Youth and education:

Possible interventions and strategic planning

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Summary

The project is aimed at analyzing the barriers faced by adolescents and young adults in achieving their full human capital potential, as well as identifying possible strategies and interventions to enhance equality of opportunities in education, with a geographic focus on the Unicredit scope area (Austria, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Germany, Hungary, Italy, Romania, Russia, Serbia, Slovakia, Slovenia). The first chapter provides a picture of the educational systems in each country of the Unicredit geographical scope. It provides information on the organization of the schooling system, on the average performance of students and public spending in education, including allocated resources from NPRR (National Plan for Recovery and Resilience). The second chapter delves deeper into the educational challenges faced in the area, with a focus on inequalities by gender, socio-economic status, gaps between immigrants and native and rural and urban context. The third chapter summarizes the literature on education economics on effective interventions implemented across the world to address similar issues. Finally, the last chapters identifies cost-effective areas for a strategic planning on future interventions.

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Glossary

Regression analysis: A statistical method to evaluate the relation between two or more variables. Specifically, linear regression estimates the linear association between the mean value of a variable (often referred as dependent variable, y variable or outcome variable) and the mean value of another variable or variables (often referred as independent variable(s), x variable(s), predictor(s) or covariate(s).

Randomized Controlled Trial (RCT): A method used to estimate the causal effect of a program or an intervention (often referred to as the "treatment"). It consists of randomizing the allocation of a program only to a certain amount of people, defined as the *treatment group*, leaving out other potential eligible beneficiaries, defined as the *control group*. The causal effect of the treatment can be retrieved by comparing the outcome of interest for the treatment group and the control group, after the first one received the treatment. A fundamental assumption to retrieve the true causal effect is that treatment and control group must be similar in observable characteristics (the outcome of interest and other demographic characteristics such as gender, immigrant background etc.)

Regression Discontinuity (RD): A method used to retrieve the causal effect of a program or a policy. It consists of exploiting some random cutoff (e.g. the eligibility age, the street of residence etc.) that defines who is eligible to receive the treatment, and therefore divides people into treatment and control group. The rationale behind this method is that people just below and just above the cutoff are very similar in observable characteristics, and therefore people just above the cutoff are a good proxy of what would have happened to the control group had they received the treatment.

Difference in Differences (DiD): A method used to retrieve the causal effect of a program or a policy. It consists of comparing, instead of the levels, the difference or the *change over time* in the outcome of interest of the treatment group with the *change over time* in the outcome of interest of the control group. The underlying assumption is that, despite the treatment and control group are different *in levels*, the people in the treatment group would have followed the same trend of the control group had they not being treated.

Meta-analysis: A statistical technique that combines together results from different scientific studies that address similar questions in order to determine the overall effect.

Low socio-economic status: In this report and in the context of the PISA data, we define people from a low socio-economic status as belonging to the bottom 25% of the distribution of the index for Economic, Social and Cultual Status (ESCS), as calculated by the OECD.

High-achievers: In In this report and in the context of the PISA data, we define as "high-achievers" the students who belong to the top 25% of the distribution of performance in mathematics/read-ing/science.

Educational systems in the Unicredit geographical scope

	ria

41	.4%

Population aged 25-34 with a tertiary degree^a

17.5% Percentage of immigrant stock (% population) ^b

13.9%

Population below the poverty line ^c

8.5%

Youth not in employment, education or training (NEET) ^d

Average TIMSS/PIRLS scores (4th grade)^e *Center point: 500*

541

539

522

Reading

Math

Science

Average PISA scores (10th grade)[†] OECD average</sup>

484 487 **Reading** **499** ⁴⁸⁹ Math

490 489 Science

5.2%

public spending in education as a % of GDP^g

4.5

billions allocated in NPRR ^h

Sources: a, b, c, d, g: World Bank Indicators ; e: TIMSS 2019 report, PIRLS 2016 report; f: PISA 2018 results, h: European Commission

3



Upper secondary school

Pre-school

In Austria, compulsory education starts when students are 6 years old, and lasts for 9 years. It covers primary school, lower secondary school and part of upper secondary school. ¹. The majority of the educational system is public, with only 8% of private schools³. Public education is free of charge for everybody. In primary school students follow a common curriculum and by the end of it (when students are 10 years old) they are asked to choose a track between (i) general education (Mittelschule) or (ii) in the lower grades of an academic school (Allgemeinbildende Höhere Schule). This decision of early tracking has been at the center of the debate on educational reforms⁴⁵, since it might have a profound impacts on students' further educational development, and therefore the equity of the overall educational system⁶. After middle school, students have the option to enroll in (i) general education or (ii) vocational education and training (VET). Figure 1.1 summarizes the structure of the educational system. Immigrants represent roughly 17% of the population. The top three nationalities of newcomers in 2018 were (i) Romania, (ii) Germany and (iii) Hungary.⁷ The percentage of early leavers from education and training aged 18-24 (7.8%) is lower than the EU average (10.2%) and it has been slightly decreasing since 2009 (8.8%). However, there are important heterogeneities, with the majority of early school leavers concentrated among foreign-born students (19.2% versus 5.7% of natives). Tertiary educational attainment is higher than the EU average (41.4% versus 40.3%) and it is similar between natives and immigrants (respectively 43.5% and 40%).⁸ Participation in Vocational Education and Training (VET) is guite high compared to the EU average (68.8% versus 48%). The percentage of youths aged 15-29 neither in employment nor in education or training (NEET) is lower than the EU average (8.5 % versus roughly 13%).

Governance and funding

The responsibility for managing the educational system is shared between the Federal Ministry of

Education (which is responsible mainly for primary and secondary education and vocational education and training) and the Länders (which are responsible for the maintenance of the schools and staff in compulsory education). Decision making processes are shared at all levels of administration, from the central state to single schools.⁹ Government expenditures in education remained stable in 2019, and are in line with the EU average $(4.7\%)^{10}$.

Performance

According to the last PISA results available (2018), while 15-years old students scored similarly to the OECD average in reading and science (respectively 484 points in reading and 490 in science versus the OECD averages of 487 and 489), in maths the average score is significantly higher than the OECD average (499 versus 489).

The percentage of students who manage to achieve basic skills is close to the OECD average: 76% in reading, 79% in mathematics and 78% in science (compared to the OECD averages of 77%, 76% and 78%). While performance in reading and mathematics has been stable over the years, the performance in science started to decline.

Girls performed significantly better than boys by 28 points in reading, while in maths they were outperformed by boys, with a large and statistically significant gap of 13 points. In science, the performance gap is very small (only 2 points of difference) and statistically insignificant.

The gap in performance between socioeconomically disadvantaged and advantaged students is 93, larger than the OECD average of 89 points. 10% of disadvantaged students scored in the top quarter for reading (compared to the OECD average of 11%). Socio-economic status explained 15% of the variation in performance in mathematics and science, a number similar to the OECD average (14% for maths and 13 % for science).

In the PISA sample of 2018, 23% of students with an immigrant background in Austria. Roughly half of them comes from a socio-economically disadvantaged background. Native students scored

⁴https://www.ifo.de/DocDL/dicereport109-rr1.pdf

¹Since 2010, compulsory kindergarten attendance was introduced for children who are 5 years old (Source:https://eurydice.eacea.ec.europa.eu/national-education-systems/austria/overview). Since 2016 students are required to engage in education or training up to the age of 18 (Source: ²)

³https://www.migration.gv.at/en/living-and-working-in-austria/children-and-education/educational-systems/

⁵https://www.oecd.org/education/school/OECD%20Reviews%20of%20School%20Resources_Austria_Summary.pdf

⁶https://www.oecd.org/education/reform-of-austrias-school-governance-crucial-to-deliver-better-value-for-money.htm

⁷International Migration Outlook, 2020

⁸Education and Training Monitor, 2020

⁹Education Policy Outlook, Austria Country Profile

¹⁰Education and Training Monitor, 2021

Figure 1.1: Educational system in Austria



Source: The Structure of the European Education Systems 2021/22, Eurydice. European Commission

both students and teachers lacked the necessary

IT literacy skills to profitably follow and conduct

distance learning. In 2018, 18% of school prin-

cipals declared that insufficient digital equipment

or internet access was still a barrier to quality ed-

ucation, less than half of the teachers received specific training on how to use digital technology

for learning, and only a third of them used digi-

tal technology for school-related projects or class-

work. ¹³ Despite this lack of training, Austrian

pupils have been estimated to be at low risk of

learning loss compared to other countries in the

EU area¹⁴, since a low proportion of the popula-

ognizes as a significant challenge the need

to replace in the subsequent years an aging

teaching workforce. The average age of teach-

ers in the school system is higher than the EU av-

erage, with 47% of teachers aged 50 or older (ver-

sus 39% in EU on average).¹⁵ The overwhelming majority of the workforce is female, especially in primary schools (92%). Despite catching up, fe-

males are still less likely to become school leaders,

especially in non-academic tracks of secondary

Recently enacted policies and

During the difficult situation of the pandemic,

several activities spurred, with the aim of help-

The National Education Report of 2018 rec-

tion lacks technology resources.

on average 63 points more than immigrants, and even after having taken into account socioeconomic status, a smaller but significant persists (33 points). Only 11% of immigrant students scored in the top quarter of reading, compared to the OECD average of 17%.

Career aspirations strongly reflected gender stereotypes: among high-achieving students in mathematics and science, 10% of girls expected to work in an engineering or science job, compared to 20% of their male counterpart. 25% of girls wanted to work in the health-related sector (compared to only 11% of boys) and only 1% of girls expected to work in an ICT related job (compared to 7% of boys).

Expectations to go to university reflected socioeconomic differences: among high-achieving students, a high percentage of disadvantaged ones (50%) expected not to complete tertiary education, compared to roughly 20% of the advantaged students.

Key policy challenges

Distance learning during the COVID-19 pandemic brought to light a need to strengthen IT literacy skills. Austria had approximately 20.6 weeks of distance learning during the pandemic¹¹, a value in the mid-range of school closure days within the EU countries. In terms of digital literacy and teacher training, Austria was among the least prepared countries in the EU area to face distance learning and, according to some studies¹²,

schools.16

investments

¹¹UNESCO data, 2021

¹²https://irihs.ihs.ac.at/id/eprint/5873

¹³https://www.oecd-ilibrary.org/sites/1d0bc92a-en/index.html?itemId=/content/publication/1d0bc92a-en

¹⁴Blasko et al. 2021

¹⁵https://education.ec.europa.eu/sites/default/files/document-library-docs/et-monitor-report-2019-austria_en.pdf ¹⁶idem

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ing students in distress. For example, to reduce students' isolation and provide entertainment, from March to May 2021, the project *Gönn' Dir* created a web portal where students could interact with their peers. Austria also stepped up the provision of online support during the pandemic (Rat auf Draht) and home visits to reach the most isolated and disengaged students.¹⁷

In the context of the National Recovery and

Resilience plan, Austria plans to invest more than 15% of the 3.5 billion euros grant in education and skills.¹⁸ The strategic areas of focus are mainly (i) digitalization¹⁹, with the aim of easing access to digital education for student and schools and of promoting learning of digital skills and (ii) a remedial education package and (iii) development of elementary education.

¹⁷Education and Training Monitor 2021

¹⁸Education and Training Monitor 2021

¹⁹https://www.bmbwf.gv.at/en/Topics/school/krp/8_p_p.html

Bosnia and Herzegovina

23.5%	Population aged 25-34 with a tertiary degree ^a					
0.9%	Percentag stock (% p	Percentage of immigrant stock (% population) ^b				
19.3%	Populatio the pover	Population below the poverty line ^c				
11.6%	Youth not in employment, education or training (NEET) ^d					
Average TIMSS/PIRLS scores (4th grade) ^e Center point: 500						
NA 452 459						
Reading	Math	Science				
Average P	Average PISA scores (10th grade) ^f OECD average					
403	406	398				
487 Reading	489 Math	489 Science				
NA	public spe education GDP ^g	nding in as a % of				

Pre-school

Upper secondary school

General (23%)

Vocational (77%)

Primary & lower secondary school (Common track)

> Sources: a, b, c, d, g: World Bank Indicators ; e: TIMSS 2019 report, PIRLS 2016 report; f: PIS/ 2018 results, h: European Commission

Educational system

Education in Bosnia and Herzegovina (BiH) is compulsory for 9 years, and starts at age 6. Figure 1.2 summarizes the structure of the educational system. Pupils enrol in primary school and stay in the same school until they are 15. The Agency for Primary and Secondary Education tried to implement a common core curriculum (CCC). However, there were political objections against the harmonization of curricula, and the degree of compliance to CCC is not known at this stage²⁰. Compulsory education is free and open to everybody. School is taught in the three official languages: Bosnian, Croatian and Serbian. Secondary school available tracks are (i) a general academic track, which lasts 4 years and (ii) a vocational track, which lasts 3 or 4 years.

Governance and funding

There are 14²¹ different authorities in charge of education in BiH²²: (i) the Ministry of Education and Culture of the Republic of Srpska (ii) the ten cantonal ministries of education in the Federation of BiH and (iii) the Department for Education of the Brčko District of BiH Government. The Ministry of Civil Affairs of BiH (MoCA) and the Agency for Higher Education and Quality Assurance, Center for Information and Recognition of Qualifications in Higher Education and the Agency for Preschool, Primary and Secondary Education act as coordinating bodies of the ministries. The educational system is mostly public, with few private educational institutions. Financing is mostly public, depending on the jurisdiction²³.

Performance

Students in BiH had a lower performance than the OECD average in all the PISA subjects (maths, reading, science). Moreover, a smaller proportion of students reached a minimum level of proficiency in reading (46% versus 77 % of OECD), maths (42% versus 76% of OECD) and science (43% versus 78% of OECD) and a negligible percentage of students were top performers in these disciplines.

Girls outperformed boys in reading of around 30 points, but scored similar to boys in mathemat-

ics and science.

The score gap between economically disadvantaged students and advantaged students is 58 points, lower than the OECD average (89 points). Socio-economic status explained 8% of the variation in performance in mathematics and 7% of the variation in performance in science, a number lower to the OECD average (14% for maths and 13% for science). 13% of disadvantaged students managed to be in the top quarter for reading (compared to 11% of disadvantaged students).

Absenteeism is higher than OECD average: 47% of students missed a day of school and 45% arrived late in the preceding two weeks of the PISA test.²⁴

Job expectations differ among high-performing students in mathematics or science: only 1% of girls expects to work in ICT compared to the 11% of boys. Girls are more likely than boys to expect a job in a health-related profession (33% versus 13%). Socio-economic status seems to play an important role also when it comes to ambitions: among high-achieving students, a high percentage (14%) of disadvantaged ones expected not to complete tertiary education, compared to roughly 3% of the advantaged students²⁵.

Key policy challenges

The extremely decentralized jurisdiction, poses a severe challenge to achieve state level coordination and strategic alignment in educational policies. This results in inefficient spending and unclear strategic planning, hampering the overall quality of education: the high level of decentralization, combined with weak practical coordination results in uneven education policies, emphasis on the national group of subjects, and lack of valid external evaluation of students' achievements after primary and secondary school.

The quality of vocational training in Bosnia and Herzegovina is among the worse in the Balkan area²⁶: it is outdated, fragmented, and difficult to reform due to weak governance. In a recent survey, 50% of students said they are dissatisfied with what they learnt in secondary education, and more than one out of four states that the acguired skills are not in line with the ones requested

 $^{20}\mbox{Bosnia}$ and Herzegovina Review of Efficiency of Services in Pre-University Education. World Bank (2019). Funded by the EU

²¹Realizing education's promise in Bosnia and Herzegovina: The case for investing in children and youth, World Bank Blog ²²European Committee od the Regions, Bosnia and Herzegovina, Education

²³Key Features of the Education System - Bosnia and Herzegovina, Eurydice (European Commission)

²⁴ https://measurebih.com/uimages/Overview20of20Main20Challenges20in20Primary20and20Secondary20Education20in20BiH.pdf ²⁵ PISA 2018 Results. Bosnia and Herzegovina Country note

²⁶Technical Vocational Education and Training (TVET) in Bosnia and Herzegovina

²⁷Unemployment, youth total (% of total labor force ages 15-24) (modeled ILO estimate). Available at:





Source: Eurydice Website: https://eurydice.eacea.ec.europa.eu/

in the labour market. This contributes to a very high youth unemployment ate (32.9%²⁷)

The lack of monitoring mechanism to assess the overall quality of education is a significant barrier for effective policy making. Educational statistics are scattered and fragmented²⁸, and often lack useful detailed information at student or teacher level. Similarly, pedagogical institutes lack the capacity to support teachers' professional development.²⁹

Increasing support and training of teachers is pivotal to increase quality of the system. Teachers' salaries are in line with public sector salaries (roughly 25% higher than the private sector), but are commensurate to qualifications and years of experience, instead of performance. There are low perspectives for professional development, with very weak in-service training. Better management and support of teachers' workforce should be a priority in order to increase quality of education ³⁰

Recently enacted policies and investments

In the past few years BiH tried to reach a good level of school participation and made some encouraging advancements in order to ameliorate the educational system: it integrated the Common Core Curriculum Based on Learning Outcomes (CCC) and participated in international assessments of student learning, such as the Programme for International Student Assessment (PISA) in 2018 and the Trends in International Mathematics and Science Study (TIMSS) in 2019. However, political hostility against harmonization of curricula and decentralization of the responsibility for curricula and textbooks hindered both the implementation of the common curricula and the compliance monitoring.³¹ In general, further effort is required to enact an efficient and effective strategic planning in education. Stronger coordination among parties to streamline decision making and implementation of sound monitoring and evaluation (M&E) systems are required to advance quality and equity of the overall educational system.

https://data.worldbank.org/indicator/SL.UEM.1524.ZS

²⁸Monitoring and evaluation support activity. Bosnia and Herzegovina. USAID (2017)

²⁹Bosnia and Herzegovina. Review of Efficiency of Services in Pre-University Education. World Bank Group (2019). Funded by the European Union.

³⁰idem

³¹Bosnia and Herzegovina Review of Efficiency of Services in Pre-University Education. World Bank (2019). Funded by the EU

	•
RH	garia
	54114

33%	Population aged 25-34 with a tertiary degree ^a Percentage of immigrant stock (% population) ^b				
1.4%					
23.8%	Populatio the pover	n below ty line ^c			
14%	Youth not in employment, education or training (NEET) ^d				
Average TIMSS/PIRLS scores (4th grade) ^e <i>Center point: 500</i>					
552 515 521					
Reading Math Science					
Average PISA scores (10th grade) ^f OECD average					
420	436	424			
487 Reading	489 Math	489 Science			
4.1% public spending in education as a % of GDP ^g					
	GDP				

3

Upper secondary school General (47 %) Vocational (53 %)

Lower secondary school (Common track)

> Primary school (Common track)

> > **Pre-school**

Sources: a, b, c, d, g: World Bank Indicators ; e: TIMSS 2019 report, PIRLS 2016 report; f: PISA 2018 results, h: European Commission

Educational system

School starts at age 7, it is compulsory until the age of 16 and free for everybody.³² It is delivered majorly through the public system (only 2% of students attend private schools.³³) Student population is declining especially in rural areas, given the internal migration of people to cities. As a result of the declining population of Bulgaria throughout the years, over 1000 schools have been closed, mostly in remote areas. Nowadays, roughly 75% of the population under working age is concentrated in urban areas. Tracking into differentiated programs starts earlier than in other OECD countries, when students are 13 years-old and have to choose upper secondary school. Students can choose between (i) a general track and (ii) a vocational track. Even within tracks, schools vary significantly in terms of specific programs offered and quality. Upper secondary school tends to be selective, with societal emphasis on identifying early top-performing students to enroll in most prestigious 34.

Among the foreign-born population, the top three nationalities are Russia (17%), Turkey (9%) and Syria (8%), while Ukraine was one of the top three nationalities of newcomers in 2019 (together with Russia and Turkey)³⁵. Bulgaria has a percentage of early school leavers higher than the EU average (12.8% versus in 9.9% 2020) but this is declining in accordance to the EU average (dropout rates in 2019 were respectively 13.9% for Bulgaria and 10.2% for the EU average) and a low percentage of people with tertiary educational attainment (33% versus 40.5% which represents the EU average). The percentage of youths aged 15-29 neither in employment nor in education or training (NEET) is in line with the EU average³⁶.

Governance and funding

The Ministry of Education, Youth and Science (MEYS) in Bulgaria is responsible for the administration of education. It is organized along four levels: national, regional, municipal and school level. Primary and general secondary schools are mainly funded at municipal level, while vocational schools are mainly funded by the state, and the largest share of private spending is dedicated to higher education. Bulgaria benefits from EU funding schemes such as the Lifelong Learning Programme and the National EU-funded Operative programmes such as the Human Resources Development Operative Programme³⁷. Investment in education and training increased in the past recent year, but still remains low compared to other EU countries.

Performance

Despite the upward trend, the overall level of pupils achieving basic skills is much lower than the OECD average: only 53% in reading, 56% in mathematics and 53% in science (compared to the OECD averages of 77%, 76% and 78%). While performance in reading remained stable throughout PISA editions, it significantly improved in mathematics, although in the last two editions (2018 and 2015) remained stagnant. Performance in science worsened, with one of the largest drops among all PISA participants from 2015 to 2018.

Girls performed better than boys in reading by 40 score points, in maths they performed similar to boys and in science they outperformed boys by 15 points ³⁸.

The gap in performance between socioeconomically disadvantaged and advantaged students is 106, much larger than the OECD average of 89 points. 6% of disadvantages students scored in the top quarter for reading, a lower number compared to the OECD average of 11%. Socioeconomic status explained 14% of the variation in performance in mathematics and 16% in science (OECD average: 14% for maths and 13 % for science).

Absenteeism is higher than OECD average: 44% of students missed a day of school in the two weeks prior to the PISA test and 34% of students reported being bullied at least a few times a month, compared to 23% on average across OECD countries³⁹. This percentage is much higher than the average in other EU countries (22.1%).

The gender gap in career expectations is predominant among high-achieving students, especially in health-related professions and ICT, where respectively 25% and 3% of girls expecting to work there, compared to 14% and 17% of boys.

Willingness to go to university is much lower

³²https://eurydice.eacea.ec.europa.eu/national-education-systems/bulgaria/overview

³³OECD Reviews of Evaluation and Assessment in Education : Bulgaria

³⁴Key features of the educational system - Bulgaria

³⁵International Migration Outlook - Bulgaria, OECD (2021)

³⁶Bulgaria Education and Training Monitor 2021

³⁷https://eurydice.eacea.ec.europa.eu/national-education-systems/bulgaria/funding-education

³⁸https://www.oecd.org/pisa/publications/PISA2018_CN_BGR.pdf

³⁹https://www.oecd.org/pisa/publications/PISA2018_CN_BGR.pdf

Figure 1.3: Educational system in Bulgaria



among high-achieving disadvantaged students: a high percentage (50%) expected not to complete tertiary education, compared to roughly 20% of the advantaged students.

Key policy challenges

The inequality of access, variable quality across locations and education tracks, and early tracking of students that leads to extensive social and ethnic segregation are the primary problems in Bulgarian education.⁴⁰ Moreover, tertiary educational attainment is below the EU average (40.5%) and the EU target⁴¹. Participation of students from disadvantaged socioeconomic background is lower 42.

In recent years, the government tried to tackle the problem of early school dropouts by running a large-scale campaign to identify nonattending children of mandatory school age (up to age 16). Despite these efforts, Bulgaria still had a high percentage of early leavers from education and training in 2019, the fourth highest in EU.43.

An ageing teachers body and teachers training characterised by insufficient digital skills and a high degree of theory at the expense of pedagogical practice represent another crucial policy challenge in Bulgaria.44

Recently enacted policies and investments

Participation of students from disadvantaged backgrounds is low, despite the higher levels of socio-economic development achieved in the past years ⁴⁵. In this respect, Bulgaria has implemented the EU-funded project "Active inclusion in pre-school education" that finances carerelated fees for children from disadvantaged backgrounds, parental education programs and pedagogical support for children.

To tackle the declining enrolment rate for children aged 4 to the starting age of compulsory primary school, the age of compulsory pre-school education was lowered from 5 to 4 from September 2020 46

To improve access to tertiary education, students from disadvantaged backgrounds received targeted support from the ESF+ from 2014 to 2020. The same funds have been confirmed in the 2021-2027 programming period.⁴⁷

€748 million of the 6.27 billions in the Recovery and Resilience Plan in Bulgaria are dedicated to education. The Plan supports the following strategic areas: (i) the modernisation of educational institutions' infrastructure (ii) a comprehensive education reform (iii) the efficient policy coordination in all phases of research and innovation (iv) the support to research and innovation performance of public research institutions and innovative business 48.

⁴⁰https://bti-project.org/en/reports/country-report/BGR

⁴¹45% of population with tertiary attainment by 2030

⁴²EU Country Report, Bulgaria

⁴³ https://bti-project.org/en/reports/country-report/BGR

⁴⁴Education and Training Monitor 2020

⁴⁵https://www.oecd-ilibrary.org/sites/81d18411-en/index.html?itemId=/content/component/81d18411-en

⁴⁶https://www.unicef.org/serbia/en/reports/monitoring-framework-inclusive-education-serbia ⁴⁷EU Country Report, Bulgaria

⁴⁸https://ec.europa.eu/info/sites/default/files/recoveryandresilience_bulgaria_factsheet_en.pdf

Croatia	36.6%
	13.6%
	18.5%
	12.7%
	Average TIM:
10	

Upper secondary school

General (31%) Vocational (69%)

Primary & lower secondary school

(Common track)

Pre-school

Population aged 25-34 with a tertiary degree^a

3.6%

Percentage of immigrant stock (% population) ^b

the poverty line ^c

Population below

Youth not in employment, education or training (NEET)^d

(verage TIMSS/PIRLS scores (4th grade) $^{
m e}$ Center point: 500

NA

509

524

Reading

Math

Science

Average PISA scores (10th grade) † OECD average

479 487 Reading

464 489 Math

472 489 **Science**

3.9%

public spending in education as a % of GDP^g

6.4

billions allocated in NPRR^h

3

Educational system

In Croatia, primary school starts at 7 and it is compulsory until the age of 15. The last year of preprimary school is compulsory as well. Students stay in the same school for primary and lower secondary level, as in some other eastern countries. They follow a core curriculum that is focused on equipping students with the necessary knowledge to access further schooling. Upper secondary school has a variable duration, from 3 to 5 years. Available tracks are (i) general education (4-years) (ii) 4- or 5-year vocational programs (iii) 3-years vocational programs. General education ends with a national state exam that gives access to higher education. The official language of instruction is Croatian, but there is a minority of schools dedicated to ethnic minorities that offer teaching in Serbian, Italian, Czech and Hungarian.⁴⁹ Public education is free and accessible to everyone. The majority of the school system is public with a small percentage of students (2%) enrolled in private institutions⁵⁰. The country is mostly inhabited by natives, with some ethnic minorities primarily from neighbouring countries such as Serbs (4.4%) Bosnians (0.5%), Italians (0.45%), Hungarians (0.37%), Albanians (0.34%) and Slovenes.⁵¹ The percentage of early school leavers among people aged 18-24 is extremely low (2.2% compared to the EU average of 9.9% in 2021), while tertiary educational attainment is slightly lower when compared to EU average (36.6% versus 40.5%). However, according to a pilot survey conducted by the European Commission⁵², Croatia has quite high levels of youth unemployment rate (23.8%). The percentage of youths aged 15-29 neither in employment nor in education or training (NEET) is in line with the EU average (12.7 % versus roughly 13%).

Governance and funding

The Ministry of Science, Education and Sports is the national entity responsible for the educational system. Other national public bodies involved in the regulation, development and quality control are the Education and Teacher Training Agency, the Agency for Vocational Education and Training, the Agency for Science and Higher Education, the Agency for Mobility and the EU Programmes and National Center for External Evaluation of Education. Compulsory education is financed through public funds while private expenditure is concentrated in pre-primary and tertiary education. Annual expenditure in education is lower than the EU average⁵³.

Performance

According to the last PISA assessment (2018), students in Croatia scored lower than the OECD average in all the subjects of the assessment (reading, maths and science). However, the percentage of pupils who reached basic skills in reading and science is similar to the OECD average (78% and 75% of students attained at least Level 2 proficiency in reading and science respectively compared to the OECD average of 77% and 78%) but lower in maths (69 % versus 76 %). The mean performance throughout the years remained stable, but in science it started to decline, especially among the lowest-achieving students.

While performance in reading and mathematics remained stable throughout PISA editions, performance in science is steadily declining since 2012.

The gender gap in reading is in favor of girls (33 percentage point), similar to the OECD average (30). However in maths the gap is reversed, with boys outperforming girls by 9 points (compared to 5 points average in OECD countries). In science, the gap between boys and girls is not statistically different.

Socio-economically advantaged students outperformed disadvantaged ones by 63 score points, which is smaller than the OECD average of 89, and 15% of students, a higher number than the OECD average (11%), was able to score in the top quartile for reading. Socio-economic status explained a lower part of the variation in performance when compared to the OECD average: 10% of the variation in performance in mathematics and 8% in science (OECD average: 14% for maths and 13% for science).

In the PISA sample of 2018, there are 9% of students with an immigrant background in Croatia. Roughly 40% of them comes from a socioeconomically disadvantaged background. Native students scored similarly to immigrants, even taking into account students' and schools' socioeconomic background. Moreover, 21% of immigrant students scored in the top quarter of reading, compared to the OECD average of 17%.

On average, self-reported absenteeism is slightly lower than the OECD average (16% versus

⁴⁹https://gem-report-2020.unesco.org/wp-content/uploads/2021/02/Croatia.pdf

⁵⁰Secondary school enrolment. UNESCO, 2020

⁵¹Migrants and Refugees Country Profile: Croatia

⁵²European Commission, 2020

⁵³Key Features of the Educational System

Figure 1.4: Educational system in Bosnia and Herzegovina



21% of students reported to have missed a class in the preceding two weeks of the PISA test) and the percentage of late entries to school is similar to the OECD average (49% versus 48%).

Careers tend to somewhat reflect gender stereotypes, with girls shying away from the ICT sector. Within high-performing students in maths and science, the difference in the share of boys and girls who wanted to work in engineering and science was small and not statistically significant (20% for boys versus 15% for girls). About 33% of high-performing girls expected to work in a health-related profession, while only 12% of highperforming boys expected so. Finally, only 1% of high-performing girls expect to work in ICT, versus 11% of boys.

Among high-achieving students, a high percentage of disadvantaged students (33%) expected not to complete tertiary education, compared to roughly 13% of the advantaged students.

Key policy challenges

Despite the lowest percentage of early school leavers in the EU, average students' basic skills are low. According to PISA 2018 assessment, the share of low-achieving students is higher than the EU average, especially in maths and science.⁵⁴

The percentage of students enrolled in general upper secondary school is low and highly heterogeneous between regions. Only 31% of pupils are enrolled (EU average: 51%) and within VET programs, a high percentage (roughtly 66%) chooses to enrol in the 4-year programs, another way to access university, especially popular among males and low-achieving students.⁵⁵

Educational attainment rate in tertiary education is still low, with important heterogeneities

in terms of gender and place of residence (urban versus rural areas). Both students in general and vocational schools would be interested in starting university⁵⁶, but despite this interest, a lot of study places still remain vacant.

The percentage of students that graduate from a tertiary education is lower than the EU average (36.6% versus 40.5%), with important gaps in terms of gender (18.2 percentage points of difference) and place of residence (rural versus urban area) (26 percentage points of difference)⁵⁷.

Youth employment rate and first salary after graduation are lower than the EU average, and among the lowest in EU: in 2020, 77.2% of recent graduates were employed (compared to the EU average of 83.7%) a percentage that decreased by 1.9 percentage points in the last year.⁵⁸ According to the Croatian Employment Service, graduates in STEM are more needed.

Recently enacted policies and investments

In recent years, Croatia put in place several projects to ameliorate digitalization and accumulation of digital skills. Their implementation was a success, considering that now it is the only EU country where all 16-19 year-olds have at least basic digital skills.⁵⁹ In particular, the project e-school and the curricular reform focused on distributing digital equipment to schools and extending the usage of ICT to teaching practices. Moreover, from 2019/2020 the government introduced ICT as a compulsory subject from sixth to seventh grade. At the time COVID-19 pandemic hit, these processes were still in progress and only a fraction of schools was equipped with the necessary digital devices (and teachers with the necessary digital devices (and teachers with the necessary digital devices).

⁵⁴Education and Training Monitor, 2021

⁵⁵idem

⁵⁶What after middle school? Desires, plan and attitudes of Croatian high-school students

⁵⁷Education and Training Monitor, 2021

⁵⁸https://op.europa.eu/webpub/eac/education-and-training-monitor-2021/en/croatia.html

⁵⁹Education and Training Monitor, 2021

sary skills) to set up and switch to online learning. However, thanks to this modernization Croatian schools were able to effectively provide classes online.

In order to increase equity of the educational system, Croatia started implementing a Roma curriculum from 2020/2021, to preserve Roma language and culture, where Roma pupils can attend from 2 to 5 hours of extra classes in their mother language.⁶⁰

The National Development Strategy (NDS)⁶¹ and the National Recovery and Resilience Plan (NRRP) focus on strengthening both primary and higher education, and improving teacher quality. Specifically, the NDS plans on increasing instruction time and introducing whole-day schooling in primary school. Then, it aims at retaining good quality teachers and supporting them in the implementation of new curricula, developed following EU technical assistance.⁶². In the NPRR, Croatia is investing 84 million of euros in digitalizing the higher education system, investing in e-learning and digital teaching tools.⁶³

⁶⁰https://narodne-novine.nn.hr/clanci/sluzbeni/2020_04_52_1046.html

⁶¹Croatia - National Development Strategy 2030

⁶²Education and Training Monitor, 2021

⁶³national Recovery and Resilience Plan, Croatia

Czec	h
Repu	blic

	33%	Populatio with a ter	n aged 25-34 tiary degree ^a	
	3.8%	Percentag stock (% p	ge of immigrant population) ^b	
	12.3%	Population below the poverty line ^c		
	6.5%	Youth no employm or trainin	t in ent, education g (NEET) ^d	
5	Average TIMS	S/PIRLS scor enter point: 50	es (4th grade) ^e 00	
lary school	543	533	534	
(30 %) al (70 %)	Reading	Math	Science	
de ray esta est	Average PISA scores (10th grade) ^f OECD average			
n track)	490 487 Reading	499 ⁴⁸⁹ Math	497 489 Science	
school n track)	4.3%	public spe education GDP ^g	nding in as a % of	
chool	7.1	billions al	located in	

Upper second Genera Vocation

Lower secon (Commo

> Primary (Commo

> > **Pre-school**

Sources: a, b, c, d, g: World Bank Indicators ; e: TIMSS 2019 report, PIRLS 2016 report; f: PISA 2018 results, h: European Commission

NPRR^h

Educational system

Compulsory education starts at 5, with the last year of the pre-primary education and continues until pupils are 15 years old. Students can decide to stay in the same school for the entire duration of compulsory schooling or decide to early enroll for lower secondary school in a multi-year general school (that will also offer upper secondary general education) or enroll in the eight-year conservatory. At 15 years old, students decide whether they would like to continue with (i) general education (ii) vocational education and training. At the end of the 4 years of upper secondary school, students both in general and vocational school can pass a final examination that grants access to higher education. The school system is predominantly public, but the number of children who go to primary school in private institutions is increasing: private schools represented 3.5% of the total in 2015, while today they almost doubled to 6.6% and the percentage of pupils enrolled now is 2.2% compared to 1.1% in 2015.64 Immigrant students represent 3.8% of the population, and migrants' main countries of birth are Slovak Republic (36%), Ukraine (17%) and Viet Nam (7%). The top three nationalities of newcomers in 2018 were Ukraine, Russia and Slovak Republic.65 The rate of early school leavers is low compared to the EU average (7.5% versus 9.9% in 2020), while the percentage of people with tertiary educational attainment is lower than the EU average (33% compared to 40.5%). The percentage of youth not in employment nor in education and training is low compared to the EU average (6.5% versus roughly 13%).

Governance and funding

The Czech education system is highly decentralised; in 2017, schools had the second-largest share of responsibility for educational decisions at lower secondary level among OECD countries. Central government steers the system through key documents, such as the Framework Educational Programme and the Strategy for Education Policy of the Czech Republic until 2020. Both local and regional governance layers are also active in the education system. This adds complexity to funding streams and allocations⁶⁶. Public schools are financed both from the State and from local authorities. The state finances the so-called direct costs (i.e. teachers' salaries and professional development and other teaching aids) and local authorities take care of operational costs such as maintenance costs⁶⁷. Usually municipalities are responsible for investments in primary schools and regions for investment costs in secondary schools.

Performance

According to the last PISA assessment (2018), students in Czech Republic scored similar to the OECD average in maths and reading and higher than the average in science. Moreover, the percentage of students who reached basic skills in reading, maths and science is higher than the OECD average: (respectively 79% 80% 81% compared to OECD averages of 77% 76% and 78%).

The gender gap in reading is in favour of girls (33 percentage point), but this is not significantly different than the OECD average (30). Both in mathematics and science, the gap between boys and girls is not statistically different.

Performance in reading has been stable and close to OECD average throughout different PISA editions, while performance in mathematics has increased since the last edition (2015). Performance in science is decreasing, although not significantly, from previous editions.

Socio-economically advantaged students outperformed disadvantaged ones by 105 score points, a number larger than the OECD average of 89 points. 9% of students, a number closer to the OECD average (11%), were able to score in the top quarter for reading. Socio-economic status explained a higher portion of the variation in performance when compared to the OECD average: respectively 18% of the variation in maths and 17% of the variation in science compared to the OECD average of 13% and 14%.

Immigrant students scored 34 points less in reading than natives, a number that is higher than the OECD average (24 points).

On average, self-reported absenteeism is lower than the OECD average (10% versus 21% of students reported to have missed a class in the preceding two weeks of the PISA test) and the percentage of late entries to school is similar to the OECD average (54% versus 48%).

Moreover, low- and high-performing students tend to be grouped in the same schools more often than the OECD average.

Career aspirations somewhat reflect gender stereotypes: among high-achieving students in mathematics and science, 10% of girls expected to

⁶⁴Czech Republic Education Ministry Data

⁶⁵International Migration Outlook 2020

⁶⁶https://www.oecd.org/education/policy-outlook/country-profile-Czech-Republic-2020.pdf

⁶⁷OECD Reviews of School Resources: Czech Republic 2016



Figure 1.5: Educational system in Czech Republic

work in an engineering or science job, compared to 14% of their male counterparts. 30% of girls wanted to work in the health-related sector (compared to only 11% of boys) and only 1% of girls expected to work in an ICT related job (compared to 9% of boys).

Willingness to go to university significantly differs among high-achieving students according to their socioeconomic background: a high percentage of disadvantaged students (30%) expected not to complete tertiary education, compared to roughly 5% of the advantaged students.

Key policy challenges

Regional heterogeneities and performance gaps between advantaged and disadvantaged students are a key challenge for the educational system, with further inequalities concerning the Roma students. At system level, some features associated with greater inequity are present, such as (i) early tracking into different educational pathways and (ii) the provision of reduced curricula in some types of schools⁶⁸.

Despite the popularity of vocational education and training, considerable skill mismatches between education and the labour market significantly decreases graduates from VET's employability.

More effort is needed in order to support teacher' training and professional development. To ensure a high-quality of teaching, Czech Republic should invest more in teachers' training, especially in the light of recent digital developments in education. Moreover, it should increase efforts in rendering the teacher profession attractive in the labour market, for instance, by introducing a link between teachers' performance and salary.

Governance in education is highly frag-

mented, with some municipalities in severe capacity constraints. A more equal distribution of funding and finances across local authorities might increase educational equity and efficiencies⁶⁹.

Konzonusto

During the next academic year, Czech Republic will face increasing challenges in order to offer quality of education to refugee children in their schools. According to the United Nations, Romania, together with Poland, Germany, Czech Republic, Italy, Moldavia and Slovakia, is hosting the highest number of Ukranian refugees since Russia's invasion of Ukraine⁷⁰.

Recently enacted policies and investments

To tackle emerging and long-standing problems in education the Government adopted the Strategy for Education 2030+. The main objectives of the strategy are (i) to address skill mismatch between education and the job market and (ii) to reduce emerging inequalities in education and (iii) to support teacher training, professional development and increase attractiveness of the profession⁷¹.

In order to promote equity in the overall educational system, in the framework of the Education for Competitiveness Operational Programme (2007-13) Czech Republic provided school counselling centres, in order to strengthen support during compulsory schooling and help students in their school choice⁷².

To strengthen the evaluation of the educational system, the Czech School Inspectorate launched the Complex system of Evaluation, co-financed by the European Union through Operational Programme Research, Development and Education (OP RDE) in 2017. The aim is to integrate internal and external evaluation of schools and produce new data, methods and tools to eval-

CZ

⁶⁸Co-ordinating educational levels and sectors to improve student trajectories, OECD 2018 ⁶⁹Education Policy Outlook: Czech Republic, OECD 2020

⁷⁰https://data.unhcr.org/en/situations/ukraine

⁷¹Czechia New Education Strategy, 2020

⁷²Education Policy Outlook, Country profile: Czech Republic

uate key competencies⁷³.

silience Plan, Czech Republic will invest to strengthen digitalization and ensure more equal access to education: an investment of 585

million euros will be deployed for purchase of digi-In the context of the Recovery and Re- tal equipment for schools and training for teachers, and part of 393 million euros will be allocated to disadvantaged schools and to provide additional tutoring for children at risk of failure⁷⁴.

⁷³https://www.csicr.cz/en/ESF-projekty/Komplexni-system-hodnoceni

⁷⁴Czech Republic Recovery and Resilience Plan

Germa



Population aged 25-34 with a tertiary degree^a

Percentage of immigrant 14.9% stock (% population) ^b

11.4%

Population below the poverty line ^c

7.5%

Youth not in employment, education or training (NEET)^d

Average TIMSS/PIRLS scores (4th grade) ^e Center point: 500

537

521

518

Reading

Math

Science

Average PISA scores (10th grade) † OECD average

500 498 503 489 487 489 Reading Math **Science**

5%

public spending in education as a % of GDP^g

27.9

billions allocated in NPRR^h

6

5

4

3

19

Compulsory schooling

Pre-school

Upper secondary school

General (66 %)

Vocational (34%)

Lower secondary school

Primary school (Common track)

Educational system

In Germany compulsory education starts at 6 and lasts until pupils are 18 or 19 years old (depending on the region). The majority of the education system is public, with roughly 10% of students enrolled in private schools⁷⁵ (although there is some evidence that the number of students in private schools is growing ⁷⁶).

While primary education follows a common path for everyone, with some exceptions (in Berlin and Brandenburg after grade 6), after grade 4 students are already asked to choose a track between (i) general education (ii) vocational education and training (iii) dual-system educational training (which includes both education in school and education at the workplace).77. In some federal states of Germany, students enroll in 2 years of "orientation" after primary school, which is intended to help them decide in which secondary schools they would like to enroll. Usually, the primary school teacher provides parents with counseling on which school they should send their child to. Immigrant stock represented roughly 15% of the population, and migrants' main countries of birth are Poland (12%), Turkey (10%) and Russia (7%). The top three nationalities of newcomers in 2018 were Romania, Poland and Bulgaria⁷⁸ The rate of early school leavers is similar when compared to the EU average (10.3% versus 10.2% in 2019), while the percentage of people with tertiary educational attainment is lower (35.5% compared to 40.5%). The percentage of youth not in employment nor in education and training is low compared to the EU average (7.5% versus roughly 13%).

Governance and funding

Governance in education is highly decentralized, with federal states (Länder) themselves having the right to legislate even on matters that in most countries are responsibility of the central state, such as teacher's career path, remuneration and pension are within the Lander jurisdiction.⁷⁹ The system is predominantly public, with the majority of the institutions financed from public budgets. Financing decisions are taken at the three different administrative levels that have jurisdiction (Federation, Länders and local authorities or Kommunen), but the overwhelming majority of public expenditure (around 90 per cent) is provided by Länders and local authorities⁸⁰.

Performance

According to the last PISA assessment (2018), students in Germany scored higher than the OECD average in all the subjects of the assessment (reading, maths and science). The percentage of students who reached basic skills in reading, maths and science is higher than the OECD average in all subjects: (respectively 79% 79% and 80% compared to OECD averages of 77% 76% and 78%).

Overall, the trend in reading performance throughout the past editions is small but negative, slowly returning to the levels of 2009. In mathematics, the trend is decreasing as well, with a significant lower score in 2018 than in 2012 (500 versus 514). Also performance in science saw a downward trend (503 points), with a score below the level of 2006 (516 points). This might be due in part to the change in demographics (immigrant, gender and socio-economic status) since Germany is a destination country, where many low-educated immigrants are settled⁸¹.

The gender gap in reading is in favour of girls (26 percentage point), slightly lower than the OECD average (30), while in maths the gap is reversed, with boys outperforming girls by 7 points (OECD average: 5 points). Girls performed similar to boys in science, but this is due to a decline in boys' performance compared to past PISA editions⁸².

Socio-economically advantaged students outperformed disadvantaged one by 113 score points, a number that is higher than the OECD average of 89. 10% of them, a slightly lower number than the OECD average (11%), was able to score in the top quarter for reading. Socio-economic status explained a higher portion of the variation in performance when compared to the OECD average: respectively 18% of the variation in maths and 19% of the variation in science compared to the OECD average of 13% and 14%.

In the PISA sample, students with an immigrant background grew from 18% to 22% in Germany. Roughly half of them comes from a socio-

⁷⁵UNESCO data, 2019

⁷⁶https://www.thelocal.de/20190807/explained-why-private-school-enrolment-across-germany-is-growing/

⁷⁷ https://eurydice.eacea.ec.europa.eu/national-education-systems/germany/overview

⁷⁸International Migration Outlook 2020

⁷⁹https://eurydice.eacea.ec.europa.eu/national-education-systems/germany/organisation-and-governance ⁸⁰idem

⁸¹PISA 2018 Results, Germany Country Note

⁸²idem

Figure 1.6: Educational system in Germany



economically disadvantaged background. Native students scored on average 63 points more than immigrants, and even after having taken into account socio-economic status, the difference is smaller but persists (17 points). However 16% of immigrant students scored in the top quarter of reading, a similar number when compared to the OECD average of 17%.

On average, self-reported absenteeism is lower than the OECD average (13% versus 21% of students reported to have missed a class in the preceding two weeks of the PISA test) and the percentage of late entries to school is similar to the OECD average (46 % versus 48 %).

PISA data show that in Germany, low- and high-performing students are grouped together in certain schools more often than the OECD average. This is also due to early selection and tracking into various school forms.

Students' career aspirations reflect gender stereotypes: among high-achieving students in mathematics and science, 13% of girls expected to work in an engineering or science job, compared to 25% of their male counterparts. 25% of girls wanted to work in the health-related sector (compared to less than 10% of boys) and only 1% of girls expected to work in an ICT related job (compared to 7% of boys).

Among high-achieving students, a high percentage of disadvantaged ones (66%) expected not to complete tertiary education, compared to roughly 25% of the advantaged students.

Key policy challenges

Germany is facing challenges in ensuring educational quality and equity to everybody: despite the efforts to integrate new migrants, reading performance among foreign-born students in Germany plummeted between 2009 and 2018; immigrants are also more likely to leave school prematurely: in 2019, the percentage of foreign-born school leavers was of 24.2% compared to 8.1% of natives⁸³.

Another important challenge for Germany is the shortages of teachers, which is more prevalent in disadvantaged schools. The combination of ageing teachers, changes in the population of student, and declining attractiveness of the teaching profession is exacerbating the problem. In this context, an opportunity emerges to directly empower schools, redefining the role of the principals to be a driver of school improvement.

During the next academic year, Germany will face increasing challenges in order to offer quality of education to refugee children in their schools. According to the United Nations, Romania, together with Poland, Germany, Czech Republic, Italy, Moldavia and Slovakia, is hosting the highest number of Ukranian refugees since Russia's invasion of Ukraine⁸⁴.

There are still important differences in each single Länder's capacity and funding and there is more and more pressure to increase efficiency in financing given the growing students' population.⁸⁵

Recently enacted policies and investments

Germany has developed several measures to integrate migrants in education through vocational education and training, such as launching the *"Recognition in Germany"* portal⁸⁶ in 2012: a multilingual portal which aims to provide people with an immigrant background with informa-

⁸³EU Education and Training Monitor, 2020

⁸⁴ https://data.unhcr.org/en/situations/ukraine

⁸⁵Education Policy Outlook Country Report: Germany

⁸⁶https://unevoc.unesco.org/pub/bibb_pp3.pdf

tion on the German labour market and recognition of acquired certifications. Another initiative carried out since 2016 is the "Career Guidance for Refugees (BOF)" (*Berufsorientierung für Flüchtlinge, BOF*)⁸⁷: in the context of BOF, refugees participate in Vocational and Educational Training and are offered counselling and language courses. Other initiatives along the same line are the Vocational Language Training programme (2016) and the network of Co-ordination Offices for Vocational Training and Migration (enhanced from 2013)⁸⁸.

In order to strengthen digitalization of the system, Germany launched the *Digital Pact for Schools (2019)*⁸⁹, with which it is investing in improving the digital infrastructure of schools and promoting digital literacy among both teachers and students.

To facilitate digital transition in education, Germany allocated 630 million euros of the Recovery and Resilience Plan to build the first nationwide online education platform to help learners acquire competences based on their individual learning pathways⁹⁰.

⁸⁷ https://www.berufsorientierungsprogramm.de/bop/de/angebot-fuer-zugewanderte/berufliche-orientierung-fuer-zugewanderte-bof/berufliche-orientierung-fuer-zugewanderte-bof_node.html

⁸⁸idem

⁸⁹https://www.digitalpaktschule.de/

⁹⁰Germany Recovery and Resilience Plan

lungary		30.7% Population aged 25-34 with a tertiary degree ^a		
		4.6% Percentage of immigrant stock (% population) ^b		
		12.4%	Populatio the pover	n below ty line ^c
		10.6%	Youth not employm or training	: in ent, education g (NEET) ^d
~		Average TIMS	S/PIRLS scor enter point: 50	es (4th grade) ^e 00
		554	523	529
	Upper secondary school General (56 %) Vocational (44 %)	Reading	Math	Science
		Average PISA scores (10th grade) ^f OECD average		
ory schooling	Lower secondary school (Common track)	476 487 Reading	481 489 Math	481 489 Science
Compulse	Primary school (Common track)	4.6%	public spending in education as a % of GDP ^g	
	Pre-school	7.2	billions all NPRR ^h	located in

Sources: a, b, c, d, g: World Bank Indicators ; e: TIMSS 2019 report, PIRLS 2016 report; f: PISA 2018 results, h: European Commission

Educational system

Compulsory education in Hungary starts at age 3 and lasts until pupils are 16. Students stay in the same school throughout primary and lower secondary school, but have the option of early enrolling in general education after grade 4 or after grade 6. Available tracks in secondary school are (i) general education (which lasts 4 or 5 years) (ii) technical school and (iii) vocational school. Figure 1.7 summarizes the structure of the educational system. Students can access higher education upon passing a final school leaving examination, which can be done in all three tracks. The percentage of students enrolled in private secondary school is higher than in other countries (27% in 2019⁹¹), however, the majority of the educational system remains public. Immigrant stock accounts for 4.6% of the overall population, and immigrants' main countries of birth are Romania (35%), Ukraine (12%) and Serbia (7%), while Ukraine, Romania and Germany were the top three nationalities of newcomers in 2019.92 The rate of early school leavers is slightly higher when compared to the EU average (12.2% versus 10.2% in 2019), while the percentage of people with tertiary educational attainment is lower than the EU average (30.7% compared to 40.5%). The percentage of youth not in employment nor in education and training is slightly lower when compared to the EU average (10.6% versus roughly 13%).

Governance and funding

Education is financed primarily by public funds. The entity maintaining the overall responsibility of the educational system is the Ministry of Human Capacities, with the exception of the school-based vocational and education training, which is managed by the Ministry of Economy. Starting from 2013, the educational system became more centralized, and the state now is in charge of maintaining schools, with the exception of pre-primary school, which are the competency of local authorities⁹³. This has been done with the intention of shortening the existing gaps in school quality across different municipalities.

Performance

According to the last PISA assessment (2018), students in Hungary scored lower than the OECD average in all the subjects of the assessment (reading, maths and science) although the percentage of people who reached basic skills is similar to OECD averages (75%, 74% and 76% of students attained at least Level 2 proficiency in reading, maths and science respectively, compared to the OECD average of 77%, 76% and 78%).

Throughout the PISA editions, the overall trend in performance across disciplines is declining, especially in science. This decrease is due to the fact that the proportion of low-achieving students (the ones who do not have basic skills in the said discipline) increased by roughly 9% from 2006 (the first year in which Hungary participated to PISA for the science subject) to 2018.

The gender gap in reading is in favour of girls (26 percentage point), but this is not significantly different than the OECD average (30). However in maths the gap is reversed, with boys outperforming girls by 9 points (compared to 5 points average in OECD countries). In science, the gap between boys and girls is not significantly different.

Socio-economically advantaged students outperformed disadvantaged one by 113 score points, a number that is larger than the OECD average of 89, and only 8% (OECD average: 11%) were able to score in the top quarter for reading. Socioeconomic status explained a higher portion of the variation in performance when compared to the OECD average: respectively 24% of the variation in maths and 21% of the variation in science compared to the OECD average of 13% and 14%.

The gap in reading performance among natives and immigrant is very low (7 points in favour of natives, compared to the OECD average of 24 points).

On average, self-reported absenteeism is lower than the OECD average (12 % versus 21 % of students reported to have missed a class in the preceding two weeks of the PISA test) and the percentage of late entries to school is similar to the OECD average (41% versus 48%).

Students' career aspirations reflected gender stereotypes: among high-achieving students in mathematics and science, 17% of girls expected to work in an engineering or science job, compared to 25% of their male counterpart. 25% of girls want to work in the health-related sector (compared to 10% of boys) and only 1% of girls expected to work in an ICT related job (compared to 13 % of boys).

Among high-achieving students, a high percentage of disadvantaged students (roughly 50 %) expected not to complete tertiary education, compared to roughly 10% of the advantaged students.

⁹¹ UNESCO data, 2019

⁹²https://www.oecd-ilibrary.org/sites/f8c87bfe-en/index.html?itemId=/content/component/f8c87bfe-en

⁹³ Hungary Country Profile, OECD

Figure 1.7: Educational system in Hungary



Key policy challenges

Hungary faces challenges in improving students' basic learning outcomes and ensuring educational equity. In 2020, Hungary slightly increased the number of early leavers⁹⁴, which were concentrated within the least developed district and marginalized groups, such as Roma people. The proportion of people at risk of dropping out is unequally distributed along the territory, and the school system tends to be quite selective, with disadvantaged pupils concentrated in some areas and some school types (mainly vocational training schools)⁹⁵.

Another key challenge is represented by the reduction skill mismatch between education and labor market. To do this, it will be necessary to reform the Vocational and Education Training (VET) curriculum to attract more people, making sure that skills taught are in line with the demands in the labor market.

Tertiary educational attainment is very low compared to the EU average (30.7% versus 40.5%). Therefore, it becomes necessary to enact policies to improve the overall quality of higher education and reduce students' dropout.

The teaching workforce is ageing and unevenly spread across the territory and subjects. For this reason, attracting young talents into the teaching profession and providing them with high-quality training is pivotal⁹⁶.

Students' well-being and mental health in Hungary has been deteriorating during the COVID-19 pandemic. According to a UNICEF survey, more than half of the parents reported attention disorders, sleep problems, loneliness, restlessness or anxiety among their children and fear this might have long-term consequences on their child's future. In particular, students with disadvantaged socio-economic background seemed to be more at risk of developing mental health problems⁹⁷.

Recently enacted policies and investments

In partnership with the European Social Fund, Hungary developed a series of projects aimed at integrating marginalized people⁹⁸. For example, the "*Growing/Women's Opportunities – Training and Employment*" started in 2016, with the aim of helping Roma women, who face discrimination in the labor market. it provides training for becoming (i) a child and youth inspector or (ii) a social care provider and nurse⁹⁹.

To reduce early school leaving, Hungary launched a project to modernize the training of school teachers: The Education Authority, in partnership with seven universities is providing some teachers with skills on how to deal with pupils in a diverse group, integrating experiential methods and games into education¹⁰⁰.

Hungary has taken important steps to support digitalization in education and promote digital training practices: the *Digital Pedagogical Methodology Center (DPMK)* is working towards strengthening the use of digital practices by teachers in schools, providing them with train-

⁹⁴Education and Training Monitor 2021

⁹⁵Education Policy Outlook, Hungary

⁹⁶https://www.oecd.org/education/Hungary-Profile.pdf

⁹⁷ https://unicef.hu/mental-health

⁹⁸ https://ec.europa.eu/european-social-fund-plus/en/projects/hungary-jobs-disability

⁹⁹ https://ec.europa.eu/european-social-fund-plus/en/projects/unemployed-work-and-self-esteem

¹⁰⁰ https://www.komplexalapprogram.hu/

ing, support and resources. During the period of distance learning, the DPMK supported teachers by providing webinars and e-learning opportunities on how to implement blended learning. Moreover, building from the initial experience of the COVID-

19 pandemic, the Hungarian Ministry of Innovation and Technology, in partnership with the OECD, is working to promote digital learning in higher education with the program "*Support for the Digital Transformation of Hungarian Higher Education*" ¹⁰¹.

¹⁰¹https://www.oecd-ilibrary.org/education/education-policy-outlook-2021_5c792274-en

Italy			27.8%	Populatio with a ter	n aged 25-34 tiary degree ^a
			9.7%	Percentag stock (% p	ge of immigrant population) ^b
			21.7%	Populatio the pover	n below ty line ^c
			19.8%	Youth not employm or trainin	t in ent, education g (NEET) ^d
			Average TIMS <i>C</i>	S/PIRLS scor enter point: 50	es (4th grade) ^e 00
4.0		Upper secondary school	548	515	510
18 17 16		Academic (57.1 %) – Vocational Technical (30.3 %) (11.9 %)	Reading	Math	Science
15 14	ß		Average P	ISA scores (1 OECD average	0th grade) ^f
13 12 11	ry schooliı	Lower secondary school (Common track)	476 487 Reading	487 489 Math	468 489 Science
10 9 8 7	Compulso	Primary school (Common track)	4.3%	public spe education GDP ^g	nding in as a % of
6 5 4		Pre-school	191.5	billions al NPRR ^h	located in
3				ndicators Los TIMES 2010	

Sources: a, b, c, d, g: World Bank Indicators ; e: TIMSS 2019 report, PIRLS 2016 report; f: PIS, 2018 results, h: European Commission

Educational system

Education is compulsory for at least 10 years and covers the age group between 6 and 16. The purpose of compulsory education is to obtain an upper secondary school qualification or a professional qualification of at least three years' duration. Moreover, young people who have fulfilled compulsory education have a right/duty to attend training activities until the age of 18 (Obbligo forma*tivo*) ¹⁰². Compulsory education is free of charge and it can be conducted (i) in public schools or equivalent (scuole paritarie) (ii) in structures accredited by the Regions (for vocational training) (iii) through parental education ¹⁰³. The great majority of students enroll in public institutions in all cycles of education (in 2014, the enrollment rate in private institutions was 7% in primary schools, 4% in lower secondary school and 4% in upper secondary school). The distribution of private schools is uneven in the Italian territory, with the majority of private schools concentrated in Lombardy (around 17 %) ¹⁰⁴. Most of the students follow a similar curriculum in primary and lower secondary school, and they are asked to decide in which track they would like to enroll at the end of lower secondary school (when they are 14 years old). In this decision, lower secondary school teachers play a significant role, since they give a (not binding) recommendation to each student on which track they believe they should enroll in. The available tracks are: (i) academic tracks (liceo) with specializations in humanities, math and science, foreign languages, psychology and pedagogy, music and fine arts, (ii) technical tracks (tecnico) with specializations in business administration and technology (iii) vocational (professional) programmes, including several sub-tracks such as gastronomy and hospitality, agriculture, and mechanics. The first two tracks are state-led vocational institutes last 5 years and, upon successful completion of a final examination, they guarantees eligibility to apply for higher education. In addition, regions offer three-year and four-year vocational courses and training, issuing at the end of the course a qualification certificate (after completion of 3 years) or a diploma (after completion of 4 years). The latter,

supplemented with an additional year of study and upon successful completion of the final examination, guarantee eligibility to apply for higher education ¹⁰⁵. Tertiary educational attainment is severely lower than the EU average: 27.6% of the population aged 30-34 obtained a tertiary degree versus 40.3% on average in the EU. ¹⁰⁶

Governance and funding

The Ministry of Education, University and Research (MIUR) is the principal funding entity of the public school system at all levels (with the exception of universities, which also receive funds from students' compulsory and voluntary contributions). It ensures the quality of education by setting the general guidelines, minimum standards and fundamental principles¹⁰⁷. Regions have concurrent legislative power and exclusive competence in vocational training in upper secondary school ("Formazione professionale")¹⁰⁸, while the majority of decisions in lower secondary school are taken at the State and school level¹⁰⁹. When compared to the OECD average, Italian schools enjoy a higher autonomy when it comes to resource allocation and setting of curriculum and assessment.

Performance

On average, Italian 15-year-old students performed close to the OECD average in math (with an average score of 487, very similar to the OECD average of 490) and worse than the OECD average in reading by almost 10 points (476 in Italy compared to OECD average of 487 points) and in science by 25 points (468 in Italy compared to OECD average of 493).

Girls performed better than boys by 25 points on average in reading and worse than boys in math by 16 points. The gender gap in math is among the highest in the countries that participate to the PISA assessment. The gender gap in performance is not statistically significant in science ¹¹⁰.

According to OECD estimations, in Italy only 9% of the variance in reading performance is explained by socio-economic status (OECD average: 12%).

While the share of immigrant students increased in the past years (from 6 % in 2009 to 10

¹⁰² https://www.miur.gov.it/obbligo-scolastico

¹⁰³ https://www.miur.gov.it/obbligo-scolastico

¹⁰⁴ http://dati.istat.it/

¹⁰⁵ https://www.miur.gov.it/web/guest/percorsi-di-studio-e-formazione

¹⁰⁶https://op.europa.eu/webpub/eac/education-and-training-monitor-2020/countries/italy.html

¹⁰⁷ https://www.miur.gov.it/web/guest/missione-e-funzione

¹⁰⁸https://eacea.ec.europa.eu/national-policies/eurydice/content/italy_en

¹⁰⁹https://www.oecd.org/education/Education-Policy-Outlook-Country-Profile-Italy.pdf

¹¹⁰Source: PISA data, 2018 here the country highlights and here the country note.

Figure 1.8: Educational system in Italy



% in 2018), the performance gap between native and immigrant shrunk, with 14 % of immigrant students in the top quarter of reading (compared to the OECD average of 17 %).

Absenteeism and early school leaving percentages are higher than the EU average: when administered the PISA test, 57% of students reported to have skipped a day or two in the two preceding weeks before the test, and the percentage of early school leavers is among the highest in Europe (13.1%)¹¹¹. These percentages, although elevated, hide a pronounced heterogeneity at regional level in terms of performance, student truancy and school dropout: absenteeism and early school leaving are more pervasive in Southern regions.

Even among high-achieving students, expectations to go to university were low, especially if coming from a low socio- economic background (almost 13% of disadvantaged students compared to 40% less disadvantaged). Strong gender stereotypes can be observed in career aspirations: almost no girls expected to work in ITC (compared to 7% of boys) and around 13% of girls (against 25% of boys) was expected to work in the engineering/science sector.

Key policy challenges

Educational poverty is a relevant phenomenon, with more than one million children living in absolute poverty: 1 child out of 7 leaves studies prematurely and almost half of children and adolescents have never read a book. This situation has been exacerbated by the worsening economic conditions and school closures during the COVID-19 pandemic, with strong repercussions on children's mental health and well-being.¹¹²

Regional differences in educational attainments and learning outcomes are pronounced,

with northern provinces having reached PISA scores similar to top-performing European countries and southern ones performing lower than the OECD average, and having higher percentages of early school leavers and students not in employment nor in education and training (NEET)¹¹³.

The gender gap in mathematics as it emerges from PISA 2018 is among the highest in OECD countries. Moreover, the narrowing gap between boys and girls in reading compared to past PISA editions was driven by a decline in reading performance among girls¹¹⁴.

Recently enacted policies and investments

To strengthen the educational system and promote development of new skills, Italy launched in 2015 The "Good School Reform" (*la buona scuola*)¹¹⁵ which recruited new teachers, promoted teachers' development by allocating funds to be spent on enhancing professional skills (especially digitalization skills), granted more autonomy to schools in the management of their (human, financial and organizational) resources, introduced evaluation of teachers and school managers, and a merit-based element in teachers' salaries.

To facilitate the development of skills and to bridge the gap between school and labor market, Italy promoted curricular traineeships (alternanza scuola-lavoro) which became compulsory in 2015 for all upper secondary school tracks. With the same purpose, short-cycle tertiary programs have been created (*Istituti Tecnici Superiori*), which are less theoretical than universities and are targeted to people who prefer a rapid entry in the labor market.

In order to tackle high dropout rates in upper secondary school among immigrants, in

¹¹¹https://ec.europa.eu/eurostat/

¹¹²Riscriviamo il futuro: una rilevazione sulla povertà educativa digitale, Save the Children

¹¹³https://op.europa.eu/webpub/eac/education-and-training-monitor-2021/en/italy.html#A15

¹¹⁴Girls' and boys' performance in PISA, OECD 2018

¹¹⁵https://www.istruzione.it/allegati/2017/La_Buona_Scuola_Approfondimenti.pdf

2014 it released guidelines for teachers of Italian as a second language (and provided qualified teachers of Italian as a second language in 2016) and allotted 500 thousand euros to promote projects that enhanced the teaching of Italian languages to immigrant students in secondary school in 2015.

With the aim of reducing regional differences in performance and drop out rates, Italy is implementing the National Operation Programme 2014-2020 ¹¹⁶ in cooperation with the European Strategy for Education and Training (ET2020), which allocated 2.1 billion of euros to the least-developed regions in Italy.

In 2016, the Government, together with a network of foundations, started the Fund to fight child educational poverty. Overall, the Fund is worth more than 600 million euros and the approved projects, supported with a contribution of more than 338.6 million euros, involve half a million children and young people together with their

families. Through the projects, more than 7,200 organizations, (including the Third Sector, schools, public and private entities) have been networked, strengthening the "educating communities" of the territories¹¹⁷.

As part of the National Plan for Recovery and Resilience (NPRR), Italy will allocate 30.88 billions to education, with the aim of (i) strengthening the supply of educational services from kindergartens to universities and (ii) increase investments in research. The first part will entail tackling the structural deficiencies in the supply of primary education and education services, reducing gaps in basic skills, high dropout rate and regional disparities, increase the percentage of adults with a tertiary degree and try to address the skills mismatch between education and labor demand. The second part will increase the level of Research and Development (R&D) spending, address the problem of low number of researchers and brain drain, and low demand for innovation¹¹⁸.

¹¹⁶https://bit.ly/3Qyl1At

¹¹⁷ https://percorsiconibambini.it/chi-siamo/

¹¹⁸ https://pnrr.istruzione.it/
Po		
RU.		

24.9%	Population aged 25-34 with a tertiary degree ^a
1.2%	Percentage of immigra stock (% population) ^b
23.4%	Population below the poverty line ^c
18%	Youth not in employment, educatio or training (NEET) ^d

edu<u>cation</u> EET) ^d

Average TIMSS/PIRLS scores (4th grade) ^e Center point: 500

NA

NA

NA

immigrant

Reading

Math

Science

Average PISA scores (10th grade) † OECD average

428 487 Reading

430 489 Math

426 489 **Science**

3.3%

public spending in education as a % of GDP^g

29.4

billions allocated in NPRR^h

Compulsory schooling

Upper secondary school

General (44%) Vocational (56 %)

Lower secondary school (Common track)

> **Primary school** (Common track)

> > **Pre-school**

General features

Educational system

Compulsory education lasts 12 years and comprises the last year of kindergarten, primary education. lower secondary education and the first 2 years of the upper secondary education¹¹⁹. Education is mainly public, with only 1% of pupils enrolled in private schools.¹²⁰ In 2020 the government prolonged compulsory education from 12 to 14 years, adding as compulsory the last year of kindergarten, as well as the 11th and 12th grade¹²¹. The current minister of education plans on further prolonging compulsory school to 16 years¹²². The official language of instruction is Romanian, except for the case of ethnic minorities, where the mother tongue is the language of instruction. Students follow the same core curriculum in primary and lower secondary school, and are asked to choose a specific track when they are 15 years old. Secondary schools offer three main tracks (i) general education, (ii) technical/technological education and (iii) vocational education. Immigrant stock accounts for only 1.2% of the overall population, and immigrants' main countries of birth are Moldova (40%). Italy (11%) and Spain (9%), while Moldova, Viet Nam and Turkey were the top three nationalities of newcomers in 2018.¹²³ The rate of early school leavers is higher when compared to the EU average (15.3% versus 10.2% in 2019), while the percentage of people with tertiary educational attainment is much lower than the EU average (25.8% compared to 40.5%). The percentage of youth not in employment nor in education and training is significantly higher than the EU average (18% versus roughly 13%).

Governance and funding

The Ministry of Education is in charge of the strategy and implementation of educational policies. Public education is free for everybody. Overall, educational spending remains still among the lowest in EU, but in 2019, government expenditure in education increased significantly (almost 21% in real terms). This increase was driven by a large pay raise for teachers.

Performance

The percentage of people who reached basic skills is low (only 59% and 53% of students attained at least Level 2 proficiency in reading and maths respectively, compared to the OECD average of 77% and 76%¹²⁴) as well as the percentage of top performers (in reading, only 1% of students are top performers, compared to an average of 9% in other OECD countries, while in maths, there are 3% of top performers, compared to an OECD average of 11%). Also in science, students under performed when compared to the OECD average¹²⁵.

Since the first participation to PISA, Romania displayed an upward trend, especially in reading. However, this trend reversed, returning closer to 2016 levels. Specifically, the mean performance in reading and science, after having increased from the first year of participation (2006), slightly decreased since 2012, although not significantly. The performance in math in the last edition (2018) was significantly lower than the one in the edition before (2015).

The gender gap in reading is in favor of girls (34 points more), in line with the other participant countries, but similar to the OECD average (30 points). Girls and boys performed similarly in maths and in science as well.

Socio-economic status explained a higher portion of the variation in performance when compared to the OECD average: respectively 19% of the variation in maths and 16% of the variation in science compared to the OECD average of 13% and 14%. Socio-economically advantaged students outperformed disadvantaged ones by 109 score points, a larger number than the OECD average of 89¹²⁶, but 9% (a number closer to the OECD average of 11 %) of them was able to score in the top quartile for reading. Among high-achieving students, a high percentage (25%) of disadvantaged ones expected not to complete tertiary education, compared to roughly 3% of advantaged students.

Absenteeism was higher than OECD average: 50% of students missed a day of school and 58% arrived late in the preceding two weeks of the PISA test. Socio-economic differences are reflected by the school climate: in the PISA assessment 34% of students said they were bullied in the last month,

¹²²https://www.edupedu.ro/ministrul-educatiei-grupa-mare-la-gradinita-devine-obligatorie-altminteri-nu-mai-poti-fi-inscris-la-pregatitoare/

¹²⁴PISA 2018, Romania Country Note

¹¹⁹https://eurydice.eacea.ec.europa.eu/national-education-systems/romania/overview

¹²⁰ UNESCO Data, 2019

¹²¹https://bittv.info/14-ani-de-scoala-obligatoriu-incepand-din-toamna-reguli-pentru-inscrierea-la-clasa-pregatitoare/

¹²³https://www.oecd-ilibrary.org/sites/f8c87bfe-en/index.html?itemId=/content/component/f8c87bfe-en

¹²⁵56% of students in Romania attained Level 2 or higher in science (OECD average: 78%) Source: PISA 2018, Romania Country Note

¹²⁶PISA 2018, Romania Country Note

Figure 1.9: Educational system in Romania



Source: The Structure of the European Education Systems 2021/22, Eurydice. European Commission

a much higher percentage than the EU average of 22.1%. Much more disadvantaged students reported being a victim of bullying (39%) than advantaged ones (26.7%). Bullying seemed to have had severe repercussions on performance, since victims of bullying had a lower score on average of 40 points, equivalent to more or less a year of schooling.

In terms of aspirations, more girls than boys expected to work in the healthcare sector, and far less in the ICT sector (2% versus 14%). Among high-achieving students in mathematics and science, 11% of girls expected to work in an engineering or science job, compared to 13% of their male counterpart. 33% of girls wanted to work in the health-related sector (compared to less than 10% of boys) and only 2% of girls expected to work in an ICT related job (compared to 14% of boys).

Key policy challenges

Despite the significant progress in the past few years, Romania still has a low share of students that manage to achieve basic competencies at the end of the schooling period, and the share of people with secondary education attainment is still low, given the large share of students who drop out. The levels of functional literacy in Romania are among the lowest in EU and the share of 15-years old not enrolled in education is high (20 %).

The average level of digital literacy in Romania is still quite low: in 2020, only 57% of people aged 16-19 had at least basic digital skills. Some efforts were made to improve both skills and infrastructure. For instance, in 2015, the government set up a national strategy with the aim of promoting and including ICT in education (however, this

was not accompanied by a monitoring and evaluation plan, and therefore, the evidence on its effectiveness is very scarce) and in 2017 it made ICT a compulsory subject at school.127 The capacity to use digital technology is especially poor in rural areas, given the low number of gualified teachers and worse infrastructure. Given the limited accumulation of digital skills, the COVID-19 posed a serious challenge for Romanian students: a large proportion could not be engaged in remote learning, and disadvantaged students were the ones who suffered more from the school closure. According to a teacher survey conducted by the National Centre for Policy and Evaluation in Education in 2020, only 69% of students in urban areas and 58% in rural areas participated to the classes128.

During the next academic year, Romania will face increasing challenges in order to offer quality of education to refugee children in their schools. According to the United Nations, Romania, together with Poland, Germany, Czech Republic, Italy, Moldavia and Slovakia, is hosting the highest number of Ukranian refugees since Russia's invasion of Ukraine.

Recently enacted policies and investments

To promote equity and inclusion in education, the President started in 2016 "*Educated Romania*": a multi-year and multi-phase project¹²⁹ with four public policy briefs collecting examples of best practices on (i) teaching careers, (ii) educational management, (iii) fairness, (iv) early education.¹³⁰

During the period of distance learning, Romania launched a program to provide disadvantaged students with digital devices, so that

¹²⁷ https://op.europa.eu/webpub/eac/education-and-training-monitor-2020/countries/romania.html

¹²⁸https://www.oecd.org/pisa/publications/PISA2018_CN_ROU.pdf

¹²⁹with the funding of the European Union Structural Reform Support Programme (SRSS) and in cooperation with the OECD https://www.presidency.ro/en/commitments/educated-romania

¹³⁰ http://www.romaniaeducata.eu/

¹³¹ https://ec.europa.eu/regional_policy/en/newsroom/coronavirus-response/react-eu/

they could follow online classes. The program turned out to be very challenging, and therefore, also received the support of REACT-EU¹³¹.

Around 10% of the 29.4 billions in the Recovery and Resilience Plan in Romania is dedicated to education. The Plan will support the priority areas lined out in the Educated Romania Report and will cover all levels of education. The plan

touches multiple areas: from governance in education to teacher training. Some of the objectives are (i) to increase digitalization and digital infrastructure, especially in rural areas, (ii) to increase the quality of vocational education and training, (iii) to improve early childhood education and reduce early school leaving¹³².

¹³² https://op.europa.eu/webpub/eac/education-and-training-monitor-2021/en/romania.html

Serbia			33%	Populatio with a ter	n aged 30-34 tiary degree ^a
			9.1%	Percentag stock (% p	ge of immigrant
			9.5%	Populatio the pover	n below ty line ^c
			16%	Youth not employm or trainin	t in ent, education g (NEET) ^d
	$\sum_{i=1}^{n}$		Average TIMS	SS/PIRLS scor <i>Center point: 50</i>	es (4th grade) ^e 00
19			NA	508	517
18 17 16		Upper secondary school General (26 %) Vocational (74 %)	Reading	Math	Science
15			Average P	PISA scores (1	0th grade) ^f
14 13 12 11	y schooling	Primary & lower secondary school (Common track)	439 487 Reading	OECD average 448 489 Math	440 489 Science
9 8 7	Compulsor		3.6%	public spe education GDP ^g	nding in as a % of
5		Pre-school	0.38	billions al NPRR ^h	located in

Sources: a, b, c, d, g: World Bank Indicators ; e: TIMSS 2019 report, PIRLS 2016 report; f: PISA 2018 results, h: European Commission

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1 1

General features

Educational system

In Serbia compulsory education starts at 6, with the last year of pre-primary school, and lasts until pupils are 14 years old. Similar to other eastern countries (such as Slovak Republic) primary and lower secondary grades are grouped together into a single school, where students follow approximately a common curriculum. The educational system is mostly public, with a negligible percentage of students (around 1%) enrolled in private secondary education¹³³. The official language of instruction is Serbian, but education is also provided in 8 other languages (Albanian, Bosnian, Bulgarian, and Croatian, Hungarian, Rumanian, Ruthenian and Slovak), depending on the presence of ethnic minorities in the territory. However, the curriculum is the same for everybody. Available upper secondary school tracks are (i) general education (which lasts 4 years) (ii) 4-year vocational schools (iii) 3-year vocational schools. Access to higher education is guaranteed upon being awarded a high-school diploma, which can be achieved by attending general education or a 4year vocational school and passing a final examination. The percentage of youth not in employment nor in education and training (NEET) is high and amounts to 16%. The proportion of early school leaver was 5.6%¹³⁴, a proportion comparable to other neighbouring countries¹³⁵. The share of people with tertiary educational attainment is 33%, lower than the EU average.

Governance and funding

Public education is free for everybody. The majority of the funding comes from the central government (80%), followed by local governments (15%) and provinces (5%). The central government is mostly in charge of administrative expenses, such as teacher salaries, while local governments take care of operational expenses. Local authorities are also in charge of coordinating and implementing any financing related to inclusive education.

Performance

According to the last PISA assessment (2018), although Serbia performs better than other western Balkan countries¹³⁶, scores are still lower than the OECD average in all the subjects of the assessment (reading, maths and science). The percentage of students who reached basic skills in reading, maths and science was lower than the OECD average in all subjects: (respectively 62%) 60% 62% compared to OECD averages of 77% 76% and 78%). The gender gap in reading is in favour of girls (36 percentage point), higher than the OECD average (30), while in science and maths the gap between boys and girls is not significantly different. Socio-economically advantaged students outperformed disadvantaged ones by 73 score points, a number that is smaller than the OECD average of 89, and 13%, (OECD average: 11%) was able to score in the top quarter for reading. Among high-achieving students, a conspicuous percentage of disadvantaged ones (13%) expected not to complete tertiary education, compared to roughly 2% of the advantaged students.

Key policy challenges

According to OECD (2020) the level of spending in education is still low, although the trend has been increasing in the past few years.

Early school leaving and segregation in the educational system remain problematic posing a serious threat of equity: school dropout rates are high especially among ethnic minorities, such as Roma girls. Jointly with the Ministry of Education, Science and Technological Development, UNICEF created the Monitoring Framework for Inclusive Education in Serbia, which defines indicators, provides guidelines on how to conduct the collection of data and defines targets¹³⁷. Despite these efforts, there is still a lack of a unified monitoring and evaluation system, fundamental to assess the effectiveness and inform policies.

As Serbia works to develop a new national education strategy for 2030, it needs strong evaluation and assessment systems to detect and address areas of low and inequitable performance.

Recently enacted policies and investments

Despite the lack of a comprehensive framework for targeting educational interventions, some efforts have been made by the government to advance the digital transformation of the education sector and allow to cope with remote learning and digital

¹³³UNESCO 2019

¹³⁴Enlargement countries - education statistics

¹³⁵North Macedonia (5.7 % of young men and 5.8 % of young women) and Montenegro (5.2 % of young men and 4.9 % of young women – 2019 data)

¹³⁶ https://pisabyregion.oecd.org/serbia/

¹³⁷ https://www.unicef.org/serbia/en/reports/monitoring-framework-inclusive-education-serbia

Figure 1.10: Educational system in Serbia



The Structure of the European Education Systems 2021/22, Eurydice. European Commission

divide in the aftermath of COVID-19.

In 2021 the European Investment Bank (EIB) signed a ≤ 1.2 million grant for supporting the successful implementation of the Connected Schools Programme in Serbia. This funding complements the ≤ 65 million EIB loan signed in 2020 for improving digital capacities and skills in over 1500 schools in Serbia. The EIB backed a ≤ 65 million loan to upgrade digital infrastructures and digital teaching materials, as well as teacher

training (with UNICEF support)¹³⁸. According to Eurostat, the level of individual digital skills in Serbia has increased from 32% in 2015 to 46% in 2019. In 2018, there were 2 000 digitally equipped classroom across Serbia which raised to over 10000 in 2019. Moreover, computer science has became compulsory for first graders, while programming has been introduced in the third grade starting from the academic year 2020/2021 ¹³⁹.

¹³⁸EIB 2020 ¹³⁹EIB 2020

Slovak Republic

	39%	Populatio with a ter	n aged 25-34 tiary degree ^a		
 -	3.3%	Percentage of immigrant stock (% population) ^b			
	18.3%	Population below the poverty line ^c			
~	11%	Youth not in employment, education or training (NEET) ^d			
	Average TIMS	SS/PIRLS scor <i>Tenter point: 50</i>	es (4th grade) ^e 00		
	535	510	521		
	Reading	Math	Science		
	Average PISA scores (10th grade) ^f OECD average				
	Average P	ISA scores (1 OECD average	oth grade)		
	Average P 458	ISA scores (1 OECD average 486	464		
	Average P 458 487 Reading	OECD average 486 489 Math	464 489 Science		
	Average P 458 487 Reading 4%	PISA scores (1 OECD average 486 489 Math public spe education GDP ^g	464 <i>489</i> Science nding in as a % of		

Upper secondary school
General (33 %)
Vocational (67 %)

Lower secondary school (Common track)

> Primary school (Common track)

> > **Pre-school**

Sources: a, b, c, d, g: World Bank Indicators ; e: TIMSS 2019 report, PIRLS 2016 report; f: PIS/ 2018 results, h: European Commission

General features

Educational system

In Slovak Republic compulsory school starts at 5 and ends at 16. Compulsory education is free and available for everybody. The official language of instruction is Slovak, however, ethnic and linguistic minorities also can attend schools in other languages such as Hungarian, Ukrainian, Bulgarian, Ruthenian, and German. Students sit in the same school for the entire duration of compulsory schooling, following approximately the same curriculum.

Governance and funding

The Ministry of Education, Science, Research and Sport defines the core curriculum. Municipalities are in charge of self-governance for pre-primary, primary and lower-secondary school. Regions are mostly in charge of upper-secondary school. Public schools are funded by the state. Moreover, the state provides funds also to private and church-led schools.

Performance

According to the last PISA assessment (2018), students in Slovak Republic scored lower than the OECD average in reading and similarly to OECD in mathematics and science. The percentage of students who reached basic skills in reading, maths and science is slightly lower than the OECD average: (respectively 69% 75% 71% compared to OECD averages of 77% 76% and 78%).

The gender gap in reading is in favour of girls (34 points), slightly higher than the OECD average (30), while in science and maths the gap between boys and girls is not significantly different.

Socio-economically advantaged students outperformed disadvantaged one by 106 score points, a number that is larger than the OECD average of 89 points, and 9%, a number closer to the OECD average (11%) was able to score in the top quarter for reading. Among high-achieving students, a high percentage of disadvantaged ones (30%) expected not to complete tertiary education, compared to roughly 5% of the advantaged students.

Key policy challenges

Integration of marginalized groups and ethnic minorities poses a serious challenge to the equity of the overall educational system. Roma students are severely discriminated in schools: they tend to be segregated in special schools for students that display non-severe mental disabilities, after being screened by specialist during pre-primary or primary school. A report from Amnesty International¹⁴⁰ shows that many children have been misdiagnosed with disabilities, because the tools used in the screening test are biased and culture-specific. Moreover, psychologists in charge of administering the test hold strong negative prejudices against Roma people.

Recently enacted policies and investments

In 2015, the NUCEM¹⁴¹ gradually started the implementation of electronic assessment in primary and secondary school. As a consequence of the school closure due to the COVID-19 pandemic, some primary school students did not achieve the expected knowledge and skills required for their grade, and last-year students did not possess the necessary competences to successfully transition to secondary school. In 2020, during distance learning, NUCEM made available new e-assessments to all schools in the country to assess competencies in reading, maths, science, foreign languages and financial/statistical literacy.¹⁴²¹⁴³

To alleviate the adverse effects of the learning loss due to distance learning, the Slovak Republic is piloting two initiatives¹⁴⁴: the Adjusted Objectives of Education and the Curriculum Framework by Cycle of Education. These provide schools with more flexibility and guidance in terms of curriculum setting, allowing schools to organize learning in multi-year cycles, so that they can adapt teaching to the level of the learning students and can more easily allocate time to adjust any arising learning gap¹⁴⁵.

¹⁴⁰Amnesty International

¹⁴¹National Institute for Certified Educational Measurements: https://www.nucem.sk/en/nucem

¹⁴²Počas dištančného vzdelávania bol najväčší záujem o e-testy z čitateľskej gramotnosti ([During distance learning, the greatest interest was in e-test in literacy)

¹⁴³Increasing the quality of primary and secondary education with the use of electronic testing, NUCEM

¹⁴⁴Education Policy Outlook 2021: Shaping Responsive and Resilient Education in a Changing World (OECD)

¹⁴⁵National Institute for Education of the Slovak Republic. Methodological guidance - Framework curricula by cycle of education



Figure 1.11: Educational system in Slovak Republic

The Structure of the European Education Systems 2021/22, Eurydice. European Commission

Slovenia



Population aged 25-34 with a tertiary degree^a

Percentage of immigrant 11.4% stock (% population) ^b

12.7%

Population below the poverty line ^c

6.6%

Youth not in employment, education or training (NEET)^d

Average TIMSS/PIRLS scores (4th grade) ^e Center point: 500

542

NA

NA

Reading

Math

Science

Average PISA scores (10th grade)[†] OECD average

495 487 Reading

509 489 Math

507 489

Science

4.9%

public spending in education as a % of GDP^g

2.5

billions allocated in NPRR^h

3

Upper secondary school General (34%) Vocational (66 %)

Primary & lower secondary school (Common track)

Pre-school

General features

Educational system

In Slovenia compulsory school starts at 6 and lasts for 9 years. For during this period, students sit in the same school and follow a common curriculum (*Osnovska skola*). Then, students can freely choose an upper secondary school track depending on their skills and interests. Upper secondary education can last from 2 to 5 years, depending on the chosen track. Available tracks are (i) general education (ii) technical education and (iii) vocational education. The official language of instruction is Slovenian, but ethnic minorities (Hungarian and Italian) in ethnically mixed regions can attend schools in which instruction is in their own language.

Governance and funding

In Slovenia the school system is mainly public and education is free for everybody. Both central government and single schools share governance. The first one is mainly responsible for upper secondary school, and municipalities for lower grades. The annual expenditure per student is comparable to the OECD average.

Academic Performance

According to the last PISA assessment (2018), students in Slovenia scored higher than the OECD average in all the subjects of the assessment (reading, maths and science). Similarly, the percentage of students who reached basic skills in reading, maths and science is higher than the OECD average: (respectively 82% 84% 85% compared to OECD averages of 77% 76% and 78%). Moreover, the percentage of students who reached maximum proficiency in mathematics is very high (14 % compared to 11 % of OECD average).

The gender gap in reading is in favour of girls (42 percentage point), higher than the OECD average (30 points). In maths the gap between boys and girls is not significantly different, while in science, girls outperformed boys by 10 points on average.

Socio-economically advantaged students outperformed disadvantaged one by 80 score points (a number smaller than the OECD average of 89), and 12% of them (a higher number than the OECD average of 11%) was able to score in the top quarter for reading.

Among high-achieving students, a high percentage of disadvantaged ones (33%) expected not to complete tertiary education, compared to roughly 13% of the advantaged students.

Key policy challenges

Social inclusion of immigrants and ethnic minorities (i.e., Roma people) must be strengthen to ensure equity of the educational system

Successfully transitioning students into the job market represents a serious challenge: The percentage of Vocational and educational training (VET) is among the highest in EU, but the employment rate of VET graduates recently plummeted from 84.5% to 71.6%.

Recently enacted policies and investments

Slovenia decided to allocate more than 10% of its funds for the Recovery and Resilience Plan to education and training. One of the main areas of intervention is the digitalization of the educational system to support distance learning. Slovenia is planning to use nearly 67 million to provide better digital infrastructure to schools (internet and laptop).

To promote integration, the government decided to sustain the learning of Slovene language among immigrant students, by increasing the number of hours of teaching (Cedefop and ReferNet, 2021) and, starting from 2020, by hiring extra language teachers. Finally, it started providing schools with assistant teachers in classes where ethnic minorities (such as Roma student) are present.

To help young people with special needs to transition to the labour market, Slovenia created the "Project Transition of young people to the labour market" in partnership with EU ¹⁴⁶, where beneficiaries are provided with personalized counseling and information on which schools and profession might suit better their interests and needs.

¹⁴⁶ https://prehodmladih.si/



Figure 1.12: Educational system in Slovenia

The Structure of the European Education Systems 2021/22, Eurydice. European Commission

2

Cross-country Comparison of Inequalities in Education

Inequalities in educational outcomes are widespread across countries. The schooling systems are facing severe challenges to provide high-quality education to all children; this situation has been exacerbated by the COVID-19 pandemic and the consequent school closure. Learning losses as a consequence of distance learning are widening pre-existing gaps and inequalities within each country. In this chapter, we summarize the gaps in the performance of the PISA tests (math, reading, and science) of the 12 countries taken into consideration, comparing them with OECD and EU averages, and underlying gaps in terms of gender, immigrant status, socio-economic status, and place of residence (rural vs urban). We focus on these dimensions as the performance in standardized test scores, especially in math, is a good predictor of students' future outcomes, such as university enrollment and earnings. Furthermore, the increased sophistication and expansion of financial services have made financial literacy globally recognized as an essential skill, especially for young people who are likely to bear more financial risks during their lifetime as a consequence of an increased life expectancy, less welfare protection, and more uncertainty in retirement income.¹. Across OECD countries, around 20% of the performance variation in financial literacy is independent of performance in the mathematics and reading assessments, thus only relating to aspects that are unique to financial literacy.² Therefore, when available, we supplement the analysis with data on financial literacy.

2.1. Gaps by Socio-Economic Status

Socio-economic status is among the most important predictors of performance and academic achievements, with disadvantaged students performing worse compared to their peers in all subjects.³ However, the share and the performance gap of disadvantaged students vary significantly across countries.

Figure 2.1 shows the percentage of students in the bottom 25% of the OECD Index of Economic, Social and Cultural Status⁴ in each country considered in this report: Bosnia and Herzegovina and Romania have more than 30 % of students in the bottom quartile, while only Slovenia has a percentage of disadvantaged students that is less than 10%. The light blue bar in Figure 2.1 shows that in all countries, the percentage of high-performers (defined as the students who scored in the top 25 % of the distribution of overall performance in PISA 2018) from disadvantaged families is extremely low, suggesting deep implications for social mobility in the country, as disadvantaged students struggle to be among the top performers.

Figure 2.2 shows the average performance for high and low socio-economic students and gap in performance along the three subjects tested in PISA (mathematics, reading and science). The score

¹https://www.oecd.org/education/pisa-2018-results-volume-iv-48ebd1ba-en.htm

²idem

³For instance, they are less likely to achieve a minimum proficiency level in reading according to PISA 2018 results.

⁴The Programme for International Student Assessment (PISA) index of economic, social and cultural status was created on the basis of the following variables: the International Socio-Economic Index of Occupational Status (ISEI); the highest level of education of the student's parents, converted into years of schooling; the PISA index of family wealth; the PISA index of home educational resources; and the PISA index of possessions related to "classical" culture in the family home. Source: OECD

Figure 2.1: Share of disadvantaged students



gap is consistent across subjects, and even if in all countries advantaged students perform significantly better than their disadvantaged counterparts, the gap in performance varies from around 40 points to more than 80. Countries that on average display a high score in performance hide large gaps by socio-economic status. For instance, in the Slovak Republic the gap by socio-economic background in maths is around 80 points, more than twice the gap in Bosnia and Herzegovina.



Figure 2.2: Performance in PISA 2018 and score gap according to socio-economic status

Source: Own elaboration of OECD PISA 2018 Data

As we discussed in Chapter 1, most education systems are segregated in different tracks at highschool. However, the age of tracking varies in different countries. Figure 2.3 shows the correlation between the age of tracking and the gap between children with high and low socio-economic status, as well as the gap between immigrants and natives. Three of the countries with the highest gap by socio-economic status, Austria, Germany and Czech Republic, are associated with school tracking at 11 years old or earlier. Providing support in career counseling for disadvantaged students seems key to mitigate inequalities in education, as students with a low socioeconomic status may have more limited information on the implications of track choice on the educational and occupational career.

Figure 2.4 and 2.5 show that on average, in all countries, disadvantaged students are much less





Figure 2.4: Expectations to go to university by socioeconomic status



likely to expect to go to university and work in a prestigious job when they are 30. This is true for the majority of the countries, even among high achieving students, as shown in Panel B of each Figure (students who are at the top 25% of the distribution in terms of performance). However, the gaps are particularly severe for high-achieving students from low socioeconomic status in Hungary, Germany, Czech Republic⁵ This is important because independently from academic performance, poorer students might internalize higher constraints to achieve potential goals, due to a variety of factors (lack of role models in the family, lack of financial resources, lack of information etc.) and this might translate into lower aspirations and self-efficacy. Existing evidence shows that expectations and aspirations are highly correlated (La Ferrara, 2019), and that aspirations play a role in individuals' decision on educational investments and occupational choices (Carlana et al., 2022a).

Moreover, some studies show that family characteristics and socio-economic background are crucial for inter-generational transmission of financial knowledge⁶

⁵PISA data also show that socio-economically disadvantaged students expect to go to university much less than their more advantaged peers (See Appendix Figure A.2).

⁶Using USA National Longitudinal Survey of Youth fielded in 2007-2008, Lusardi et al. (2010) show that mother's education is strongly associated with financial literacy of the son, above all if a respondent's mother graduated from college. Moreover, each of the proxy for family wealth and family financial sophistication (such as stocks or retirement savings) is also associated with the level of financial literacy of the respondent.





Main results and potential focus of future interventions to improve schooling outcomes and reduce socio-economic inequalities:

- Among the countries in Unicredit focus area, the results from this section show that Bosnia and Herzegovina, Bulgaria, Romania and Serbia have the lowest PISA test scores in all subjects.
- 2. Countries with the highest share of disadvantaged children are **Bosnia and Herzegovina** and **Romania**.
- 3. Countries with the highest inequality in education by socio-economic status are **Hungary**, **Slovak Republic, Germany, Austria and Czech Republic.**

2.2. Gender Gaps

Several studies have focused on documenting and understanding gender gaps in performance and aspirations (Borgonovi et al., 2018; Mostafa, 2019; Brussino and McBrien, 2022). Despite some recent attention and advances trying to address gender inequalities, there are still some important gender disparities in educational outcomes. The PISA 2018 data show that on average, girls significantly outperform boys in reading and the pattern is confirmed in the twelve countries described in details in this report (See Figure 2.6, panel b and e for the PISA 2018 assessment) with substantial gaps between 20 and 40 points in each country. Boys outperform girls in maths in most countries (See Figure 2.6, panel a and d for the PISA 2018 assessment). These gaps are particularly severe in Italy and Austria and are concerning because math performance has been shown to be a good predictor of readiness for science, technology, engineering, and math (STEM) universities and future labor market outcomes Card and Payne (2017). The under representation of girls in STEM fields can lead to a persistent gender gap in wages, given that STEM occupations are among the highest-paying ones.

Across all countries, women are more likely to attend university and the gap is even higher if we consider girls' aspirations. Appendix Figure A.2 shows the share of girls that expect to go to university is substantially higher than the share of boys. However, even among high-performing students, expectations on the future job highly reflect gender stereotypes. Figure 2.7 shows that among high-performing students in maths, female students are much less likely to expect a job in STEM ⁷ fields. Among the countries analyzed, only 10% of girls with high math performance are interested in a STEM career in Italy, Austria, Czech Republic and Germany. The share does not reach 30% in any of the country analyzed.

⁷Occupations have been classified in PISA 2018 data according to International Standard Classification of Occupations 2008 (ISCO-08). A job has been classified in a STEM field if it corresponded to the following categories: "Science and engineering professionals", "Information and communications technology (ICT) professionals", "Science and engineering associate professionals" and "Information and communications technology (ICT) associate professionals"



Figure 2.6: Performance in PISA 2018 and score gap according to gender status

Source: Own elaboration of OECD PISA 2018 Data

One of the reasons suggested to explain under representation of women in scientific disciplines is that gender stereotypes play an important role in gender gaps. There might be some features of both the family environment and educational system that allow explicit and implicit stereotypes against females in scientific disciplines to perpetuate, such as teachers' grading (Carlana, 2019; Rakshit and Sahoo, 2021). Both parents and teachers hold different beliefs (and therefore hold different interactions) towards boys and girls, which, in turns can lead to disparities in learning, aspiration and occupational outcomes (Hoisl et al., 2022; Rodriguez-Planas and Nollenberger, 2018). Moreover, a higher participation of women in the labour market is associated with better learning outcomes among girls (van Hek et al., 2016). This is explained by the fact that when Female Labour Force Participation (FLFP) is low, returns to education are lower for girls than for boys, and this might discourage parents to invest in further education for female children.

Figure 2.8 shows that across countries there is a negative correlation between the share of women who graduated or are employed in a STEM field, and gap in math performance between girls and boys. This is consistent with some studies (Guiso et al., 2008) highlighting a possible link between social



Figure 2.7: Percentage of high-performing students expecting a job in STEM fields

(a) Women who graduated in a STEM subject

20 20 ITA AUT Gap in maths between males and females Gap in maths between males and females 9 2 DEU SRB 0 0 은 -10 20 -20 60 20 30 40 Share of women gradua 50 ated in STEM 35 40 45 Female Share of STEM occupati 50 55

Figure 2.8: Correlation between performance gaps in maths (Boys vs Girls) and women presence in STEM

norms and gender gaps in mathematical performance: the more a culture is gender equal, the least we observe gaps in mathematics performance between girls and boys (Nollenberger et al., 2016).

Another important dimension of gender gap that emerges already in adolescents is the imbalance in socio-emotional skills that are determinants for success, such as self-confidence and leadership. It is well documented that women occupy top executive positions in politics and industry much less frequently than men. Self confidence and leadership represent crucial components of many such careers. Existing evidence (Alan et al., 2020) shows the social confidence, a major component of leadership.⁸, dramatically declines for girls in the adolescence period. Along the same line, PISA 2018 data show that boys are more likely than girls to report positive attitudes towards competition. However, cross-country comparisons show large variations in the magnitude, and even the direction, of the gender gap. In Bulgaria, for example, girls and boys report similar negative attitudes towards competition.

Gender also matters in financial literacy gaps. Appendix Figure A.3 shows that Italy is the country with the highest gender gap in financial literacy among those with data available.¹⁰

Main results and potential focus of future interventions to reduce gender inequalities:

- Among the countries in Unicredit focus area, Italy and Austria have the highest gender gaps in math performance, with girls lagging behind compared to boys. This is problematic as it correlates with the long-term probability of entering into highly-profitable STEM occupations.
- In all countries, there is a substantial gender gap in reading performance, with girls outperforming boys.

2.3. Immigrant-Native Gaps

Across countries, immigrants represent a vastly heterogeneous group, holding different cultures and speaking different languages. The type of immigrants that are present in a country might vary according to immigration policies, with some countries accepting a greater share of skilled highly-educated immigrants versus refugees and asylum seekers. Although this is not always the case, immigrant students tend to come from a socio-economically disadvantaged background. Figure 2.9 shows the percentage of immigrants and, among them, the percentage of socio-economically disadvantaged ones inside the

(b) Female share of STEM occupation

⁸Social confidence is measured by willingness to assume the decision-maker role in a group Alan et al. (2020) show that while there is no gender difference in willingness to make risky decisions on behalf of a group in a sample of children, a large gap emerges in a sample of adolescents in a field experiment in Turkey.

⁹PISA 2018: Where all students can succeed

¹⁰The average gender gap is represented by the triangles.

PISA 2018 sample in each country.¹¹



Figure 2.9: Share of immigrants

Figure 2.10 shows that immigrants significantly under perform compared to their native counterpart in reading, mathematics and science. Some countries with a significant share of immigrants (i.e. more than 30%) such as Austria and Germany, display large gaps in all the three subjects in consideration. This is in line with existing studies consistently showing that immigrant students under perform compared to natives (Marks, 2005; Mostafa, 2010; Carlana et al., 2022a).

Possible reasons that have been put forward to explain these gaps are (i) lower language skills and (ii) disadvantaged socio-economic background: immigrants tend to be less educated, engage in less prestigious jobs and, in turns, earn lower incomes. However, there is a substantial part of this gap that is not explained by these features (Azzolini et al., 2012). Another reason for the existence of this gap might be represented by differences in human capital across parents' countries of origin: students whose parents come from high-scoring countries in standardized international tests do better than their peers with similar socioeconomic backgrounds (Philippis and Rossi, 2021). Immigrants also (with the exception of Hungary) hold lower aspirations than natives: the share of immigrants who want to go to university is lower than the share of natives, and this is particularly low in some countries (such as Italy, Bulgaria or Slovak Republic). Structural features within educational systems might undermine immigrants' aspirations, such as differential teachers' track recommendation into lower prestigious tracks (Carlana et al., 2022b), from where access to higher education is more difficult.

Appendix Figure A.4 shows the gap in financial literacy for immigrants versus natives. On average, immigrant students score 30 points lower than non-immigrant students across OECD countries.

Main results and potential focus of future interventions to reduce immigrant-native inequalities:

- 1. Among the countries in Unicredit focus area, **Austria, Germany, and Romania** have the highest share of immigrants among their high-school student population.
- 2. The immigrant-native gap is severe in many countries, including Austria, Germany, Slovak Republic, Slovenia, Italy, Czech Republic, and Bosia Herzegovina.

¹¹It is important to notice that the share of disadvantaged students is probably a lower-bound estimate, given that they might be less likely to attend school.

Source: Own elaboration of OECD PISA 2018 Data



Figure 2.10: Performance in PISA 2018 and score gap according to immigrant status

2.4. Rural-Urban Gaps

In most countries, schools in rural areas are quite isolated, less equipped than urban ones and, on average, present a higher rate of absenteeism.¹² Students in urban areas tend to perform better than students in rural ones (See Figure 2.11, with the exception of Austria and Germany). However, a recent study¹³ on learning in rural school shows that the gap in performance between rural and urban areas disappears after accounting for socio-economic status. In terms of aspirations, students residing in rural areas are less willing to complete a university degree than urban ones, but this gap persists even when rural students have a similar socio-economic status. Finally, opportunities to acquire financial skills and performance in financial literacy might be related to where students live, hence whether their school is located in an urban or rural area. Students in rural areas score worse than students in urban areas. However, students in urban areas are generally of higher socio-economic status and performance in these two subjects, PISA 2018 data show no significant difference between urban and rural in financial literacy performance. ¹⁴

2.5. Summary of Gaps and Regression Analysis

Table 2.1 shows the results of a linear regression using the 2018 PISA data with fixed effects at country level. The sample is restricted to the 12 countries under consideration. We examine the association of the individual characteristics mentioned in chapter 2 with performance in reading, mathematics and science on the PISA test. Being female is positively associated with the performance in reading (roughly 28 points, panel A), and in science (12.2 points, panel C), although in the latter case this correlation is not statistically significant. Panel B shows that there is a negative correlation between being female and performance in maths (-8.9 points). Coming from a disadvantaged socio-economic background, having an immigrant background and residing in a rural area are all associated negatively with performance across the three subjects. Even after controlling for all these characteristics, the gaps along these dimensions remain significant and do not change substantially in magnitude, with the exception of the coefficient "Immigrant", which from -45/-50 declines to -30/-36.

¹²PISA Results, Volume III

¹³Learning in rural schools: insights from PISA, talis and the literature

¹⁴PISA 2018 Results: Are students smart about money?



Figure 2.11: Performance in PISA 2018 and score gap according to rural/urban location

Panel A: performance in reading					
	(1)	(2)	(3)	(4)	(5)
Female	27.900*** (1.361)				26.514*** (1.333)
Low socio-economic status		-69.060*** (1.669)			-67.149*** (1.696)
Immigrant			-51.700*** (1.922)		-32.167*** (2.173)
Rural				-10.351*** (1.494)	-13.849*** (1.428)
Obs.	78622	76654	78622	78622	76654
R^2	0.079	0.148	0.100	0.062	0.118
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Panel B: performance in m	aths				
	(1)	(2)	(3)	(4)	(5)
Female	-8.911*** (1.236)				-11.267*** (1.210)
Low socio-economic status		-67.788*** (1.498)			-66.740*** (1.539)
Immigrant			-45.998*** (1.666)		-30.090*** (1.879)
Rural				-8.246*** (1.350)	-10.426*** (1.296)
Obs.	78622	76654	78622	78622	76654
R^2	0.069	0.164	0.105	0.068	0.117
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Panel C: performance in so	cience	(2)	(2)	(4)	(5)
	(1)	(2)	(3)	(4)	(3)
Female	0.122 (1.287)				-2.050 (1.276)
Low socio-economic status		-68.024*** (1.563)			-66.307*** (1.591)
Immigrant			-53.418*** (1.788)		-36.747*** (2.057)
Rural				-7.050*** (1.406)	-11.335*** (1.364)
Obs.	78622	76654	78622	78622	76654
\mathbb{R}^2	0.082	0.176	0.130	0.083	0.114
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes

Table 2.1: Regression analysis using PISA data (2018)

 $\overline{\text{Source: PISA data 2018. The sample in these regressions considers only the 12 countries of analysis in this report.} All the regressions have with fixed effects at country level.}$

3

Successful Interventions to Improve Youth Education

This chapter provides a summary of the key successful interventions implemented across the world to improve youth education. We will present evidence on the causal impact of interventions, with a specific focus on those aimed at addressing gaps in educational outcomes by gender, immigration status, and family socio-economic status.

3.1. Tutoring and Mentoring

Tutoring interventions have proven to be among the most effective to improve students' academic outcomes. In a meta-analysis of 96 tutoring interventions evaluated with randomized control trials Nickow et al. (2020) find that tutoring has an overall positive impact on learning outcomes, with a pooled effect size estimate of 0.37 SD. In particular they state that tutoring is more effective if delivered by teachers or paraprofessional (versus volunteers and parents tutoring), and tend to be strongest among earlier grades. However, the majority of tutoring interventions holds two key limitations: costs and scalability. The cost per pupil is extremely high as students require one-to-one or small group interaction with a tutor. Moreover, organizational constraints hamper the possibility of implementing tutoring on a large scale.

Carlana and La Ferrara (2021) evaluate the impact of a Tutoring Online Program (TOP) aimed at addressing these two key challenges, while improving learning outcomes of disadvantaged children. The program was implemented for the first time in Italy during the lockdown in the Spring 2020 and it is currently scaled in Italy, Dominican Republic and Brazil. They find that during the spring 2020 lock-down online tutoring increases performance by 0.26 SD for disadvantaged children, and significantly improves pupils' socio-emotional skills, aspirations, and psychological well-being. These effects are stronger for children from the lowest socioeconomic status and, in the case of well-being, for immigrant children. The intervention had a limited cost per student, as tutoring is provided by volunteer university students who are trained and supported by a team of pedagogical experts. The same program has been replicated in 2022 in a post-pandemic situation, when schools were almost fully returning to in-person teaching. The evaluation shows consistently positive effects on learning of individual tutoring of around 0.25 SD, which corresponds to more than one year of achievements, while the effect of group tutoring is smaller (0.08 SD, statistically indistinguishable from zero). In this case, the effect of the tutoring program was positive but not statistically significant at conventional levels for aspirations, socio-emotional skills and well-being ¹.

¹A possible limitation of an online tutoring intervention can be the availability of a device and a good internet connection. However, there is evidence on the effectiveness of phone tutoring that might mitigate this concern in the most disadvantaged settings. Hassan et al. (2021) evaluate the impact of randomizing an over-the-phone learning support intervention on 200 Bangladeshi villages among primary school students. Tutors are volunteers and university students providing support in Maths and English. They find an improvement 0.75 SD in test scores for treated children with the impact being persist after one year and more intense among academically weaker children.

Hardt et al. (2022b) provide evidence on the effectiveness of online tutoring for higher education in Germany. They conduct an RCT offering weekly remote peer tutoring ² to university students in microand macroeconomics. They find that treated students perform about 30% of a SD better than students who did not receive the online tutoring, with a magnitude comparable to Carlana and La Ferrara (2021) described above.

Tutoring has proven effective also when target students are immigrants and socially excluded minorities. Battaglia and Lebedinski (2015) investigate the effects of the Roma Teaching Assistant Program targeting the Roma minority in Serbia. The program assigns Roma Teaching Assistants to each eligible schools in order to provide Roma students with additional in-class and out-of-class support and to build a bridge between their community and the school.³ The program reduces absenteeism by 0.12 SD in treated schools. Children in the first grade benefit more from the program as compared to their older peers: grades improve by 0.296 SD in Serbian and 0.284 in Maths. Battaglia and Lebedinski (2021) assess the impact of the very same program in the medium term (5 to 8 years of intervention). Although treated Roma students are not more likely to go to secondary school, if they do, they are more likely to choose longer secondary school tracks compared to their control counterparts. Effects on medium-term educational attainments are found only in treated schools with a low number of Roma pupils: Roma students receive higher grades by 0.405 SD more in the Math test compared to their counterparts in control schools. Interestingly, they provide evidence of positive spillover effects of the program on the educational attainments of Non-Roma students in treated schools. This finding is in line with other recent studies that suggest that intervention aiming at improving the bottom of the achievement distribution have the potential to benefit all. In this respect, Berlinski et al. (2022) find that an intervention aiming at providing low-performing third grade students in Colombia with educational support significantly improves test scores of non-treated children in treated schools.

Mentoring can also be used to improve educational outcomes for low achievers. Kosse et al. (2020) evaluate the impact of a mentoring program for disadvantaged elementary school children in Germany that aims to enrich their social environment and enable their acquisition of new skills through an authentic relationship with a caring adult. The findings show a statistically significant improvement in the prosocial behavior and a 10 percentage points increased likelihood of high-track attendance in school for the children assigned to the intervention, compared with children in the control group, but no effects on test scores.

Several interventions combine tutoring with coaching or mentoring programs. Oreopoulos et al. (2017) investigate the effects of the program "*Pathways to Education*" implemented in the USA targeting students from very poor socioeconomic background in high schools. The program includes proactive mentoring, daily tutoring, and group activities. They find evidence that it rises graduation and post-secondary enrollment rates for Pathways-eligible students. When analysing the long-term effects of the program, Lavecchia et al. (2020) find that eligibility increases adult annual earnings by 19%, employment by 14%, and reduces welfare receipt by more than 30%. However, long-term effects of such programs are mixed. Rodríguez-Planas (2012) evaluate the Quantum Opportunity Program (QOP) offering mentoring, educational services, and financial rewards to low-performing high school students. The students who receive support from the program obtain their high school diplomas earlier and are more likely to attend post secondary education compared to those student who do not benefit from the program. However, no significant effects are found on employment outcomes later on.

Recent studies assess how far technology can go in supporting students through remote mentoring and coaching programs to help reduce the cost and improve the feasibility of such intervetions. Hardt et al. (2022a) evaluate an RCT on remote peer mentoring at a German university that switched to online teaching due to the COVID-19 pandemic finding positive impacts on motivation, studying behavior, and exam registrations. Oreopoulos and Petronijevic (2018) randomly assign more than 4,000 students from a large Canadian university to control, online exercise, text messaging, and one-on-one online coaching finding large effects on academic outcomes from the coaching program but no effects from either technology-based interventions. However, Oreopoulos et al. (2020) find that two mentoring online interventions consisting of (i) an online module to help students overcome barriers and (ii) text-message coaching program have a positive and significant impact on non academic outcomes such as feelings

²Students meet in small groups of two or three people with the support of a more senior student

³Schools are eligible based on percentage of Roma in school at application. The main criterion for getting admitted to the program is having a share of Roma between 5% and 40%. The program provides one assistant per school only. Thus, the higher is the number of Roma pupils she needs to interact with, the lower is the intensity of the program.

of satisfaction and belonging.

	Summary: Tutoring and Mentoring					
	Intervention	Effectiveness	Limitations	Key studies		
	In Person Tutoring	+++	High Cost and Low Scala- bility	Nickow et al. (2020)		
	Online Tutoring	+++	Recruitment of volunteers	Carlana and La Fer- rara (2021); Hardt et al. (2022b)		
	Mentoring	++	Limited effect on test scores	Kosse et al. (2020), Ore- opoulos et al. (2020), Hardt et al. (2022a)		

The scoring criteria for effectiveness are presented in Table A.1 in appendix

3.2. Information and Career Counselling

Public and private returns to higher education depend on whether or not students make informed choices about when and where to study. Information asymmetries about earnings and costs associated with educational investments are higher for low-income students. Using a large scale surveys from college applicants in Chile, Hastings et al. (2016) assess the causes and consequences of uninformed college choice finding that students students with low socioeconomic status (SES) (i) are more likely to rely on advertising and publicity, (ii) are less likely to rely on in-school sources than students from high-SES backgrounds (iii) have less accurate expectations on earning outcomes than other students. When studying the effect of college admission on labor market earnings, Hastings et al. (2013) find that earning gains associated with highly selective degrees are just as large for students with low SES as those for students with high SES. Hence, there is room for policymakers to guide students toward higher-return degrees in at least two different ways: (i) by supplying information (ii) by providing career counselling with better college preparation for students from low- socioeconomic backgrounds which enables them to qualify for more selective higher education degrees.

Hastings et al. (2015) study the effects of providing information about college- and major-specific earnings and cost outcomes to college applicants in Chile. They find that disclosing information is more effective for students with low SES, reducing the demand for low earnings college by 4.6% and dropouts. Importantly, disclosure does not affect whether students enroll in college, but has an impact on which degree program they choose. Disclosure reduces but does not eliminate demand for low return programs, possibly because students' preferences for non-earning attributes limit the impact of changes in beliefs on enrollment decisions. This is consistent with Wiswall and Zafar (2015) who estimate a structural life cycle utility model of college major choice and provide evidence that (i) heterogeneity in major specific and unobserved tastes⁴ are a dominant factor for students (ii) these tastes for majors play a much larger role for older than younger students.

Targeting youth misperceptions of their own talent and skills has proven to be effective to have a positive effect on educational outcomes, especially for low-SES students' educational choices. Exploiting a one-year policy change in high school in Spain, Azmat and Iriberri (2010) study the effect of providing students with relative performance feedback information in addition to the usual individual performance information. They find a strong positive improvement on students' performance which amounts to 5% increase in their grades, with the strongest effect coming from both the tails of the ability distribution ⁵. However, when the feedback information is removed, the effect disappears with no lasting effect of the treatment.

More interestingly, Bobba and Frisancho (2016) implement a field experiment that provides students from less advantaged backgrounds with individualized feedback on academic performance during the transition from middle to high school, reducing the gap between expected and actual performance.

⁴An example can be the enjoyability of coursework and other non pecuniary aspects

⁵Precisely, the effect is significant only for students in the first and fourth year of high school when it is reasonable to think that the information matters the most: performance in the first year of high school provides relatively new information while in the fourth year performance information is particularly important in determining the final university entry grade.

The shift in revealed preferences on high school tracks induced by the intervention affects schooling trajectories, with better-performing students being assigned into more academically oriented tracks.

In schooling systems where high school choice requires selecting into different tracks, immigrants can be particularly vulnerable to biased recommendation when making this choice, as their families may have a more limited information set on the local schooling system and they may give a higher weight to the teachers' suggestions (Carlana et al., 2022a). In Italy, for example, immigrants enroll disproportionately more into vocational high schools, as opposed to technical and academically-oriented ones, compared to natives of similar ability. Carlana et al. (2022a) assess the effect of the program "Equality of Opportunity for Immigrant Students" (EOP) providing career counseling to high-ability immigrant students through grade 7 and 8, finding that the program completely closes the immigrant-native track choice gap at the end of grade 8.

The importance of tracking for low socio-economic status is further documented by Malamud and Pop-Eleches (2011) who show that postponing such choice can increase university attendance among disadvantaged students. By exploiting a unique educational reform in Romania, which delays students tracking into academic or vocational schools, they find that the reform increases the fraction of students who complete academic high school together with the proportion of students who become eligible to apply to university. However, youth's misperceptions about their skills can lead them to favor choices with high average returns but low individual-specific returns. This rises the concern that low-achieving students can get discouraged when realising they do not have the ability to get into selective high school programs, and eventually would drop out of high school. Based on a randomised controlled trial in 37 middle schools in the suburbs of Paris, Dominique Goux (2017) show that a series of meetings facilitated by the school principals can help low-achievers to formulate educational objectives more aligned to their academic aptitudes: by changing the high school plans of the less realistic students, the intervention reduces grade repetition and dropout respectively by 25% to 40%.

	Summary: mormation and Career Counseling					
	Intervention	Effectiveness	Limitations	Key studies		
	Info on Earnings	++	Critical outreach compo- nent: possible take up is- sues. Students' prefer- ences for non earnings attributes might limit the scope of disclosure po- lices	Hastings et al. (2015)		
	Info on Own Skills	++	Limited external validity. Effectiveness might de- pend on the grade tar- geted	Bobba and Frisancho (2016), Azmat and Iriberri (2010)		
	Career counseling	+++	Design limitations due to ethical concerns	Carlana et al. (2022a) , Dominique Goux (2017)		

The scoring criteria for effectiveness are presented in Table A.1 in appendix

3.3. Financial Literacy Training

Evidence on the effectiveness of school-based financial education is still scarce. Kaiser and Menkhoff (2020) provide a first quantitative meta-analysis including 37 (quasi-) experiments, focusing exclusively on the impact of school-based financial education among children and youth. They find that these have, on average, a sizeable impacts on financial knowledge of 0.33 SD, a similar magnitude in impact to educational interventions in other domains. However, they document a smaller effect on financial behaviors among students (+0.07 SD). The difference between the impact on knowledge and the impact on behaviours can be motivated by at least two factors: (i) incorporating financial knowledge into financial behavior is more likely when financial decisions are more immediate and relevant, which is not the case for young students (ii) financial behavior among youth are inherently more difficult to measure, since they engage much less in financial transactions. As a matter of fact, behavioural changes induced by financial literacy programs are still controversial. Bruhn et al. (2016) study the impact of a comprehensive financial education program for public high school students in Brazil. They find positive treatment effects on student financial proficiency and graduation. However, they also find a statistically significant increase in borrowing by students in treated schools and greater likelihood of purchasing consumer items, along with a grater use of expensive financial products. The unintended effect of increasing the purchase of expensive installments and credit plans is possibly due to a multitasking problem deriving from the characteristics of the curriculum offered where no clear instruction is given for purchasing financial items.

Summary: Financial Literacy						
Intervention	Effectiveness	Limitations	Key stu	dies		
School-based train- ing	++	Limited evidence on finan- cial behavior	Kaiser (2020)	and	Menkhoff	

The scoring criteria for effectiveness are presented in Table A.1 in appendix

3.4. Norms and Stereotypes

Schools often reflect and reinforce the discriminatory norms and stereotypes found in the wider society. This may lead to gender and racial gaps in education as described in Chapter 2. Stereotypes are overgeneralized and simplified representations of differences between groups Bordalo et al. (2016). They allow for easier and efficient processing of information, but they may cause biased judgment or even discrimination against particular groups (Carlana et al., 2022b). Stereotypes may also induce a selffulfilling prophecy if they are internalized by individuals, who start behaving in the direction predicted by the stereotype (Carlana, 2019; Glover et al., 2017). Discriminatory norms and stereotypes that affect learning and educational outcomes are common and often reflect perceptions of immigrants' and girls' competence. Moreover, they are linked to norms about "suitable" subjects for students to study or pursue as a future career. Gender norms channel girls in humanistic fields, while boys are encouraged to pursue more lucrative careers in scientific fields (Favara, 2012; Carlana et al., 2021). Racial stereotypes, in turns, may lead immigrants to under invest in their education or getting frustrated and dropping out for too high expectations.

Stereotypes communicated by teachers may be particularly detrimental for children, as they affect the development of academic self-concept (Aptarashvili et al., 2017; Rosenthal and Jacobsen, 1968). Teachers' views toward gender roles affect students' attitudes, behaviors, and outcomes. Alan et al. (2018) show that girls who are taught for longer than a year by teachers with traditional gender views, as measured by a gender stereotype score on survey questions, have lower performance in objective math and verbal tests, and this effect is amplified with longer exposure to the same teacher. The effect is partly mediated by teachers' transmitting gender-traditional beliefs to girls. Yet, teachers may discriminate even without choosing to do so. Carlana (2019) shows that implicit stereotypes induce girls to under perform in math and to self-select themselves into less demanding high schools, following the track recommendation of their teachers. Similarly, Carlana et al. (2022b) document the role of teachers' implicit stereotypes towards immigrants in explaining students' high-school track choice. They find that teachers who hold implicit bias toward immigrants are less likely to recommend them to top-tier tracks with respect to natives with similar abilities and background.

How did policies and interventions affect norms and stereotypes? We provide evidence on two different set of interventions that have been implemented to address norms and stereotypes in the schooling context: (1) increasing awareness of stereotypes (2) increasing interaction and contact.⁶

First, some innovative and effective interventions have been focusing on increasing awareness on stereotypes among teachers and students and have been found effective in mitigating overall biases in student evaluation and hiring. This set of intervention focused especially on gender bias (Boring and

⁶Beyond specific interventions, public policies promoting counter-stereotypical behaviors among parents can change the gender norms of their children. Farré et al. (2021) provide causal evidence that, at age 12, children whose fathers were eligible for paternity leave exhibit more egalitarian attitudes towards gender roles and are more supportive of mothers and fathers being equally engaged in the labor market and in the home. However, gender stereotypes can be tackled more directly through school based interventions and in this report we focus on these interventions.

Philippe, 2021; Mengel, 2021; Carnes et al., 2015; Devine et al., 2017). On the other hand, Alesina et al. (2018) study the effect of revealing own implicit stereotypes, as measured by an Implicit Association Test (IAT)⁷, to teachers of Italian middle schools randomly dividing them in two groups: some teachers chosen randomly were allowed to see their IAT score before the end of semester grading, while some others could see it only shortly after they already decided the grade. Teachers informed of their stereotypes before term grading increase grades assigned to immigrants and decrease grades given to natives compared to the other group.⁸ Hence, revealing stereotypes may be a powerful intervention to decrease discrimination. However, this type of intervention may also induce a reaction from individuals who have stereotypes but are not acting in a biased way possibly introducing a positive discrimination toward immigrants.

Some interventions have been targeting directly students' gender norms. In India, Dhar et al. (2022) evaluate a school program engaging adolescents in classroom discussions about gender equality for two and a half years with the goal of eroding their support for restrictive gender norms. They find that the program makes attitudes 0.18 SD more supportive of gender equality.

A second set of interventions focuses on the contact hypothesis, i.e., the idea that prejudice and conflict between groups can be reduced if members of the groups interact with each other provided that they share equal status, common goals, cooperation, and institutional support (Allport et al., 1954) ⁹. Dahl et al. (2021) study whether randomly assigning female recruits to some squads but not others during boot camp at Norway military service affects gender attitudes of men. They find that living and working with women for eight weeks causes (i) a 14 percentage point increase in the fraction of men who think mixed-gender teams perform as well or better than same-gender teams (ii) an 8 percentage point increase in men who think household work should be shared equally, and (iii) 14 percentage point increase in men who do not completely deny to hold feminine traits. However, changes in attitudes are no longer found six-month after the intervention, suggesting that stereotypes are malleable, but continuous exposure is fundamental. Exploiting a very similar setting, Finseraas and Kotsadam (2017) study the causal effect of personal contact with ethnic minorities on majority members' views on immigration by randomizing soldiers into different rooms during the basic training period for conscripts in the Norwegian Army's North Brigade. They find that a considerable effect of the interaction on views on immigrants' work ethic, but small and insignificant effects on welfare policy preferences. Interestingly, Corno et al. (2019) provide evidence on the effect inter-racial interactions on racial stereotypes in the specific context of university campus. They study the effect of a random allocation of roommates in a large South African university finding that living with a roommate of a different race reduces white students negative stereotypes towards black ones and increases inter-racial ties. Interaction also affects academic outcomes for black students who improve their GPA, pass more exams and have lower dropout rates.

	Summary: Norms and Stereotypes						
	Intervention	Effectiveness	Limitations	Key studies			
	Increasing Awareness	+++	Backlash and target- ing issues	Alesina et al. (2018) Dhar et al. (2022)			
	Contact Theory	+	Effectiveness very context specific with respect to the setting and the target group	Finseraas and Kotsadam (2017) Corno et al. (2019) Finseraas and Kotsadam (2017) Dahl et al. (2021)			

The scoring criteria for effectiveness are presented in Table A.1 in appendix

⁷The Implicit Association Test is a tool used by social psychologists that exploits variation in the time that individuals take to complete a rapid categorization task that involves associating concepts with visual cues about categories such as gender and race. The underlying idea is that subjects who are systematically slower in associating certain pairs implicitly reveal mental processes that tend to perceive those pairs as less common (Corno et al., 2019).

⁸It is worthy noticing that only teachers with positive explicit views toward immigrants react to the IAT score and this is consistent with the fact that the intervention provides new information for these teachers who can update their beliefs accordingly.

⁹On the other hand, a recent literature on the negative contact hypothesis contends that negative contact makes categories more salient than positive contact, potentially leading to an increase as opposed to a reduction in negative outgroup stereotyping (Paolini et al., 2010; Barlow et al., 2012)

3.5. STEM and Coding

Despite significant improvements in recent decades, participation and learning achievement in Science, Technology, Engineering and Math (STEM) education is still characterized by a significant gender gap, as documented in Chapter 2. This gap becomes more apparent in lower secondary education when students start to self select into tracks. In addition, girls' previous exposure to STEM does not guarantee the pursuit of further studies or of a job in STEM fields. Some possible reasons for this switch are that women might not like to be in an environment where female participation is particularly low or where they perceive it is very difficult to reconcile work with family life ¹⁰. According to (Akerlof and Kranton, 2000), women are likely to select a career based on their beliefs on being successful given existing gender norms, and not just make a choice as a function of the marginal returns to their skills in that sector. Building on the previous section, we analyze interventions aimed at increasing the participation of girls into highly profitable careers in STEM by (i) increasing the exposure to female role models in STEM and (ii) early exposure to STEM and coding.

Coding clubs are widespread around the world and they encourage students since early middle schools to develop their programming skills and increase their interest in STEM fields. Carlana and Fort (2022) analyze only-girls coding clubs in Italian middle schools¹¹ and find positive effects on performance and a 20% increase in the probability of attending scientific high-school for girls enrolled in the clubs. When studying the profile of female students applying to coding clubs, Carlana and Fort (2022) find that, despite their higher interest in STEM compared to other girls who do not apply, applicants still perceive gender as a barrier to achieve their educational goals. Programs aiming at increasing girls' interest in STEM may be effective in narrowing the gender gap if they manage to "hack" the perceived identity cost associated with gender stereotypes.

Carpio and Guadalupe (2021) analyze the effect of recruitment messages to potential applicants to a 5-month software coding program offered to low income women in Perù and Mexico. The program recruits young women (18-30 years old) who lack access to higher education, takes them through an immersive five-month digital coding "bootcamp" and connects them, upon graduation, with local tech companies in search for coders. In the Perù experiment, they assess whether a de-biasing message is effective in increasing application rates to the training program and evaluate what type of women selfselect into the program. The message corrects for misperceptions about expected returns for women and their ability to pursue a career in technology sector adding three pieces of information with respect to the standard recruitment process (control group): (i) a woman can be successful in the technology sector (information on returns) (ii) the organization gives access to a network of woman in the sector (women network) (iii) the story of a recent graduate (role model). They find that the message increases the probability of applying to the coding program from 7% to 15%. In the second experiment in Mexico City, they assess which of the three information contained in the de-biasing message is driving the result providing one piece of information out at a time. They are able to show that women in the experiment respond both to the information on high expected returns and to role models. In contrast, the information about the availability of a network of other women upon graduating makes no significant difference to application rates. However, the de-biasing message appears to more women at the lower of the ability distribution: the group exposed to the treatment reports an average cognitive score which is 17% below the control group.

Carrell et al. (2010) provide evidence that that professor's gender matters for female students' performance in math and science classes when in college. They show that the gender gap in course grades and STEM majors is eradicated when high-performing female students are assigned to female professors in mandatory introductory math and science coursework. Besides teacher gender, there is a large literature showing that exposing female students to successful or admirable women can help tackling gender stereotypes. Breda et al. (2021) evaluate the program "For Girls in Science" launched by L'Oréal in 2014 consisting of one-hour in-class meeting with either young scientists or young professionals employed in the Research and Innovation division of the L'Oréal group during which the role models share their experience and career path with the students. The program targets to students in Grade 10 and 12 and it is proven to be highly effective among high-achieving girls in maths in grade 12: they are more likely to enroll in selective and male-dominated STEM programs in college. The most effective role model interventions are those led by young professionals which improve students'

¹⁰ https://unesdoc.unesco.org/ark:/48223/pf0000253479

¹¹The program analyzed is "Girls Code It Better" implemented in more than 100 middle schools since 2015 by Officina Futuro Fondazione MAW.

perceptions of STEM careers without overemphasizing women's underrepresentation in science. This study provides suggestive evidence that excessive stress on gender can be counter-productive and that gender-neutral messages might be more effective in steering girls towards STEM fields. Porter and Serra (2020) conduct a field experiment aimed at increasing the share of women majoring in economics in a US university. They randomly expose students enrolled in gender-mixed introductory classes of Principle of Economics to successful and charismatic women who majored in economics at the same university ¹². The intervention leads to an almost 100% increase in the share of female economics majors. More importantly, they show that the role model intervention does not decrease the percentages of women majoring in male-dominated fields leading to high wages, (i.e., STEM, business, and finance) but rather, it significantly lowers the share of women planning to major in low-earning fields such as humanities. Interestingly, there is no significant effect for men exposed to the intervention. Riley (2019) provides evidence on the effectiveness of role models in the context of Uganda. Students preparing to take important national exams at the end of lower and upper secondary school are individually randomised to watch either a movie featuring a potential role model excelling academically in a mathematical domain (treatment group) or a placebo movie (control group) before their exams ¹³. Among students taking exams for lower secondary school, those assigned to the treatment movie register a 0.11 SD improvement in maths scores. The magnitude of this effect is in line with another study examining the impact of an in-person role model intervention on exam performance in Madagascar (Nguyen, 2008). The author finds evidence that female students and low-achiever students prior to the exam are those who benefit most from treatment. The treatment is also proven to affect long-term outcomes, with treated students being more likely to apply for university, especially female students. Precisely, the treatment closes the 10 percentage points gender gap in continuing in school ¹⁴. The latter is important since it suggests that role models do not have to be available in real life to positively affect students educational choices and performance. This significantly raises the scalability of this type of intervention.

	Summary: STEM and Coding					
	Intervention	Effectiveness	Limitations	Key studies		
	De-biasing informa- tion	++	Targeting issues	Carpio and Guadalupe (2021) Carlana and Fort (2022)		
	Role models	+++	Limited evidence on which role models' characteristic is more influential	Breda et al. (2021), Porter and Serra (2020), Riley (2019), Carrell et al. (2010)		

The scoring criteria for effectiveness are presented in Table A.1 in appendix

3.6. Improving Teachers' Quality

Well-trained and effective teachers matter for students' short and long run outcomes (Chetty et al., 2014). Difference in teachers quality can be driven by (i) difference in teachers' abilities (ii) difference in teachers' effort (iii) difference in training and know-how. Interventions aimed at improving teachers' quality can be classified in two main sets: (i) intervention aiming at recruiting or screening candidates before they enter teaching profession, with the goal of acquiring teachers with high abilities (ii) interventions aimed at increasing the effectiveness of teachers once they are in the classroom focusing on training, incentives, accountability measures or rewards, with the aim of increasing teachers' quality ex-post.

¹²Each visit consists of a 15-minute discussion about the role model's experiences, a description of their career paths and achievements, and an explanation of how their economics major has contributed to their success on the job.

¹³The treatment movie (Queen of Katwe) is based on a true story. It features a teenage girl from the slums of Kampala (Uganda), striving to become a chess master through hard work and perseverance. She must overcome many obstacles in order to achieve her dream, including learning to read and write and getting into the top school to be able to play chess.

¹⁴It is worth highlighting the cost-effectiveness of this movie-intervention: one-off and brief exposure costing only \$5 per student for a cinema screening and transport which can be easily scaled up through screenings in schools.

Gallegos et al. (2019) provide evidence on the first group of interventions using big data. In the context of Chile, they evaluate two policies aimed at screening out low achievers from teacher colleges, based on pre-college grades. The first policy, implemented in 2011 (*Beca Vocacion Profesor*) provides full tuition subsidies for prospective students who score about 1 SD above the mean in the college entrance exam. The second policy, implemented in 2017, is a screening policy that imposes new requirements for admissions in all teacher colleges: applicants are required to have college entrance exam scores at least as high as the median of the distribution of test-takers. They find that both policies were effective in attracting higher-scoring students to teacher college ultimately rising teachers' quality.

Training can be included either in the first or second set of possible interventions to improve teachers quality depending on the features and on the timing of the training program. An example of training provided before entering the teaching profession is the voluntary youth service initiative "Teacher For America" (TFA). Precisely, TFA recruits accomplished college graduates to teach in some of the most challenging public schools. Candidates selection for TFA is very competitive and it is based on a model that scores candidates according to their predicted effectiveness as a teacher using different criteria such as previous academic achievements, perseverance, critical thinking, organizational ability, motivational ability and commitment to the TFA mission. Accepted candidates are then required to take part in a TFA summer institute which prepares them for placement in the classroom at the end of the summer ¹⁵. After the training completion, TFA members are employed and paid directly by the school districts for which they work. Several studies evaluate the effectiveness of such a program both on students and on TFA members: Glazerman et al. (2006) find that being randomly assigned to a classroom with TFA corps significantly improves students score by 0.04 SD in reading and 0.15 SD in math compared to students in classrooms with traditional teachers. Dobbie and Fryer Jr (2015) estimate the causal effect of the program on TFA corps using a Regression Discontinuity design (RD). Given that admission is based on a clear cutoff of the effectiveness score, they compare applicants just below the cutoff with applicants just above it. This allows them to obtain a quasi-random variation necessary to retrieve the causal effect. They find that participating in TFA increases racial tolerance, makes individuals more optimistic about the life prospects of poor children, and makes them more likely to work in education by 43.3 percentage points.

Focusing on the second set of possible interventions, Biasi (2021) shows that a flexible pay scheme raises salaries of high-quality teachers, increases teacher quality (due to the arrival of high-quality teachers from other districts), increases teachers effort and improves student achievements. Along the same lines, Bobba et al. (2022) show that increasing teacher compensation at hard-to-staff schools in Peru can reduce inequality in access to qualified teachers. They show that increasing salaries at less desirable locations attracts teachers who score 0.45 SD higher in standardized competency tests, leading to an average increase in student test scores of 0.3-0.35 SD. However, these results might have little application in a setting where most teachers are public servants with permanent contracts since higher wages do not prompt an effort response from incumbent teachers, but rather from short term contractors. Lavy (2009) provides further evidence on the effectiveness of teachers individual incentives, the idea behind is that incentive pay may motivate teachers to improve their performance. He evaluates the introduction of individual monetary incentives which reward English and Math teachers with cash bonuses for improving their students' performance in high-school matriculation exams. The rewards ranged between 6% and 25% of the average teacher's salary and is structured as a tournament, with teachers competing against other teachers of the same subjects in the same school. He finds that the intervention increases overall pass rates by 12% and average math scores by 10% with improvements being mediated through changes in teaching methods, enhanced after-school teaching, and increased responsiveness to students' needs. Similarly, Atkinson et al. (2009) evaluate the causal effect of a payfor-performance scheme in England exploiting the fact that eligibility for the rewards is conditional on having a minimum level of experience. They therefore compare within-teacher trajectories of student achievement growth for eligible and ineligible teachers in the same schools before and after the creation of the program, finding that the payment scheme increases secondary school test score gains on average by about 40% of a grade per pupil. More importantly, there is evidence that students' effort and teacher effect are complementary and that the alignment of student and teacher incentives is important for teacher performance pay being effective. Behrman et al. (2015) evaluate the effect on test scores of three different performance incentive schemes using data from an experiment that randomizes 88

¹⁵The training comprises teaching practice, classroom management, diversity, learning theory, literacy development, leadership and full teaching responsibility for a class of summer school students.

Mexican high schools into three treatment arms and a control group.¹⁶ Treatment 1 provides payments to students based on their own performance, Treatment 2 provides payments to mathematics teachers based on students' performance in their classes, and Treatment 3 gives individual and group incentives to students, teachers, and school administrators. They find the largest average effects for Treatment 3, smaller impacts for Treatment 1, and no impact for Treatment 2 with the combination of teacher and student incentives being larger than the sum of the effects of the teacher performance pay and student performance pay treatments.¹⁷ Interventions affecting the effectiveness of teachers once in the teaching profession includes also training and new curricula provision. Machin and McNally (2008) study the introduction of a new curriculum in English primary schools where they introduce the literacy hour. The authors show a significant and positive impact of the literacy hour, with a 2-3 percentage point improvement in reading and English skills of primary school children affected by the introduction of the policy. It is important to notice that policies focusing on changing the curriculum might be more cost-effective in improving literacy skills than other alternatives (such as raising teachers' salaries) at the lower end of ability distribution (i.e. to reach basic level). More recent evidence focuses, instead, on the way teachers learn, rather than what they teach. Ashraf et al. (2020) evaluate a one-year-long in-service pedagogy intervention in Uganda in which teachers are trained to teach in a way that is inspired by the scientific method emphasizing the use of precise language, posing sharp questions, framing precise hypotheses and using evidence to take decisions. They find extremely positive effects on students learning outcomes, not only on students' knowledge but also on reasoning skills and creativity .

Summary: Improving Teachers' Quality				
Intervention	Effectiveness	Limitations	Key studies	
Flexible pay schemes	++	Might have little applica- tion in a setting where most teachers are public servants with permanent contracts	Biasi (2021); Bobba et al. (2022)	
Screening Policies	++	Context specific: effective for countries with a consid- erable growth in teachers supply	Gallegos et al. (2019)	
Pay for Teacher Performance	++	Context specific	Atkinson et al. (2009); Lavy (2009)	
Pay for Teacher and Student Perfor- mance	+++	Cannot fully control for dif- ference in efforts between treated and control stu- dents	Behrman et al. (2015)	
Improve teachers curriculum	++	Effects might be limited to tackle the lower end of the achievement distribution	Machin and McNally (2008) , Ashraf et al. (2020)	
Training	+++	Limited external validity: effects might be driven by some specific characteris- tics of the program i.e., focus on urban teaching. Low response rate of par- ticipants (31.2%).	Dobbie and Fryer Jr (2015); Glazerman et al. (2006)	

The scoring criteria for effectiveness are presented in Table A.1 in appendix

¹⁶The Aligning Learning Incentives was launched in 2008/9 and was designed to promote mathematics achievement through performance-based monetary incentives involving more than 40,000 students.

¹⁷The average treatment effects for the first year were 0.17 of a SD for treatment group T1, 0.01 of a SD T2, and 0.31 for T3.

3.7. Socio-emotional skills

Socio-emotional skills are responsible for individual differences in achievement in various economic and social domains such as educational attainment, employment, earnings, health, and participation in crime (Heckman and Rubinstein, 2001; Roberts et al., 2007; Almlund et al., 2011). Beside the predictive power of socio-emotional skills, a more recent literature focuses on their malleability, investigating the effect of the effect of interventions targeting children's socio-emotional skills that may lead to lasting changes in educational attainment and labor market outcomes (Sorrenti et al., 2020). The main target group of the interventions presented in this section is elementary school children, since language and executive functions are rapidly developing and children are especially receptive to external guidance (pre and elementary school period) (Blewitt et al., 2018). We focus on two sets of socio-emotional skills interventions: (i) those aiming at increasing grit and self-efficacy and (ii) those effective in building cohesive classroom environments in heterogeneous ethnic contexts.

Among these skills, grit, defined as perseverance for a set goal that involves challenge-seeking, has been shown to be associated with college GPAs and educational attainment. Optimistic beliefs about the role of effort in success are crucial for enhancing performance. Alan et al. (2019) evaluate the effect of an elementary school intervention that instills in children optimistic beliefs about the productivity of effort and encourages them to persevere through setbacks adopting a "growth mindset".¹⁸ They find that students benefiting from the intervention are more likely to exert effort to accumulate task-specific ability, and hence, more likely to succeed. Treatment effects persist after 2 years and half, with treated kids performing 0.2 SD higher on a standardized math test. In the context of high school in Norway, Bettinger et al. (2018) show that a web-based mindset intervention is effective in shaping students' beliefs in their abilities, increasing perseverance and academic performance in math as measured three weeks after the intervention. Interestingly, the positive effect is mostly driven by students who prior to the experiment were less confident about their ability to learn.

Furthermore, grit appears to be closely related to willingness to compete. In Chapter 2, we point at the imbalance in socio-emotional skills that are determinants for success, such as a positive attitudes towards competition, self-confidence and leadership skills. There is evidence that the latter sharply declines among adolescence girls (Alan et al., 2020). Recent literature provides evidence that competitiveness is a malleable trait that can be affected since childhood, mitigating the gender gap in willingness to compete. Alan and Ertac (2019) evaluate an elementary school program focusing on grit, highlighting the role of effort in achieving goals, encouraging challenge seeking, and promoting a constructive response to performance feedback. They find that when children are exposed to a worldview that emphasizes the role of effort in achievement and encourages perseverance, the gender gap in the willingness to compete disappears.

Besides fostering perseverance and self-confidence, training social skills has proven to be effective also in building cohesive classroom environments in a context characterized by a very heterogeneous ethnic composition. Alan et al. (2021) evaluate a school program that focuses on a specific socioemotional skill: perspective-taking ¹⁹, in Turkish elementary schools affected by a large influx of Syrian refugee children. Using randomized variation in program implementation, they find that the program significantly (i) lowers peer violence and victimization on school grounds (ii) reduces the likelihood of social exclusion and (iii) increases inter-ethnic social ties in the classroom.²⁰

An important aspect to consider is what are, if any, the long-term effects of such interventions. Sorrenti et al. (2020) evaluate the effect of the Promoting Alternative Thinking Strategies (PATHS) implemented among eight-year-old children in Switzerland on long term educational outcomes such as tracking, high school completion, and university enrollment. The classroom-based intervention consists of weekly lessons and homework assignments embedded in the school curriculum for the duration of two years with the objective to foster self-control, patience, social problem-solving skills,self-esteem, emotional intelligence, and academic engagement. Four years after the intervention, children who benefit from the program become 4.4 percentage points more likely to get tracked into academic high school and 7.1 percentage points more likely to complete academic high school.

¹⁸An individual who holds this mindset believes that skills can be developed over time by exerting effort

¹⁹Perspective-taking is defined as the ability to perceive others' states of mind and understand their goals and intentions ²⁰The intervention significantly affects Turkish test scores for refugee children possibly as consequence of lessened social exclusion of refugee children. Interestingly enough, they do not find effect on Math test scores for refugee children.

Summary: Socio-emotional skills				
	Intervention	Effectiveness	Limitations	Key studies
	Classroom based programs	+++	Context specific. May lack external validity. No evidence on general equi- librium effects	Sorrenti et al. (2020); Alan et al. (2021) ; Alan et al. (2019) ; Alan and Ertac (2019)
	Web-based mind- set intervention	++	Limited evidence on last- ing effects	Bettinger et al. (2018)

The scoring criteria for effectiveness are presented in Table A.1 in appendix

4

Strategic Investment Areas for 2023-26

Adolescence is a key period for brain development and it can have profound impacts on cognitive skills through teenage years and beyond (Steinberg, 2014). Overall, higher levels of education lead to social cohesion, advancing economic opportunity and reducing inequality within the population. However, improving educational outcomes for adolescents and young adults requires forward-looking policies and investments, grounded in an evaluation design that will allow to scale the most cost-effective programs. The disruptions due to the COVID-19 pandemic have likely exacerbated learning gaps across students described in Chapter 2 and raised attention on issues related to mental health and the development of socio-emotional skills in adolescents.

This chapter will focus on defining the potential interventions and strategic investment areas to improve educational outcomes for adolescents and young adults in the Unicredit geographical scope. The evaluation criteria used to select the interventions are the following:

- RELEVANCE. The intervention needs to target students lagging behind compared to their potential as identified in Chapter 2. Specific attention will be paid to identifying the target group and country where the intervention may be implemented.
- 2. **IMPACT.** The intervention proposed need to score high in term of potential impact, either by being strongly grounded on previous empirical evaluation (summarized in Chapter 3) or by proposing path breaking and promising designs.
- 3. FEASIBILITY. We will consider the implementation and political feasibility of the intervention.
- 4. COST-EFFECTIVENESS. We will analyze whether the costs of the interventions are reasonable given the expected impact on students' outcomes. We will also analyze whether the intervention can be reasonably scaled-up and co-financed (e.g., by NRRP funds) by policy makers after being proven effective.

4.1. Online Tutoring

Tutoring allows to "teach at the right level" to students, making sure they receive the necessary support, especially if they are lagging behind. In our suggestions, we focus on online tutoring as it has been shown to be highly effective and it has higher feasibility and cost-effectiveness compared to in-person tutoring.

Relevance. Tutoring can target specific students from lower socio-economic background and/or immigrants that have the lowest performance and biggest gaps in their learning compared to other students. Countries with high socio-economic gaps and very low level of skills for disadvantaged children such as Bosnia and Herzegovina, Bulgaria, Serbia, Romania, Hungary, Slovak Republic, Germany, Austria and Czech Republic may benefit particularly from this intervention. However, relevant groups as target for this intervention are present in every country of the Unicredit scope area.

Impact. Tutoring interventions have provided solid evidence of positive impact on students' learning. If well-implemented, the intervention is very likely to lead to the desire results of improving test scores and keeping students connected with the schooling system to minimize dropout.
Feasibility. Tutoring programs have high level of implementation and political feasibility. Countries around the world from developed to developing countries have promoted tutoring interventions to mitigate the effect of the pandemic on student outcomes. If implemented online, it requires an internet connection but there is strong evidence on the positive impact of phone tutoring in the cases of absence of internet. The key component for a successful implementation is finding an implementing partner with the right set of knowledge and capabilities.¹

Cost-effectiveness. In-person tutoring from teachers and pedagogical experts is very expensive limiting the cost-effectiveness of the intervention. However, the evidence presented in the previous chapter shows that online tutoring provided by volunteers supported by pedagogical experts can achieve high levels of effectiveness keeping the cost low. Projects on tutoring are also closely aligned with the goals and funding of NRRP for the majority of the countries in the Unicredit geographical scope. In the case of Italy, for example, such projects can target the provision of remedial education to 120,000 young people at risk of early school leaving within the NRRP.

4.2. Big Data: Information Sharing

Administrative data on educational outcomes are becoming increasingly available in several countries and they can be exploited not only to better target policy interventions, but also to design and give feedback to (i) teachers to help them improve and mitigate the gaps in learning among their students and (ii) students to help them reduce the information asymmetry on their performance and future major choices.

4.2.1. Information Sharing to Teachers

Italy is a pioneering country for the availability of extensive administrative data for research purposes. Available data comprise teachers' grades, high-school track recommendation, high-school track choice, absences, teachers' grade and standardized test scores in different points in time.² For example, Figure 4.1 shows for all Italian students who completed middle school in 2021 the teachers' track recommendation by decile of math test score (INVALSI) and gender. Girls in the top decile of math distribution are substantially less likely to be encouraged by their teachers to attend a STEM oriented high-school. Teachers are not fully aware of their role in influencing the track choice.

Relevance. The ideal target for information sharing to teachers using big data are gender gaps in STEM enrollment, as they may be easier to communicate at a large scale, providing school- or class-specific information to teachers and principals. Among the countries in the Unicredit focus area, Italy and Austria may benefit particularly from this intervention, given the share of girls lagging behind compared to boys in math performance.

Impact. Given the promising results on increasing awareness of stereotypes to teachers, we may expect closing the gender gap in teachers' track recommendation by approximately 20%. A higher encouragement from teachers may also lead female students to increase their effort, self-confidence and aspirations in STEM related subjects.

Feasibility. The intervention has high implementation feasibility as it requires a straightforward information sharing. Given the increased attention on gender issues and on female representation in STEM subjects, we believe the intervention is politically feasible. Careful attention needs to be devoted to the wording of the information to teachers to avoid backlash effects.

Cost-effectiveness. Conditional on the availability of big data, the cost of an intervention that provides class-specific reports with past bias in recommendation from teachers would be extremely limited. Moreover, interventions aimed at mitigating the gender gap in STEM are also closely aligned with the goals and funding of NRRP. For instance, this issue is a top priority for the Italian investment agenda in education within the framework of the NRRP³.

¹A partnership with Teach For All may help the implementation of the project. In Italy, similar projects (the Tutoring Online Program described in Chapter 3) have been successfully implemented by CIAI (Centro Italiano Aiuti all'Infanzia), a local NGO advocating for children's rights, but also by other organizations, such as Save The Children.

²The research team on education led by M. Carlana at LEAP Bocconi has a protocol of agreement with INVALSI and the Ministry of Education to get access to matched administrative data and eventual researcher-collected survey data until July 2026.

³For a discussion on NRRP and gender gaps in Italy please see https://www.mef.gov.it/focus/Le-diseguaglianze-di-generein-Italia-e-il-potenziale-contributo-del-PNRR-per-ridurle/

Figure 4.1: Proportion of girls and boys recommended to Scientific track based on abilities (INVALSI score deciles) Cohort 20/21



Notes: This Figure shows the probability of being recommended to the scientific track for girls and boys in Italy for each decile of the performance in the standardized test score in grade 8 (INVALSI).

4.2.2. Information Sharing to Students

Information sharing on both performance and returns to schooling allows students to make more informed educational choices when they have to select the high-school track or the university major. The provision of returns to schooling information can take advantage of the availability of big data on past graduates.

Relevance. The ideal target for information sharing interventions on track/major-specific earnings and other non-monetary returns to education are countries with high share of low-achieving and disadvantaged students, since these are likely to be those with less accurate information on the impact of high-school track choice and higher education. Hence, ideal countries to target are: Bosnia and Herzegovina, Bulgaria, Serbia, Romania, Hungary, Slovak Republic, Germany, Austria and Czech Republic.

Impact. Evidence in the Unicredit geographic scope area is scarce, but some evaluations conducted in other countries is promising, showing that students with low SES reduce both school dropouts and the demand for low earnings college by 4.6%.

Feasibility. The intervention has high implementation feasibility as it simply requires information sharing with the relevant subpopulation. Given the increased attention on skills mismatch between school and labour market, we believe the intervention is politically feasible. Careful attention needs to be devoted to the outreach component in order to avoid low take-up among those who may benefit the most from this intervention (i.e. low achievers and low-SES students).

Cost-effectiveness. Conditional on the availability of big data, the cost of the intervention would be modest and it mainly depends on the outreach component employed (i.e. the cost of the intervention may vary depending on the communication channels and logistics chosen to reach the target population). Moreover, interventions aiming to provide better information of higher education prospects are also closely aligned with the goals and funding of the NRRP, with great attention being paid to active orientation in school-university transition.

4.3. Financial Literacy and Role Models

Despite still limited evidence on its causal effects, financial literacy is highly correlated with performance in math test scores of students and it has potential profound implications on the educational choices of individuals, for example by teaching them to postpone immediate rewards for higher future returns. Increasing early exposure to financial education may help under-represented groups in statistics, eco-

nomics and math, such as low-SES students and girls, to increase their interest in those subjects.

Relevance. The intervention is particularly relevant not only to improve knowledge, but also to orient people into highly profitable occupations related to statistics, economics and finance. The ideal targets are schools with low-SES students, as they may come from a background where families have limited financial knowledge. Countries with high gender gaps in math and financial knowledge, such as Italy, are an ideal geographic focus for the intervention.

Impact. Given the limited causal evidence beyond financial education knowledge, the impact of the intervention is promising but not guaranteed. Impact evaluation is key to study the program and which component works best. In addition, the curriculum on financial knowledge could be administered randomly by either male or female professionals from financial institutions, testing the relevance of the role model effect on aspirations of girls and boys.

Feasibility. Given the financial literacy endorsement by national and international bodies of the last decades with initiatives such as the International Network on Financial Education (INFE), policy support is expected. Financial education can be easily integrated in the school curriculum and it can be implemented in partnerships with well-know institutions such as Unicredit.

Cost-effectiveness. The implementation by professionals may increase the cost of the intervention but allows for an additional role model effect, with consequences on aspirations and career trajectory of students. Partnerships with well-known institutions might help reduce the cost associated to the involvement of professionals.

4.4. Teacher Training: Aspirations and Social Inclusion

We report on two types of training that can be particularly effective in (i) targeting effective future teachers (ii) building social inclusion and integration in very heterogeneous ethnic classroom environments.

4.4.1. Training for future teachers

Relevance. Targeting and recruiting effective teachers is a common challenge for the majority of the countries in the Unicredit geographical scope. This is particularly relevant for Austria, Bulgaria and Hungary which face the challenge of replacing an aging teaching workforce in the next years and for Germany which faces a considerable shortage of teachers above all in disadvantaged schools.

Impact. Teachers have often limited experience prior to entering the teaching profession. As documented in Chapter 3, voluntary youth services involving high-achieving college students might be highly effective on both students' test scores and teachers' individual outcomes such as improved racial tolerance and optimistic beliefs about life prospects of poor children, and increased likelihood to work in education.

Feasibility. Teachers' training programs are widespread and they are likely to be supported by ministries of education as well as local schools. Moreover, partnerships with already existing and well established networks such as "Teach for all" can be easily implemented to ensure a smooth execution of volunteering programs.

Cost-effectiveness. Training future teachers is a highly cost-effective intervention as it has impact not only on exposed students, but also on volunteers' values and career decisions, with possible spillovers on social consciousness and on the community as whole. Governments are currently supporting training of teachers and the identification of effective tools to recruit better candidates through specific set of resources such as the ones allocated in the context of the NRRP.

4.4.2. Training for social inclusion

Relevance. As shown in Figure 2.9, the share of immigrant children is extremely high in several of the countries in the Unicredit geographic scope, and in particular in Germany, Romania and Austria, with a potential increase due to the displacement of students for the war of Russia against Ukraine.

Impact. Teachers have often limited training and support to guide students in their educational choices and help increasing social integration in the classroom. Some recent intervention have shown promising results by training teachers in enhancing socio-emotional skills, such as perspective taking, and ensuring realistic expectations to avoid early dropout.

Feasibility. Teachers' training programs are widespread and they are likely to be supported by ministries of education as well as local schools. A potential constraint is that on-the-job training for teachers is often voluntary and this factor needs to be considered in the design to incentivize teachers

that may benefit the most from joining the intervention.

Cost-effectiveness. Training teachers is a highly cost-effective intervention as it has impact not only on one cohort of students, but also on all students in future cohorts. Moreover, social skills training has the potential to affect several dimensions comprising both students academic and not academic outcomes such as mental health, social cohesion, better academic performance and educational choices. Governments are currently supporting the training of teachers through specific set of resources as established in the NRRP.

Summary of Recomn	nended Strategic Investment	Areas for 2023-26		
Intervention	Relevance	Impact	Feasibility	Cost-effectiveness
Online Tutoring	Target: countries with low socio-economic background students and high share of immigrants	MEDIUM/HIGH on test scores and school dropout	Strong policy support is ex- pected. Constraints: avail- ability of a device and imple- menting partner	HIGH if implemented online with volunteers as tutors
Big Data and Infor- mation Sharing to Teachers	Target: countries with high gender gaps in STEM education (i.e., Italy and Austria)	MEDIUM on school choice, MEDIUM/LOW on test score performance	Strong policy support is ex- pected. Constraints: Avail- ability of Big Data	HIGH as consequence of the extremely low cost of the in-tervention
Big Data and Infor- mation Sharing to Students	Target: countries with low- achieving and low-SES stu- dents	MEDIUM on reducing the de- mand for low earnings col- lege	Strong policy support is ex- pected. Constraints: Avail- ability of Big Data and iden- tification of an effective out- reach component of the pro- gram	POSSIBLY HIGH as conse- quence of the low cost of the intervention
Financial Literacy and Role Models	Target: countries with high gender gaps and/or low-SES students	UNCLEAR but potentially im- pactful long-term effects	Policy support is expected. Medium feasibility by inte- grating the intervention in school curriculum. Con- straints: availability of profes- sionals	MEDIUM as it requires pro- fessional experts to provide information and role model- ing effect
Teacher Training: Future Teachers	Target: countries with higher share of low SES students where better teachers recruit- ment is needed	EXPECTED MEDIUM effects on test scores of students and on the involvement of high-performing individuals in education	Policy support is expected. High feasibility by partner- ing with already existing net- works. Constraints: targeting and involving the most per- forming future teachers	POSSIBLY HIGH consider- ing the effects on both stu- dents and potential future teachers and the possible low cost of the intervention as a consequence of already ex- isting training networks
Teacher Training: Social Inclusion	Target: countries with a high share of immigrant children	EXPECTED HIGH medium term changes in socio- emotional skills that are likely to spillover on test scores and track choices of students (given that training is not implemented directly from experts to students)	Strong policy support is expected considering that teacher trainings are widely diffused. Constraints: in- volvement of teachers that may benefit the most from the intervention	POSSIBLY HIGH consider- ing the effects across gener- ations of students exposed to the same teachers

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Appendix with Additional Figures

Table A.T. Legenda. Intervention scoring citeria		
Effectiveness	Description	
+++	the intervention is effective across different countries/settings and target groups and possibly on both long and short term outcomes of interest (<i>Note that here we do not consider neither</i> <i>scalability or magnitude</i>).	
++	the intervention is effective with respect to specific coun- tries/settings and target groups.	
+	the intervention is effective, but with very limited evidence.	



Figure A.1: Percentage of students at each level of proficiency in financial literacy

Countries and economies are ranked in descending order of the percentage of students who performed at or above Level 2. Source: OECD, PISA 2018 Database, Table IV.B1.2.4

This Figure shows the distribution of students across the five levels of financial literacy proficiency defined in PISA 2018. Level 1 comprises basic financial literacy skills; Level 2 asks students to apply their knowledge to make financial decisions in contexts that are immediately relevant to them; Level 3 requires students to apply their knowledge of commonly used financial concepts to situations that are relevant to them; Level 4 tests less common financial concepts and terms to contexts that will be relevant to students as they move into adulthood; Level 5 tests the understanding of a wide and more complex range of financial terms such as borrowing money from loan providers..

Figure A.2: Share of students who want to go to university





Figure A.3: Gender differences in financial literacy performance

Notes: Statistically significant differences are marked in a darker tone (see Annex A3).

As data for reading performance in Spain were not released, the gender gap after accounting for performance in mathematics and reading in Spain could not be calculated.

Countries and economies are ranked in descending order of the gender gap in financial literacy performance, after accounting for performance in mathematics and reading.

Source: OECD, PISA 2018 Database, Table IV.B1.3.7.



Figure A.4: Difference in financial literacy performance by immigrant background

1. Socio-economic status was measured by the PISA index of economic, social and cultural status.

Notes: Only countries where the percentage of immigrant students is higher than 5% are shown.

Statistically significant differences are marked in a darker tone (see Annex A3).

Countries and economies are ranked in descending order of the difference in financial literacy performance between non-immigrant and immigrant students, after accounting for socio-economic status.

Source: OECD, PISA 2018 Database, Tables IV.B1.3.19 and IV.B1.3.20.