at 2,000 euro with a 4:1 match rate if used for school expenses, including tuition, transportation, and materials, and at a rate of 2:1 for similar expenses during high school. Hence the maximum match rate was 8,000 euros, which would have left students with 10,000 euro in total to pay for schooling (Martini et al., 2021). This design was created with several incentives in mind. First, required installment deposits incentivized regular savings habits. Second, a waiting period before withdraws enforced meant to discourage "opportunistic behaviors." And third, financial literacy training reenforced the value of long-term savings in addition to financial competencies.

The treated group saw large and economically meaningful effects. First, nearly all students in the treatment group complied with the conditions. 100% opened an account, 94% made at least one deposit, with an average total deposit of 1,080 euros (33 euros monthly).[21] Of note, only 33% of these savings were spent on tuition, further emphasizing the importance of non-tuition costs, bearing in mind also students could not use the funds for housing. The treatment group was 8.7 percentage points more likely to attend college, equivalent to a 13% increase. They were 9 and 11 percentage point more likely to persist to the second and third year of college as well (graduation statistics were not yet available).

The authors also conducted a cost-benefit analysis of the program. They conclude that in order to induce an additional student to attend college, the program would support 7.7 students who would have gone regardless. They claim that this is a relatively good statistic, performing better than most financial aid programs. This does not mean the program is cheap. They calculate that to induce one additional student into university, the program costs around 42,000 euros – due to the fact that targeting is difficult and many students would have attended regardless. They also conclude that while there is some evidence of regressivity, as in most CSA programs, it is not clearly the case here. While wealthier families utilized the program more, students from poorer families appeared to be more influenced into college by it.

3.2.4 Lessons Learned

These results confirm many expectations about child savings accounts:

- Despite understanding and expressing the importance of saving for children's futures, in particular university, few families save in advance, in particular among the poor.
- Child savings accounts can be effective in increasing savings, but absent automatic account opening and seed funding, very few families will have active savings for

[21] See Martini et al., 2021, Table 2.

their children. Even in the presence of universal and automated account openings, contributions remain relatively low, particularly among poor families, in the absence of strong contribution incentives.

- Wealthy families disproportionately use and benefit from these accounts, due to tax incentives, though they may be less affected in terms of enrollment by them.

4 An opportunity for financial institutions.

While a progressive system of Children Saving Accounts (CSA) would require at least a minimal government intervention, financial institutions would almost certainly play a central role. In this section we first propose a CSA that does not rely on government intervention, that has a progressive structure, and which can be accomplished without additional public funding under existing policies. We then consider how government policy could be leveraged to increase the progressive targeting of the program.

4.1 A Foundational CSA proposal

In recent years the Italian government reorganized all fiscal and welfare instruments targeting children into a single Universal Child Allowance (UCA), the "Assegno Unico". This benefit is universal in the sense that all families with children receive a monthly benefit independent of their income. It is also progressive as it is more generous for less wealthy families. In 2024, the least wealthy families receive a monthly benefit of €199.4 (2392.8 yearly) per child while the most advantaged receive €57.2 (686.4 yearly). Figure 12 shows the benefit schedule for 2024. Every family with children is automatically eligible and receives the allowance in their bank account. The only active step required to receive the benefit is submitting a request with a bank account number to an online portal managed by the Italian Social Security Administration (INPS). This request can be done individually or through a basic tax preparer office, called a "Patronati".

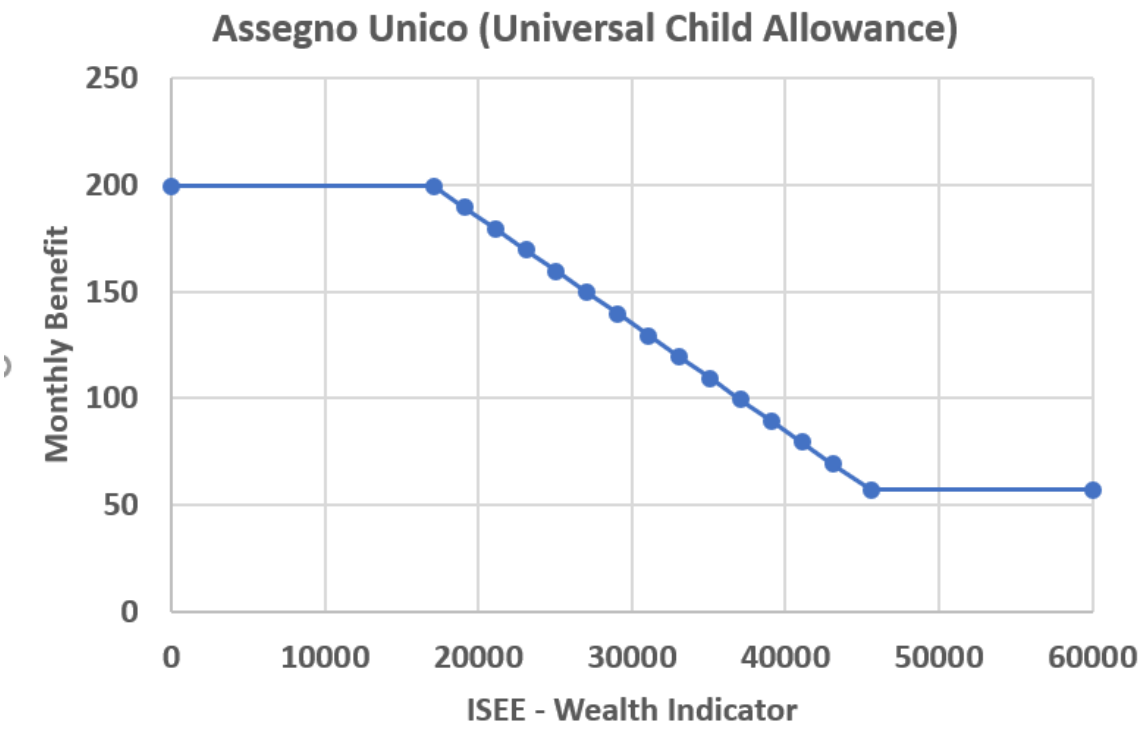
While the Assegno Unico is a critical tool for easing financial burdens for disadvantaged families in the earliest years of their children's life, it also represents an opportunity for forward looking investments as well. In this section we conduct an empirical exercise that will model savings and costs across different assumptions about the cost of university, family contributions, and matching and seed grants from institutions. Ultimately we want to show what share of the Assegno Unico families from different wealth levels would be required to divert from consumption to saving in order to finance the attendance of a 5-year university degree, including housing and other immediate costs. As our simulations show that for the least wealthy families it would be sufficient to invest between 25% and 50% of the Assegno Unico to fully fund a five-year university degree in a major city, primarily depending on expected market returns of the investment.

We begin by first modeling costs, including tuition, housing, food, and school materials. For tuition we use national average fees[22] for each wealth bracket determined using the Italian national Income and Wealth Indicator "ISEE", calculated by the Italian Social Security Institute (INPS), an equivalized measure of available income and wealth per member of household.[23] Data from the Ministry of Education suggest that roughly 35%

[22]Source for average national fees is a report by Federconsumatori (2021), 10^o Rapporto Nazionale Federconsumatori sui costi degli atenei italiani

[23]The ISEE indicator considers the income and 20% of the value of all assets owned by their family unit, including real estate and financial assets. The sum of income and 20% asset value is then divided by the number of family members, with a particular adjustment for the number of dependent children, family

Figure 12: Universal Child Allowance Schedule



of all students are exempt from paying tuition, with another 15% paying between 150€ and 820€ a year. The remaining 50%, with ISEE wealth indicator above 30,000€, pay on average around 2,600€ per year. In 2022, average tuition varied, from 591€ to 1,140€ in Northern regions. If this, we estimate that subsidies cover on average 84% of the cost of attending university across all students.[24]

To calculate housing costs collect prices from a leading housing and rental site, *Immobiliare.it*, which provides statistics the rental price of single rooms, common among university students, by city. The national average for a single room rental in 2023 was 437€ per month. Considering that families will not know which university and major their children will attend, nor they will know in what city, we think national averages are a reasonable baseline benchmark. We can relax this assumption to calculate costs in urban centers. We take a cost of 500€ per year for other materials.[25] Overall, these parameters generate an annual average cost of attending university that varies between 5,500€ for the most disadvantaged families and 8100€ for wealthier ones. The difference is due to tuition subsidies. Hence to fund a five-year university degree (the European standard of 3 years of Undergraduate University + 2 for a Masters degree) results in a total cost between 27,500€ and 40,500€.

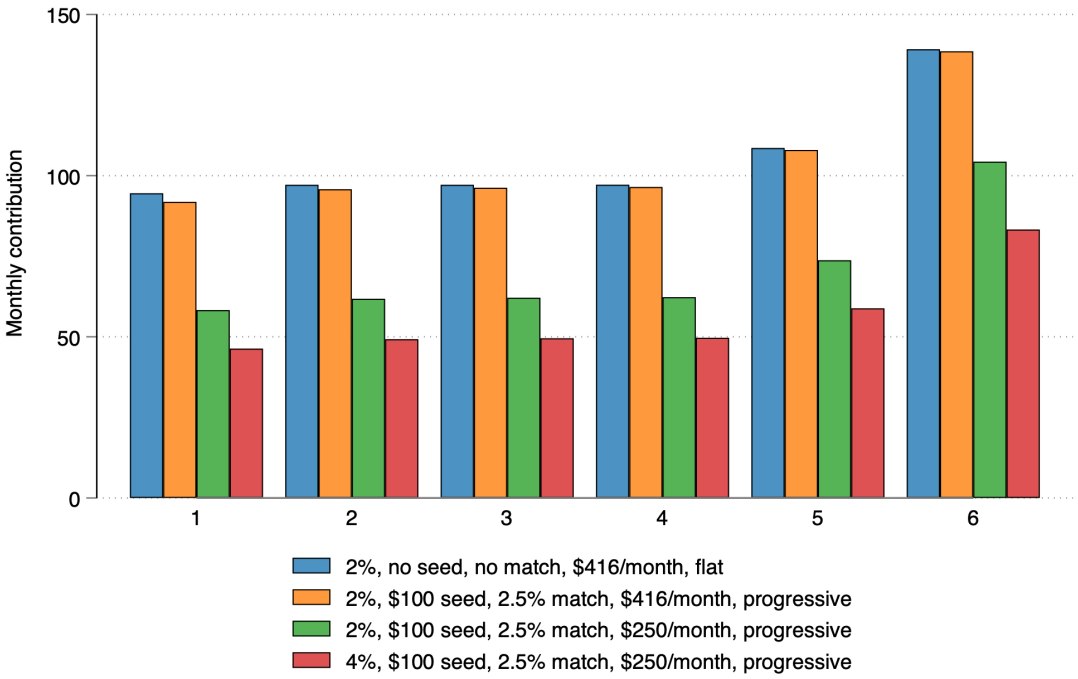
Importantly, because the Assegno Unico was designed to keep pace of inflation, we need only to assume that housing costs will increase roughly in line with other prices. This allows us to consider only the nominal returns on the invested funds as opposed to projecting

members with disabilities and adults enrolled in university.

[24]Source is ANVUR, National Agency for the Evaluation of Universities and Research Institutes, RAPPORTO SUL SISTEMA DELLA FORMAZIONE SUPERIORE E DELLA RICERCA 2023, pag. 87, Table 1.6.5

[25]Source is Udu & Federconsumatori (2023), rapporto "Universitari al verde". This estimate excludes Medicine, which has substantially higher book costs and a relative small number of students.

Figure 13: Estimated monthly contribution to finance university attendance



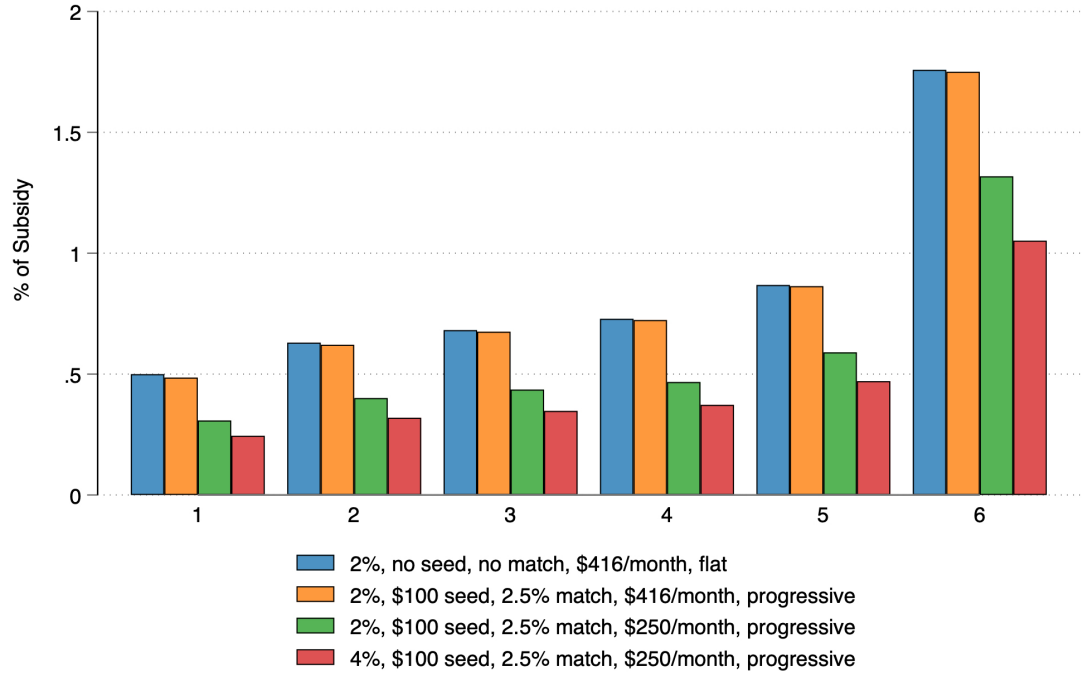
inflation adjusted real returns. We then calculate the stream of constant annuities that families in different income brackets would need to deposit each year between the birth of their children and the child's 18th year of life to finance university attendance. The invested capital would generate a constant real net growth per year that could reasonably vary between 2 and 6%, assuming that the invested funds in the allowance are locked until university attendance and withdrawable before only with a penalty. We assume students will begin drawing down funds for costs at age 19. The remaining capital will continue compounding interest until the last disbursement in the fifth year of university (when the child is 24 year old). Simulating the model for a three-year degree would simply lower required investments.

We also consider an initial seed grant of 100€ per child, along with a match incentive of 2.5% for each dollar the household invests. We simulate the match as either progressive, where lower income families receive a larger match, or flat, where all receive the same. We believe both are important for participation.

Figure 13 presents simulation results for the six different wealth brackets (from ISEE), and the estimated monthly contribution necessary to finance the entirety of university attendance under different potential parameters. Using our most conservative real rate of return, at 2%, our baseline model estimates a monthly contribution of 94€ for the most disadvantaged families, and 139€ for the most wealthy.

Figure 14 shows the share of Universal Child Allowance (UCA) cash transfer that families should be deposit in a CSA to finance university attendance. The most conservative model suggests that the most disadvantaged families would have to divert 50% of their UCA transfer to a CSA to finance university of their children. Excluding the wealthiest families, all others would be able to finance university by setting aside only a portion of the. Considering a less conservative, but still realistic, 4% net growth rate for the CSA,

Figure 14: Estimated monthly contribution to finance university attendance as share of wealth-bracket-specific UCA benefit



the most disadvantaged families would have to deposit only 40% of their UCA. With an optimistic 6%, the ratio would drop to 32%. We keep in mind here that 529 plans in the U.S. see average returns of approximately 6%.

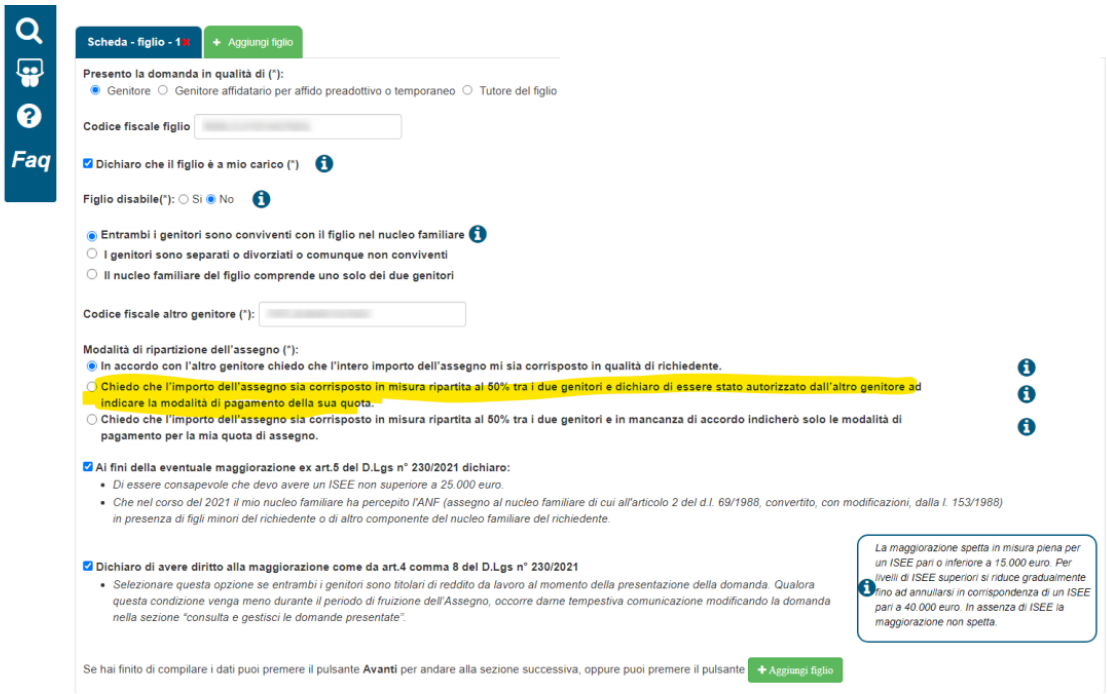
4.2 Potential direct deposit of UCA into a CSA

Without technical change to the currently available Social Security UCA portal, options for direct deposit are available, though limited. The Social Security UCA portal currently contains an option for indicating two separate accounts, designed to allow the an equal split between two parents. (see Figure 15). Thus, given the current system, it is feasible to either have the entire UCA directly deposited to a CSA, or some portion. To allow for flexibility in choosing the share, a simple modification of the current system would be sufficient where citizens can indicate that share, which would be presumably fixed until they re-enter the system to change it. Institutions issuing CSA's might propose an option for direct debit that automatically withdraws the monthly amount from the bank account where the Italian Social Security deposits the UCA. This would allow depositers to set their choice one time.

4.3 Progressiveness without Government Intervention: Seed Funds and Matching Grants

The key challenge, as evidenced by prior efforts, is enrolling low-income families. Wealthy families, for whom the allowance is relatively small, and for whom tax-free gains are potentially most valuable, are more likely to enroll unprompted. One we might worry that the most disadvantaged families are liquidity constrained and might not be able or

Figure 15: Universal Child Allowance Request System



willing to deposit 40%-50% of the UCA (€75-94 a month) toward university savings. Prior efforts suggest that a few features will be key in overcoming these hurdles. In particular, seed grants, ease of enrollment and automatic deductions, and the progressivitiy of the program. While the government is the clear candidate to introduce progressiveness in the design of CSAs, financial institutions with an active philanthropic role might consider some simple modifications to the basic CSA design to make these instruments more attractive for disadvantaged families.

To this end, the design proposed here could be enriched by two simple features aimed at increasing progressivity. The first is a simple "seed" that the financial institution deposits to the account in the same way many financial institutions promise a small cash seed to clients opening a bank account. This seed could be promised only to disadvantaged families or be substantially more generous for disadvantaged families. From the perspective of the financial institution, any new client or account has some intrinsic value. If hypothetically this value is €100 per client (the value of enrolling a new client to the institution), the institution might consider pooling the value across all families they expect to activate a CSA account and then redistribute the pooled intrinsic account value to disadvantaged families.

In 2023, slightly than 400,000 new children were born. Consider that if a large financial institution could reach 10% of families having children in a year, they could expect 40,000 new CSA accounts opened per year with a total value of the newly opened accounts at €4 million. Out of these 40,000 families, we expect roughly 35% (14,000) to be in the lowest wealth bin (as reported above, 35% of families with children going to university are tuition exempt). If the financial institution were to channel the €4 million pooled value of the new accounts toward these low-wealth families, the seed value could be as high as €285 for them.[26] Importantly, this seed would not only reduce the amount of deposits

[26]The bank issuing the CSA could ask families to submit the official wealth index - ISEE certification to apply the benefits.

that disadvantaged families would need to transfer monthly in order to finance university attendance, more importantly it would function as an incentive for those families to open the account in the first place. Our simulation considers a seed option and calculates the impact of any potential seed on the value of the constant monthly deposit and the share of the UCA that it represents. As expected, a €285 seed would not reduce this amount substantially for disadvantaged families. Assuming 2% annual real growth, the seed would reduce the monthly payment trivially from €94 to €93. The primary effect would be the behavioral "nudge" inducing enrollment in the first place. To substantially reduce the amount of monthly contribution of a disadvantaged family for instance from 50% to 40% of the UCA, the starting seed would need to be as high as €3,550. Considering the same hypothetical example of the pooled €4 million valuation for 40,000 families starting a CSA with a financial institution, the entire amount would in this case be transferred to the 1,126 most disadvantaged families out of the initial 40,000 in order to guarantee a starting seed of €3,550. A philanthropic mission of the bank could however expand the number of families benefiting from such large starting seed.

A second potential feature is a matching fund such that for every 1€ deposited in a CSA, the bank would match it with X cents (for disadvantaged families). This would both increase incentives to invest, much like employer matching in retirement funds, but would also lower the monthly investment from families. The resources for this could come from a progressive redistribution of the growth rate of the mutual fund underlying CSAs. For instance 1% of the returns of the overall mutual fund could be diverted toward an ancillary fund aimed at matching CSA contributions of disadvantaged families. The potentially problematic costs of such program is the decreased returns for advantaged families and the reduced competitiveness of CSAs for such families relative to other outside saving options.

While determining which of these would work best *ex ante*, we propose first piloting a randomized control trial varying information, seed amounts, and matching. This could conceivably be executed in a single province or region.

4.4 Potential Complementary Government Intervention

Governments can play a crucial role in developing a market for CSAs, especially for sustaining the goal of increased access to university for disadvantaged families. Public policies can introduce progressiveness in this market by augmenting the key components of the CSA. One key candidate would be a tax deduction equivalent to the amount of the initial seed deposited in a CSA in the year of subscription for low-wealth families and a partial, phasing-out deduction for wealthier families. Governments can also easily affect the matching component of our CSA design, for instance through a progressive tax credit linked to the funds deposited in a CSA. Considering that tax deduction and credits might not be effective for families with very low income and minimal or no taxes owed, it might be necessary to obtain progressiveness through cash transfers instead: for instance, the matching design could be obtained leveraging the existing UCA system, whereby the cash transfer is increased for disadvantaged families by X cents for every euro of the UCA transfer that they invest in a CSA. Finally, disadvantaged, or all families, might be exempted from taxation on the interest rates generated by their CSA.

Using our foundational CSA model, we have simulated the impact of several different interventions on the amount (in absolute terms and as share of the UCA) that disadvantaged families should deposit in a CSA to finance university attendance of their children. Under the conservative hypothesis of a 2% financial growth rate, a 25% matching rate (i.e. an increase of 25 cents in the UCA for every euro invested in a CSA), should be enough to decrease the monthly contribution of disadvantaged families from 50% to 40% of the UCA

(from €94 per month to €76). A generous scheme that would contemporaneously induce a €1000 seed deposit through the tax deduction, a higher growth rate of 4% obtained partly by the tax exemption of interest rates, and a 25% matching rate generated by the UCA matching funds, would further decrease the monthly contribution of disadvantaged families to €56 per month, or 30% of their UCA.

4.5 Financial Advantages of CSA Mutual Funds for Financial Institutions

From the perspective of a financial institution interested in entering the higher education financial market, CSAs are not only an effective tool to expand university access, as we argued in Section 3.2, but we believe they are a substantially safer option for the institution itself relative to other forms of financing, for instance loans. Contrary to loans, CSAs do not require outflows at the start of the program. Moreover, the bank will not have to deal with the typical high risk of no-repayment and will not bear the costs of debt collection and deteriorating assets.

The use of a mutual fund for CSAs can also be designed in a way to make it more appealing for families and students. For example, the fund could be (partially) indexed to housing prices in order to guarantee returns for students that reflect the increase in housing costs, which represent the major component of the liquidity constraint faced by European students. The bank could also hedge the fund against systemic risk, so to guarantee a minimum average return over the 18-year-long CSA investment, making CSAs interesting also for the most risk-averse families. The fund scheme could also be designed to redistribute risk inter-temporally, so to not penalize students who attend university and hence withdraw funds during financial markets' downturns.

4.6 Limitations and Potential Problems of CSAs

While we believe that CSAs can be effective tools to improve access to university, the design of CSA also poses challenges. In this final section, we highlight some potential limitations to consider.

Our first consideration is related to the alternative use of funds deposited in a CSA in the earlier years of childrens' lives. For disadvantaged liquidity-constrained families, CSAs might divert liquidity and consumption from early stages of life of their children to later stages. This might not be optimal if CSAs crowd-out investments in the health and human capital of children in their earliest years, negatively impacting their development and academic trajectory and potentially also the probability of university attendance.

Second, disadvantaged households tend to have shorter time-horizons when taking investment decisions, that is they discount high later returns more when the investment has an immediate (direct or opportunity) costs.[27]. Such "impatience" is one of the main determinants of the lower enrolment of disadvantaged children in tertiary education since the opportunity cost of attending university is indeed perceived as higher for low SES families. CSAs require foregoing consumption today for higher returns 25 years down the road. Such impatience is therefore likely to hinder the take up of CSAs especially for disadvantaged families. However, simple modifications of our CSA design that leverage so-called behavioral triggers could help limit this problem. For instance, the starting seed could cover the first few monthly payments instead of being deposited at the moment of CSA subscription, giving the perception of avoided immediate costs. Following a similar behavioral strategy, the proposed constant matching scheme could be modified so to

[27]In the economic academic literature this characteristic is formalized with the concept of a higher time-discount factor in inter-temporal households' preferences

concentrate the matching subsidies in the initial period and then decrease the matching rate progressively. Such scheme could be easily designed while keeping the average matching rate at the same rate of our baseline design.

Third, we are aware that it is hard to credibly evaluate the potential impact of CSA on university attendance in the short-run. Even if a randomized control trial incentivizing families to invest in CSAs was successful, researchers could only assess the impact on actual university attendance many years to follow. However, it would be possible to track the impact of CSAs on aspirations to attend university of the students and their families in a much shorter period of time. If the investment in the CSA represents psychologically the tangible option to attend university, one should observe a change in the aspirations to attend university since the early years of the child.

Fourth, a big challenge for the success of CSAs is linked to the potential alternative use of the accumulated capital in the case the child does not attend university. Indeed, if at 19 year old the child can cash the funds of the CSA independently of whether they attend university, the sudden liquidity might incentivize some children not to attend university and to use the funds in different ways (e.g. to start a business or buy a house), though we expect this is unlikely. To address this concern, some existing plans, as in the U.S., invoke a small penalty for use of funds for other purposes. Yet other countries, such as the UK, explicitly allow these types of investments as the funds are intended for the child when they mature.

Finally, it might be technically and legally complicated to automatically shift ownership of the CSA account from parents to children when these latter turn 18 year old.

References

Abraham, K. G., Filiz-Ozbay, E., Ozbay, E. Y., & Turner, L. J. (2020). "Framing effects, earnings expectations, and the design of student loan repayment schemes." Journal of Public Economics, 183, 104067.

Bahrs, M., & Siedler, T. (2019). University Tuition Fees and High School Students' Educational Intentions. Fiscal Studies, 40(2), 117–147. https://doi.org/10.1111/1475-5890.12185

Barr, A., Bird, K. A., & Castleman, B. L. (2021). The effect of reduced student loan borrowing on academic performance and default: Evidence from a loan counseling experiment. Journal of Public Economics, 202, 104493.

Been, J., & Knoef, M. (2023). Student loans, spending, and parental transfers: insights from a nudge in student loan policy in the Netherlands. Economics of Education Review, 96, 102457.

Bietenbeck, J., Leibing, A., Marcus, J., & Weinhardt, F. (2023). Tuition fees and educational attainment. European Economic Review, 154, 104431. https://doi.org/10.1016/j.euroecorev.2023.104431

Black, S. E., Denning, J. T., Dettling, L. J., Goodman, S., & Turner, L. J. (2023). Taking it to the limit: Effects of increased student loan availability on attainment, earnings, and financial well-being. American Economic Review, 113(12), 3357-3400.

Bruckmeier, K., & Wigger, B. U. (2014). The effects of tuition fees on transition from high school to university in Germany. Economics of Education Review, 41, 14–23. https://doi.org/10.1016/j.econedurev.2014.03.009

Bucarey A, Contreras D, & Muñoz P. (2020). "Labor market returns to student loans for university: evidence from Chile." Journal Labor Economics 38:959–1007.

Card, D., & Solis, A. (2022). Measuring the effect of student loans on college persistence. Education Finance and Policy, 17(2), 335-366.

Chapman, B., & Sinning, M. (2014). Student loan reforms for German higher education: Financing tuition fees. Education Economics, 22(6), 569–588. https://doi.org/10.1080/09645292.2012.729327

Chetty, R., Friedman, J. N., Saez, E., Turner, N., & Yagan, D. (2020). Income Segregation and Intergenerational Mobility Across Colleges in the United States. The Quarterly Journal of Economics, 135(3), 1567–1633. https://doi.org/10.1093/qje/qjaa005

Clancy, M. M., Orszag, P., & Sherraden, M. (2004). College Savings Plans: A Platform for Inclusive Saving Policy?

Cox, J. C., Kreisman, D. & Dynarski, S. (2020). "Designed to Fail: Effects of the Default Option and Information Complexity on Student Loan Repayment." Journal of Public Economics; 192(1).

de Gendre, A., & Kabátek, J. (2021). From Subsidies to Loans: The Effects of a National Student Finance Reform on the Choices of Secondary School Students.

Denning J & Jones T (2021). "Maxed out? The effect of larger student loan limits on borrowing and education outcomes." Journal of Human Resources 56:1113–40.

Dynarski, S. & Kreisman, D. (2013). "Loans for Educational Opportunity: Making Borrowing Work for Today's Students." The Hamilton Project at the Brookings Institution.

Herbst, D. (2023). The impact of income-driven repayment on student borrower outcomes. American Economic Journal: Applied Economics, 15(1), 1-25.

Hübner, M. (2012). Do tuition fees affect enrollment behavior? Evidence from a 'natural experiment' in Germany. Economics of Education Review, 31(6), 949–960. https://doi.org/10.1016/j.econedur

Kreisman, D. (2023). "A Case For (and Against) Automated Income Driven Repayments for Student Loans." Postsecondary Equity and Economics Research Project (PEER).

La Ferrara, Eliana. "Presidential Address: Aspirations, Social Norms, and Development." Journal of the European Economic Association 17.6 (December 2019): 1687-1722.

Lochner, L., & Monge-Naranjo, A. (2016). "Student loans and repayment: Theory, evidence, and policy." In Handbook of the Economics of Education (Vol. 5, pp. 397-478). Elsevier.

Martini, A., Azzolini, D., Romano, B., & Vergolini, L. (2021). Increasing college going by incentivizing savings: Evidence from a randomized controlled trial in Italy. Journal of Policy Analysis and Management, 40(3), 814-840.

Murphy, R., Scott-Clayton, J., & Wyness, G. (2019). The end of free college in England: Implications for enrolments, equity, and quality. Economics of Education Review, 71, 7–22. https://doi.org/10.1016/j.econedurev.2018.11.007

Yannelis, C., & Tracey, G. (2022). "Student loans and borrower outcomes." Annual Review of Financial Economics, 14, 167-186.