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Investing in education 2023



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Foreword



Three years ago, the Covid-19 pandemic triggered the biggest disruption to our economies and societies in several decades. The subsequent recovery has brought about substantial opportunities as well as challenges for investment in the education sector.

Significant support for investment in education and skills is available to Member States through the Recovery and Resilience Facility, amounting to more than 70 billion euros. On top of this, cohesion policy funding will contribute considerably to investment in quality of education in the next years. The investment focus on digital education is set to strengthen the resilience of our education systems.

However, the most recent data presented in this report shows that national investment in education did not fully keep pace with the strong economic rebound that the EU experienced in 2021. Addressing all the current economic and social challenges in the EU, including the digital and green transitions and the new geopolitical dimension, will require major public investments in several economic sectors, while keeping public finances under control. This is likely to translate into increasing competition for public funding among the various policy areas, with the potential risk of lower funding available for education in future years. The potential funding competition coincides with calls for improving the overall quality of investment in education.

That is why the European Commission is committed to better understand which investments produce greater returns in terms of educational outcomes and equity, as part of the implementation of the European Education Area. By working together with our Member States, we aim at strengthening the quality of investment in education in the long term.

In light of all this, I recently launched a “Learning Lab on Investing in Quality Education and Training”, which will work with Member States to promote the use of rigorous evaluation tools and practices in education policymaking. Those evaluations will allow for investments securing the best-possible funding-outcome relation.

Preserving investment in education while enhancing its quality will strengthen the EU innovation potential, competitiveness, and social cohesion. It will also improve the long-term sustainability of Member States’ public finances and ensure that the opportunities which emerged in the education sector during the pandemic recovery will be leveraged to the fullest.

Mariya Gabriel

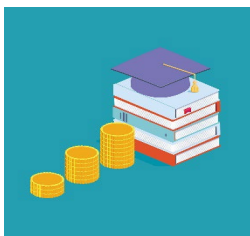
European Commissioner for Innovation, Research, Culture, Education and Youth

Executive Summary



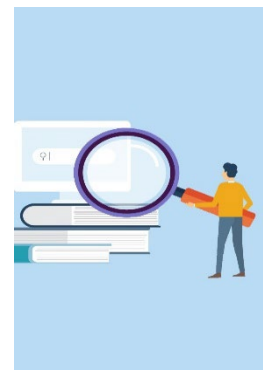
A new trend in investment in education could start emerging in the aftermath of the Covid 19 crisis. The pandemic still affected EU education systems in 2021 and its economic effects continued to have an impact on education spending. Public expenditure on education as a share of GDP decreased compared to 2020, as GDP increased due to a strong economic rebound in 2021 after the 2020 recession and returned to its pre-pandemic levels. Public expenditure on education as a share of total public expenditure remained stable, although at historically low levels. To fully understand if a new composition of public expenditure in the EU has materialised after the crisis and what effects this may have on investment in education, it is necessary to wait until 2025 when expenditure data up to 2023 will become available.

Both opportunities and challenges lie ahead for investment in education and its future will mainly depend on its ability to ensure good learning outcomes. On the one hand, substantial support for investment in education and skills is available to EU Member States between 2021 and 2026 through the Recovery and Resilience Facility as well as Cohesion Policy funding. On the other hand, competition for public funding among the various policy sectors is likely to increase. As data on public expenditure is available until 2021 only, it still excludes the 2022-2023 financial impact of the various measures to face the energy crisis and support Ukraine in the wake of Russia's invasion. High-quality investment in education can enhance learning outcomes, improve economic growth and help make public finances more sustainable.



The relationship between investment in education and learning outcomes is complex and there is no optimal level of investment in education. An increase in expenditure is associated with better scores in international tests, but the relationship is not linear and becomes weaker at higher levels of expenditure. This complex relationship between expenditure and learning outcomes at macro-level is backed at micro-level by studies able to identify causal effects of policy interventions.

Research calls for more policy experimentation and evaluation in the EU. While EU countries are rather diverse in combining efficiency and effectiveness in learning outcomes, efficiency considerations must always go hand in hand with the goal of effectiveness in order to be meaningful for education policymaking. Building on previous work with Member States, the Commission launched a Learning Lab on Investing in Quality Education and Training in November 2022. The Learning Lab is a programme of activities designed to promote a culture of evaluation in education in the EU and provide knowledge and resources to identify how to help education systems deliver better outcomes. The activities will cover three main areas: capacity building on evaluation methodologies; collaborative work among Member States; analysis and evaluation of education policies.





Part 1

Investment in education in 2021: towards a new normal?



The Covid-19 pandemic still affected EU education systems in 2021. Most EU countries underwent at least one period of partial physical school closure (UNESCO 2023) and learning outcomes deteriorated in several countries compared to pre-pandemic years (De Witte and François 2023). At the same time, the economic recovery had an impact on investment in education¹.

Public expenditure² on education as a share of GDP in the EU decreased from 5.0% in 2020 to 4.8% in 2021³, due to a strong economic rebound in 2021 after the 2020 recession. In 2021 public expenditure on education in the EU rose by 4.7% in nominal terms⁴, continuing its increasing trend (Figure 1). However, the strongest annual increase in nominal GDP (7.9%)⁵ since EU-27 data is available (1995) made the public expenditure-to-GDP ratio decline. This development came after a large pandemic-driven GDP decline (-4.0%) in 2020, which had produced a spike in public expenditure on education as a share of GDP (+0.3 percentage points compared to 2019). Consequently, the 2021 value of this indicator got closer to its pre-Covid trend (Figure 2). At country level, Sweden (6.7%), Belgium (6.3%) and Denmark (6.0%) recorded the highest values (Figure 1)⁶.

Public expenditure on education as a share of total public expenditure remained stable, although at historically low levels. The EU average had declined from 10.1% in 2019 to 9.4% in 2020 and remained stable in 2021 (Figure 2). Contrary to what happened to the public expenditure as a share of GDP, there was no return to pre-pandemic levels. Figure 3 explains why this happened, by showing the changes in the composition of total public expenditure between 2019 and 2021. ‘Economic affairs’ (which include the measures to support the various productive sectors affected by Covid-related restrictions) jumped by 2.8 percentage points. ‘Health’ was the only other function that increased its share, because of the response to new public health needs related to Covid-19, such as treatments, personal protective equipment and vaccines (European Commission 2023b). Thus, most expenditure functions saw their share declining, and education experienced one of the largest drops.

The bulk of education public expenditure goes to school education. In 2021, school education received more than 70% of public expenditure on education at EU level. This is roughly equal split between, on the one hand, pre-primary and primary levels (34%) and, on the other hand, secondary level (37%), while tertiary education accounted for 16% of expenditure. Those shares remained broadly stable between 2019 and 2021 (European Commission 2021b; European Commission 2022c). The EU averages mask large differences among Member States (Figure 4). Those differences can be explained by many factors:

- level of involvement of the general government in the education system;
- enrolment;
- the duration of compulsory education;
- relative wages in the education sector;
- class size and student teacher ratios;
- instruction time; and
- the cost of teaching materials and facilities.

At tertiary level, tuition fees and support for students are also determining factors.

¹ This report will use ‘investment in education’ interchangeably with ‘public expenditure on education’.

² Measured as general government expenditure.

³ Eurostat releases data on government expenditure by function (COFOG) for year t in February of year t+2. The most recent data available in 2023 refers to 2021.

⁴ This report will use expenditure data at current prices (i.e., in nominal terms, not adjusted for price variations over time) because its focus is on investment in education in a public finance context, where budgetary items are defined in nominal terms.

⁵ Data on GDP is from Eurostat, National accounts (ESA 2010) database. Online data code: nama_10_gdp.

⁶ The low value of this indicator for Ireland (3.0%) is explained by the specific structure of the Irish economy. In most countries, GDP and Gross National Product (GNP) are very close in value, but in Ireland GDP is larger than GNP because of negative net factor income: income outflows are much larger than income inflows due to the presence of many foreign-owned multinational firms, which pay their profits back to their owners abroad (Central Statistics Office 2023). As a consequence, public expenditure on education as a share of GNP would be higher than the 3.0% recorded as a share of GDP.

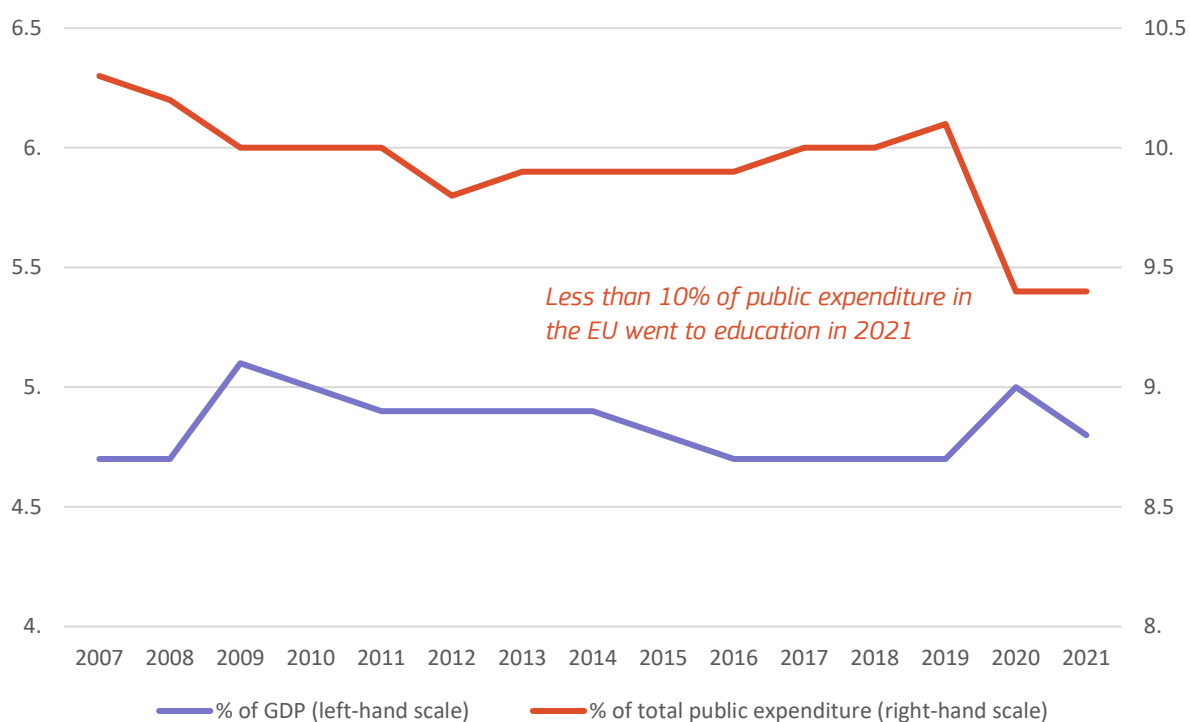
Figure 1. Evolution of public expenditure on education (2019-2021)

	Year-on-year nominal change(%)			Share of GDP (%)			Share of total public expenditure (%)		
	2019	2020	2021	2019	2020	2021	2019	2020	2021
EU	4.1	1.7	4.7	4.7	5.0	4.8	10.1	9.4	9.4
BE	2.7	2.9	4.5	6.1	6.6	6.3	11.8	11.2	11.3
BG	18.2	3.3	26.1	3.8	3.9	4.3	10.5	9.5	10.6
CZ	13.8	2.8	6.7	4.9	5.1	5.1	11.8	10.7	10.9
DK	1.5	1.4	2.0	6.3	6.4	6.0	12.7	11.9	11.9
DE	5.7	4.0	3.4	4.4	4.6	4.5	9.7	9.2	8.8
EE	5.5	3.7	5.6	6.1	6.4	5.9	15.5	14.3	14.3
IE	10.7	5.9	5.1	3.2	3.2	3.0	13.2	11.9	12.0
EL	-0.5	1.7	-0.3	4.0	4.5	4.1	8.3	7.5	7.1
ES	4.8	3.9	7.0	4.0	4.7	4.6	9.5	9.0	9.1
FR	1.7	-2.0	4.6	5.2	5.4	5.2	9.5	8.8	8.9
HR	11.9	1.8	7.4	5.1	5.6	5.2	11.0	10.4	10.7
IT	0.8	0.9	3.7	3.9	4.3	4.1	8.0	7.5	7.4
CY	9.6	5.8	4.3	5.1	5.8	5.5	13.5	12.9	12.7
LV	3.4	-0.4	7.1	5.7	5.8	5.6	15.0	13.7	12.6
LT	9.4	14.6	3.9	4.6	5.2	4.8	13.3	12.2	12.7
LU	8.2	7.3	6.0	4.8	5.0	4.7	11.1	10.6	11.0
HU	2.9	3.2	19.8	4.7	4.8	5.0	10.2	9.3	10.4
MT	10.9	5.8	9.6	5.0	5.7	5.5	14.1	12.5	12.7
NL	3.6	2.9	5.5	5.0	5.2	5.1	11.8	10.9	11.0
AT	3.7	1.5	3.7	4.8	5.1	4.9	9.9	9.0	8.8
PL	8.4	4.1	8.3	5.0	5.1	4.9	12.0	10.6	11.2
PT	5.2	-1.0	4.9	4.5	4.7	4.6	10.5	9.6	9.7
RO	28.2	1.0	-1.4	3.6	3.7	3.2	10.1	8.8	8.1
SI	6.8	1.6	10.6	5.4	5.7	5.7	12.6	11.1	11.5
SK	13.7	3.7	2.7	4.2	4.4	4.3	10.5	9.9	9.4
FI	3.9	3.6	2.7	5.6	5.9	5.7	10.5	10.2	10.2
SE	5.0	1.0	3.3	6.9	7.0	6.7	14.1	13.4	13.5

Source: European Commission calculations based on Eurostat COFOG data. Online data code: [[gov_10a_exp](#)]

Note: Provisional data for: DE (2019-2020-2021); ES (2021); FR (2020-2021); PT (2021).

Sweden and Belgium spent more than 6% of GDP on education in 2021

Figure 2 Public expenditure on education as a share of GDP and of total public expenditure in the EU (2007-2021)

Source: Eurostat COFOG database. Online data code: [\[gov_10a_exp\]](#)

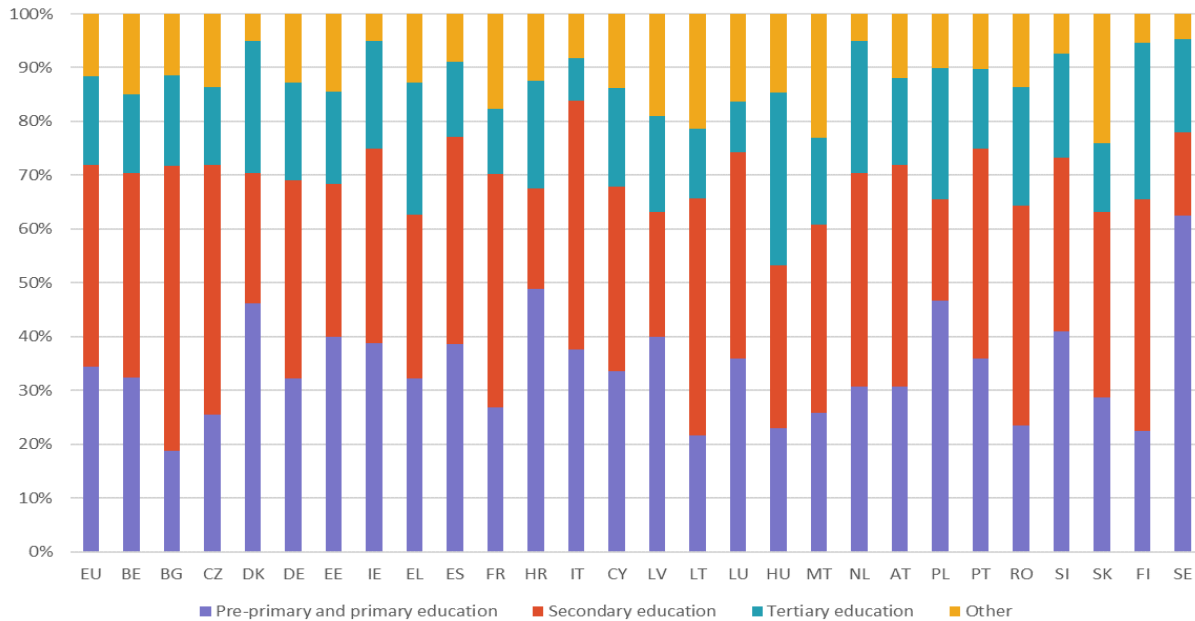
Figure 3. Public expenditure by function (2019-2021)

	2019	2020	2021	2019-2021
	% of total	% of total	% of total	percentage point change
Economic affairs	9.5	11.6	12.3	2.8
Health	15.0	15.1	15.8	0.8
Housing and community amenities	1.2	1.2	1.2	0.0
Environmental protection	1.7	1.6	1.6	-0.1
Defence	2.6	2.5	2.5	-0.1
Public order and safety	3.6	3.4	3.4	-0.2
Recreation, culture and religion	2.5	2.3	2.3	-0.2
Education	10.1	9.4	9.4	-0.7
General public services	12.4	11.5	11.7	-0.7
Social protection	41.4	41.4	39.9	-1.5

The share of public expenditure going to education decreased during the pandemic

Source: Eurostat COFOG database. Online data code: [\[gov_10a_exp\]](#)

Figure 4. Distribution of public expenditure on education by educational level (2021)

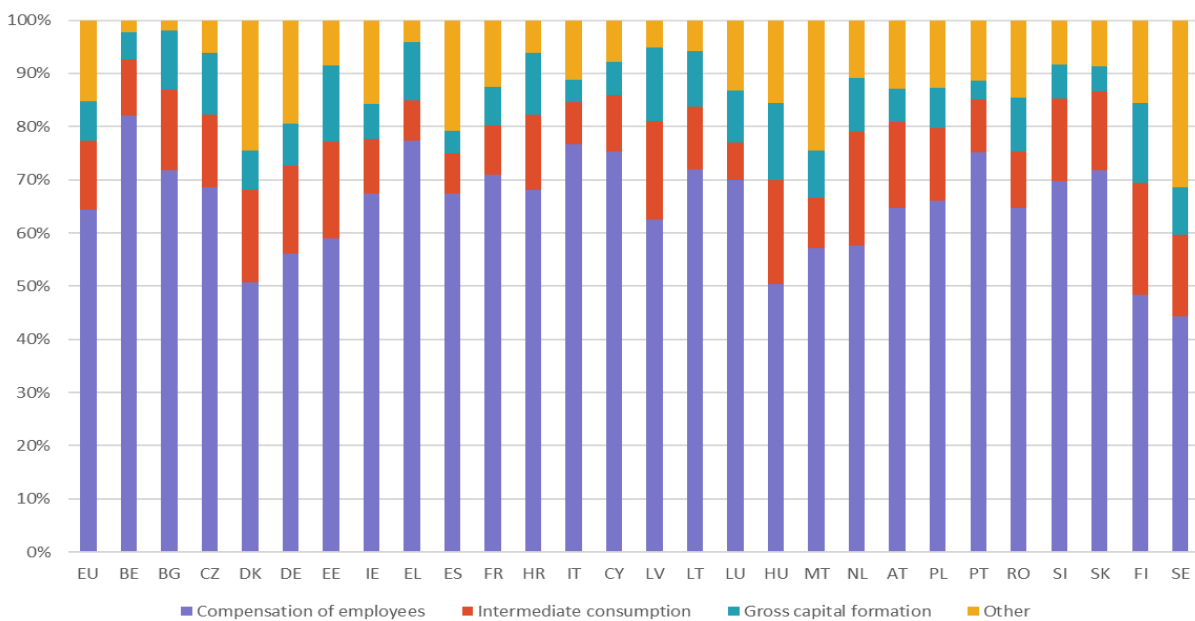


Source: European Commission calculations based on Eurostat COFOG data. Online data code: [\[gov_10a_exp\]](#)

Note: Provisional data for DE, ES, FR, PT. The category “Other” is the sum of the following items: education not definable by level, subsidiary services to education, R&D education and education not elsewhere classified.

In 2021 pre-primary, primary and secondary education received 71% of expenditure in the EU

Figure 5. Distribution of public expenditure on education by category (2021)



Source: European Commission calculations based on Eurostat COFOG data. Online data code: [\[gov_10a_exp\]](#)

Note: Provisional data for DE, ES, FR, PT. The category “Other” is the sum of the following items: subsidies, other taxes on production, property income, social benefits, other current transfers, capital transfers.

In 2021 64% of expenditure on education in the EU was used to pay staff

Staff costs account for almost two-thirds of public expenditure. 64% of public expenditure on education at EU level went to compensation of employees (i.e. wages and non-wage costs such as employers' social contributions). Intermediate consumption (i.e. purchases of non-durable goods, such as teaching materials, and services needed to provide education, such as heating, electricity, cleaning and maintenance services) received 13% of expenditure. Gross capital formation (i.e. investment in acquiring fixed assets and durable goods, such as computers and buildings, and also including the depreciation of fixed assets) accounted for 7% of expenditure (Figure 5). Those shares remained broadly stable between 2019 and 2021 (European Commission 2021b; European Commission 2022c).

Two years since the start of the pandemic, a new trend in investment in education could start emerging. While in 2021 the share of GDP invested in education rolled back to pre-Covid levels after its 2020 spike, the share of public expenditure invested in education remained as low as in 2020. This might be an early sign of an emerging pattern where investment in education would follow GDP developments but would face a stronger competition from other public expenditure functions as a consequence and get a lower share of total public expenditure than in the 2010s. As data on public expenditure is available until 2021 only, it still excludes the 2022–2023 financial impact of the various measures to face the energy crisis and support Ukraine in the wake of Russia's invasion. This could increase the competition for public funding already stemming from the Covid crisis. At the same time, part of the measures taken in 2020–2021 to respond to the Covid-19 pandemic in the areas of economic affairs and health could be temporary and be discontinued or gradually phased out over 2022–2023. Only in 2025, when expenditure data up to 2023 will be available, it will be possible to fully understand if a new composition of public expenditure in the EU has emerged out of the recent crises and what effects this may have on investment in education.

The present public financial context presents both opportunities and challenges for investment in education. Substantial support for investment in education and skills is available to EU Member States between 2021 and 2026 through the Recovery and Resilience Facility, amounting to more than €70 billion (European Commission 2022b), as well as through the 2021–2027 Cohesion Policy funding. This may become a game-changer by spurring reforms and boosting investment in education across the EU. In 2020–2023, Member States have been benefitting from a more flexible application of the EU fiscal rules, because the Commission activated the so-called 'general escape clause' of the Stability and Growth Pact⁷. In a period of severe economic downturn for the EU as a whole, Member States can temporarily deviate from their medium-term budgetary objectives (European Commission 2020; European Commission 2022b). This has given EU countries more room for using public expenditure, including on education, to tackle the economic effects of the pandemic. In its Communication on fiscal policy guidance to Member States for 2024, the Commission announced it will deactivate the general escape clause at the end of 2023, because the EU economy "*has recovered beyond its pre-pandemic level and has now weathered the acute phase of the energy price shock caused by Russia's aggression against Ukraine*" (European Commission 2023a, p. 7). The Communication also stresses the need for prudent fiscal policies in order to ensure medium-term sustainability of national public finances. At the same time, EU countries should continue to preserve high-quality public investment, in particular to support the green and digital transitions (European Commission 2023a).

⁷ The [Stability and Growth Pact](#) is a set of rules designed to ensure that EU countries pursue sound public finances and coordinate their fiscal policies.



CLOSE-UP

Examples of investments and reforms in education in the national Recovery and Resilience Plans

▶ Bulgaria

Improving infrastructure in the area of science, technology, engineering and mathematics (STEM) is a priority area in Bulgaria's recovery and resilience plan (RRP), endorsed in May 2022. The reforms and investment in the plan will help develop digital skills and promote STEM fields in schools. STEM laboratories, including high-tech classrooms, will be constructed in schools. Bulgaria will set up one national and three regional STEM centres, which will coordinate trainings for teachers, develop teaching materials, and set up an electronic portal and electronic library.

▶ Italy

The government is investing in reducing and preventing early school leaving in the framework of its national RRP, which allocates €1.5 billion to projects that aim to reduce geographical imbalances in learning outcomes. The funds will be used to finance projects involving students in the 12-18 age group in 3 198 schools selected on the basis of indicators for drop-out rate and socio-economic context. An expert working group appointed by the ministry defined general indications and guidelines for the schools involved. The projects include personalising learning paths in low-performing schools, bringing in targeted support for school leaders, mentoring and training for at least 50% of teachers, and extending school teaching time by running targeted projects.

▶ Romania

The National Programme for Reducing School Dropout (PNRAS), adopted in December 2021, is one of the most significant education measures in Romania's RRP. In March 2022, the Ministry of Education announced a list of schools eligible to participate in the programme. As part of PNRAS, a large number of publicly funded primary and secondary schools with many students at high or medium risk of dropping out will receive grants. With this financial support, these schools can launch educational and support activities such as remedial courses, after-school activities, outdoor activities, the employment of school counsellors and mediators (in Roma communities), or the purchase of IT equipment. Partnerships with non-governmental organisations to support extra-curricular activities are also planned. The PNRAS programme should also improve the results obtained by students in national assessments. Moreover, the programme should help more students to complete lower-secondary education and participate in the national assessment for eighth-grade graduates, as well as successfully enter upper-secondary education.

Source: European Commission (2022b)



Part 2

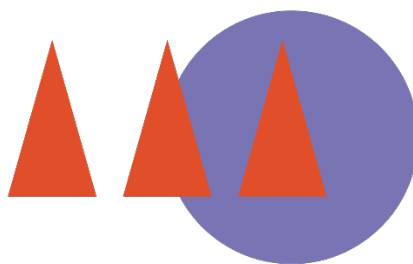
More investment, better outcomes? A complex relationship



The future of investment in education in the EU will mainly depend on its ability to ensure good learning outcomes.

The Covid-19 crisis has made more visible and urgent the structural challenges that the EU economy was already facing: rapidly ageing population, weak productivity growth, slow digital transformation, the socio-economic costs of climate change and rising inequalities (European Commission 2021a). The last two challenges were compounded by the energy crisis (European Commission 2022a). Addressing all these challenges will require major public investments in several sectors, while keeping public finances under control. This is likely to translate into increasing competition for public funding among the various policy sectors and will call for improving the overall quality of investment in education. If investing in education enhances learning outcomes, then it will improve economic growth and help make public finances more sustainable (European Commission 2022c). The second part of this report explores the relationship between investment in education and learning outcomes based on the most recent edition (2018) of the OECD Programme for International Student Assessment (PISA).

At current levels of cumulative expenditure per student (CES)⁸ observed in most countries, an increase in expenditure is associated with higher PISA scores⁹, but the relationship is not linear.¹⁰ In other words, there are positive, although decreasing, returns of expenditure on PISA scores. At low levels of CES, an increase in expenditure translates into a large rise in PISA scores. At higher levels of CES, any further increases in expenditure translate into smaller and smaller rises in PISA scores.¹¹ This relationship is very strong¹² for the whole set of PISA participating countries (Figure 6, panel A). It also holds for more economically homogeneous subsets, like OECD countries (Figure 6, panel B) or EU Member States (Figure 6, panel C).



⁸ CES in PISA is the total amount a country spent on educating a student from the age of 6 (when primary education starts in most countries) to the age of 15 (when students take the PISA test). The OECD measures CES in US dollars (USD), expressed in purchasing power standards (PPS) to correct for the different price levels between countries.

⁹ In this section, “PISA scores” are the average of countries’ mean scores in the three PISA domains (reading, mathematics and science).

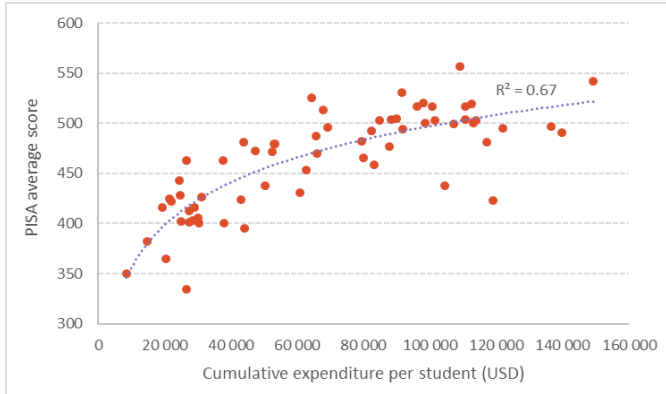
¹⁰ In mathematical terms, this relationship is expressed by a logarithmic function.

¹¹ Technically, this means that CES has diminishing marginal returns.

¹² Statistically measured by the coefficient of determination (R^2).

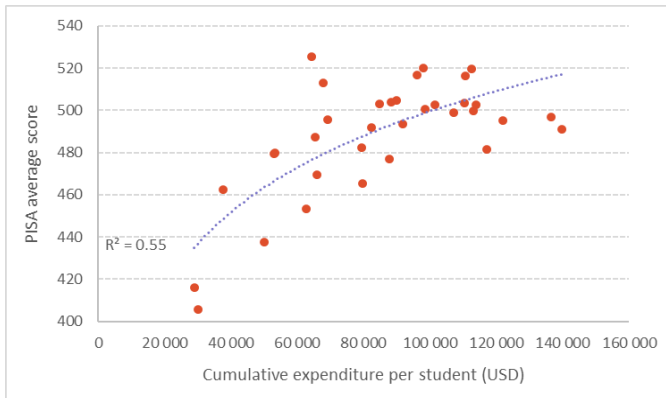
Figure 6. Cumulative expenditure per student and PISA scores (2018)¹³

Panel A. PISA countries

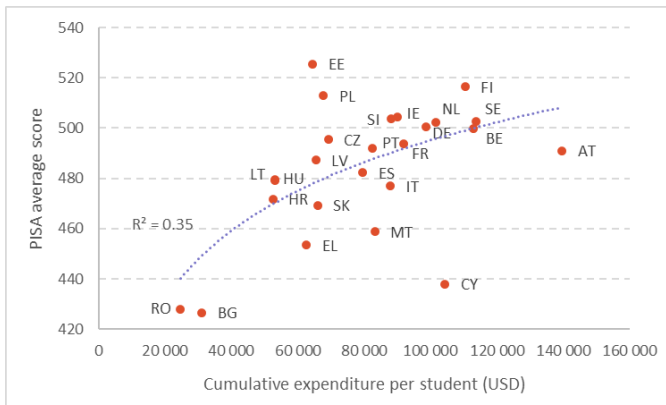


More expenditure per student translates into better PISA scores, but this relationship becomes weaker at higher levels of expenditure

Panel B. OECD countries



Panel C. EU countries



Source: DG EAC calculations based on OECD PISA 2018 data.

¹³ Panel A includes the following 64 countries/economies, for which CES data were available in PISA 2018: Argentina, Australia, Austria, Belarus, Belgium, Bosnia and Herzegovina, Brazil, Brunei Darussalam, Bulgaria, Canada, Chile, Chinese Taipei, Colombia, Croatia, Cyprus, Czechia, Dominican Republic, Estonia, Finland, France, Germany, Greece, Hong Kong (China), Hungary, Iceland, Indonesia, Ireland, Israel, Italy, Japan, Jordan, Kazakhstan, Korea, Latvia, Lithuania, Macao (China), Malaysia, Malta, Mexico, Moldova, Montenegro, Netherlands, New Zealand, North Macedonia, Norway, Panama, Peru, Philippines, Poland, Portugal, Romania, Russia, Serbia, Singapore, Slovak Republic, Slovenia, Spain, Sweden, Thailand, Türkiye, Ukraine, United Kingdom, United States, Uruguay. Luxembourg and Qatar are not included because their CES levels exceeded by far those of any other PISA participant: USD 209 000 for Luxembourg and USD 326 000 for Qatar, while CES was below USD 150 000 in all other countries/economies. The presence of these two outliers in the analysis would bias the results. Panel B and Panel C restrict the analysis to those subsets of countries/economies in Panel A belonging to the OECD and the EU, respectively. Among EU countries, data on CES was missing for Denmark and Greece.

The overall positive but complex relationship between expenditure and learning outcomes at macro-level has no causal claim, but is backed at micro-level by studies able to identify causal effects of policy interventions. Recent research applying quasi-experimental methodologies to the analysis of school finance reforms in the US found that additional per-pupil expenditure improves learning outcomes, measured both as test scores and subsequent participation in tertiary education (Jackson 2020; Jackson and Mackevicius 2021). Fryer (2017) reviewed the impact of 196 randomised controlled trials in developed countries and showed a large variation in ‘what works’. His overall conclusion was that it is often difficult to know beforehand which interventions will be effective. This is also because measures with a positive impact in a certain setting may not be transferrable to other contexts or may not be suitable for scaling up. Additional complications arise when studies include considerations based on cost-benefit analysis, as evaluation results can be sensitive to the specific methodology used to evaluate costs and benefits of a policy measure (Garcia and Heckman 2022).

Research identifies no optimal level of investment in education and calls for more policy experimentation and evaluation. There is no guarantee that increasing public spending automatically yields better results. The allocation of the resources is equally important. The relationship between expenditure and educational outcomes or equity largely depends on the context or the policy choices. Deming (2022) clearly summarises the main message from the recent experimental and quasi-experimental literature on developed countries: *“just because school spending is economically productive on the margin does not mean that the money is spent optimally. It can be simultaneously true that school spending is productive and that much of it is wasted. We can probably always do better, and so innovation and experimentation are critical for increasing the productivity of human capital investments”* (p. 90). In the EU context, the Final Report of the 2021-2022 Commission expert group on quality investment in education and training concluded that robust evidence on policy effectiveness is often missing, and more experimentation and rigorous evaluation would substantially contribute to improving the effectiveness and efficiency of educational expenditure (Fack et al. 2022).

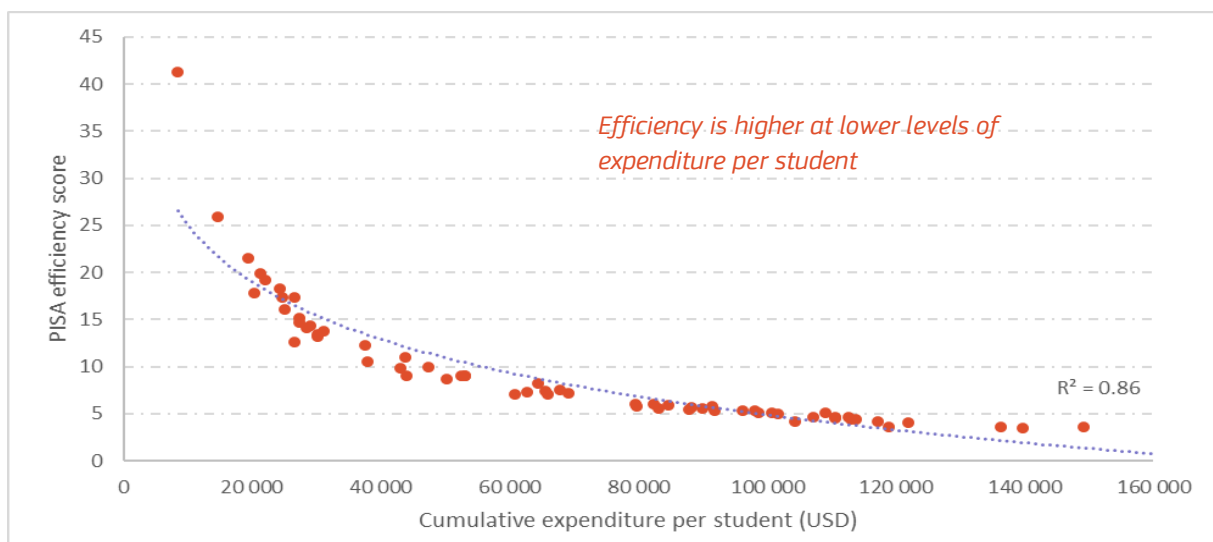
Effectiveness and efficiency, together with equity, are key dimensions of quality investment in education. Effectiveness refers to the ability to provide good educational outcomes, by making the most of the available human and physical resources. Studies of educational effectiveness usually analyse whether specific resources have positive effects on different outcomes, and if so, how large these effects are. Equity requires that the variation in educational outcomes is relatively small among different social groups (e.g. socio-economically advantaged and disadvantaged students). Efficiency adds a financial dimension to the analysis of effectiveness and equity and refers to the ability to provide the desired educational outcomes at the lowest possible cost (European Commission 2022c). In other words, increasing efficiency is a desirable policy goal only if it does not reduce the effectiveness or equity of an education system, because below a minimum level of expenditure it becomes impossible to provide good and equitable learning outcomes. As the equity dimension of EU education systems has been extensively discussed in the Commission’s Education and Training Monitor 2022 (European Commission 2022c), the following analysis will only illustrate the interplay between efficiency and effectiveness.

The pay-off from higher investment is usually larger at lower levels of expenditure. According to PISA data, at lower level of CES it is cheaper to ‘produce’ learning outcomes, even when monetary data is adjusted to account for differences in price levels across countries¹⁴. Figure 7 shows this relationship among PISA participating countries in a simple way by answering the following question: how many PISA

¹⁴ I.e. when it is expressed in purchasing power standards.

points do one thousand dollars¹⁵ of CES produce? This varies greatly from country to country. For instance, one thousand dollars generate from more than 20 PISA points in countries with very low levels of CES to less than 5 PISA points in countries with high levels of CES. This ‘efficiency score’¹⁶ can be interpreted as a rough measure of the pay-off from additional expenditure for a school education system. In this sense, countries with lower levels of CES generally benefit more from increasing investment in education than countries with higher levels of educational spending. The relationship between CES and the efficiency score is non-linear, mirroring the relationship between CES and PISA scores observed in Figure 6 above and thus adding to the evidence about diminishing returns to investment in education. It is important to recall that the growing need for advanced skill levels in today’s economy and society can only be met if countries ensure a sufficiently high level of investment in education. In this context, more evidence is needed on how increasing investment in education can maximise skill levels.

Figure 7. Cumulative expenditure per student and PISA efficiency score (2018)



Source: DG EAC calculations based on OECD PISA 2018 data.

While EU countries are rather diverse in combining efficiency and effectiveness in learning outcomes, efficiency considerations must always go hand in hand with the goal of effectiveness in order to be meaningful for education policymaking. The efficiency dimension can be compared with the effectiveness one. The average of a country’s PISA scores in the three tested domains (reading, mathematics and science) is a simple measure of its CES effectiveness in learning outcomes. Figure 8 combines PISA scores and the efficiency score for EU countries and compares them with EU average¹⁷ values. The position of each EU country in one of the four quadrants of Figure 8 does not indicate that the efficiency and/or effectiveness of its expenditure are high or low in absolute terms, but whether its expenditure appears more or less efficient/effective than the EU average. Most countries are either in the upper-left or in the lower-right quadrant, i.e. they tend to outperform the EU average in one dimension and underperform in the other. Only a few countries are above (Estonia, Poland, Czechia and Latvia) or below (Cyprus, Malta, Luxembourg and Italy) the EU average in both dimensions. This variety of results illustrates once more how there is no single model for investment in education. All EU countries can look for ways to improve the effectiveness and efficiency of their expenditure. Effectiveness, as well as equity, is always a necessary goal for an education system. Increasing efficiency is a desirable policy

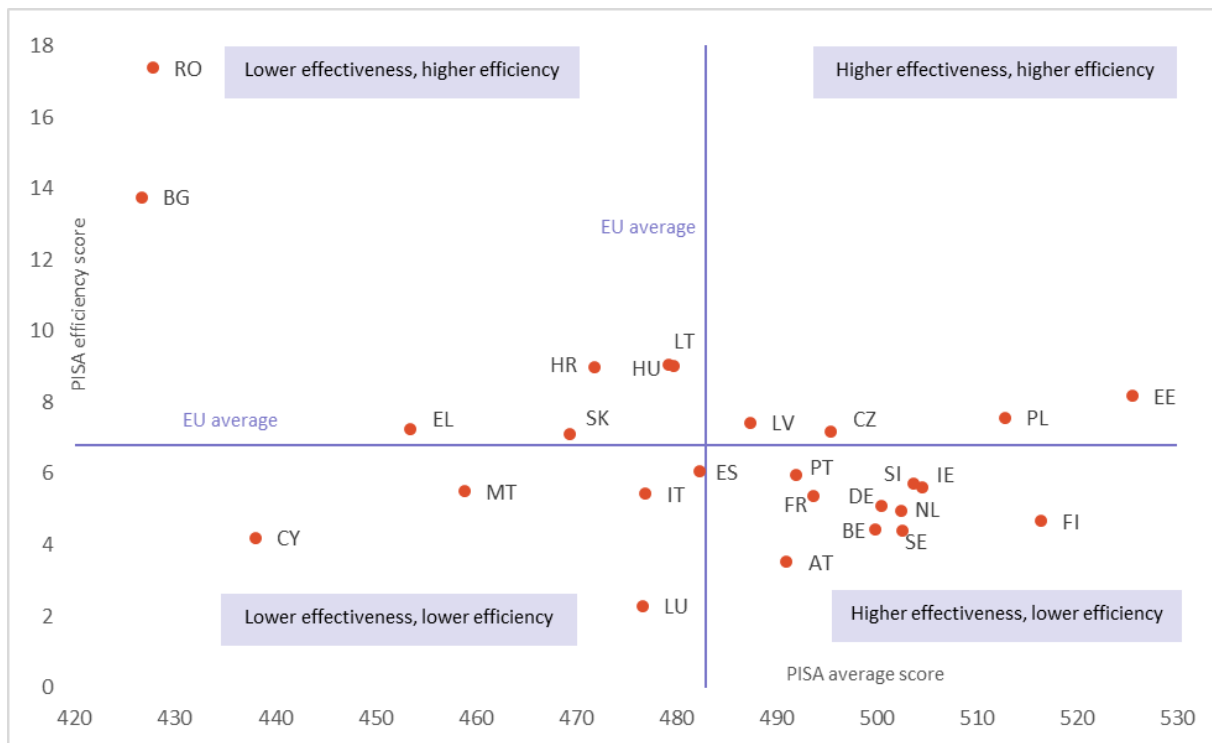
¹⁵ The calculations use US dollars expressed in purchasing power standards, as this is how the OECD measures CES.

¹⁶ The efficiency score is calculated as: $1\,000 * (\text{average PISA score over reading_maths_science} / \text{CES})$.

¹⁷ The EU average is unweighted.

aim if it does not reduce the effectiveness (and/or equity) of an education system. An education system should focus on increasing efficiency if it can provide at least the same levels of effectiveness (and/or equity) at a lower cost; if this is not the case, then cost-saving policies would risk worsening educational outcomes.

Figure 8. Effectiveness and efficiency of cumulative expenditure per student in the EU-27 (2018)



Source: DG EAC calculations based on OECD PISA 2018 data.

EU Member States and the Commission are working together to make education systems more effective and efficient. Designing the right policies, programmes or reforms, and putting in place proper implementation strategies are key to increasing the effectiveness and efficiency of investment in education. Building on previous work with Member States (European Commission 2022d), the Commission launched a Learning Lab on Investing in Quality Education and Training in November 2022 (European Commission 2022e). The Learning Lab will support Member States to further develop an evidence-based approach to policy design and implementation, by strengthening the expertise on rigorous evaluation methods among policy makers and sharing knowledge about properly evaluated policies. This will also help understand which conditions are required to make additional funding more able to improve educational outcomes, and consequently the productivity and competitiveness of EU countries.





CLOSE-UP

The Learning Lab on Investing in Quality Education and Training

The Learning Lab on Investing in Quality Education and Training aims to promote a culture of evaluation in education policy and provide knowledge and resources to identify how to make EU education systems more effective, efficient and equitable. Its activities will cover three main areas:

- ▶ **Capacity building on evaluation methodologies:** the Learning Lab proposes training courses on education policy evaluation methodologies to policymakers at all levels (national, regional, and local) and education practitioners.
- ▶ **Collaborative work among Member States:** in the second half of 2023, the Learning Lab will create a Community of Practice, where representatives of Member States and international organisations will be able to discuss their experiences with impact evaluation in education and share good practices.
- ▶ **Analysis and evaluation of education policies:** the Learning Lab will carry out analytical work on education policies, from impact evaluations to in-depth analyses of existing research findings. Specific calls under the Horizon Europe programme will support research projects on education policy evaluation.



Learning Lab:

Best formulas for quality investment
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References



- Central Statistics Office – Ireland (2023). [Net Factor Income and Primary Income](#) (accessed on 20 March 2023).
- De Witte, F. and François, M. (2023). [Covid-19 learning deficits in Europe: analysis and practical recommendations](#), EENEE Analytical Report 04/2022.
- Deming, D.J. (2022). [Four Facts about Human Capital](#), *Journal of Economic Perspectives*, Vol. 36 No 3, pp. 75–102.
- European Commission (2021a). [Communication from the Commission to the European Parliament, the Council, the European Central Bank, the European Economic and Social Committee, the Committee of the Regions. The EU economy after COVID-19: implications for economic governance](#), COM(2021) 662 final.
- European Commission (2021b). [Education and Training Monitor 2021](#), Luxembourg: Publications Office of the European Union.
- European Commission (2022a). [Communication from the Commission to the European Parliament, the Council, the European Central Bank, the European Economic and Social Committee, the Committee of the Regions. 2022 European Semester - Spring Package](#), COM(2022) 600 final.
- European Commission (2022b). [Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Progress towards the achievement of the European Education Area](#), Luxembourg: Publications Office of the European Union.
- European Commission (2022c). [Education and Training Monitor 2022](#), Luxembourg: Publications Office of the European Union.
- European Commission (2022d). [Investing in education in a post-Covid EU](#), Luxembourg: Publications Office of the European Union.
- European Commission (2022e). [The ‘Learning Lab’. Discovering best formulas for quality investment in education and training](#), Luxembourg: Publications Office of the European Union.
- European Commission (2023a). [Communication from the Commission to the Council. Fiscal Policy guidance for 2024](#), COM(2023) 141 final.
- European Commission (2023b). [Government expenditure by function - COFOG](#), Eurostat Statistics Explained.
- Fack, G., Agasisti, T., Bonal, X., De Witte, K., Dohmen, D., Haase, S., Huyen, J., McCoy, S., Neycheva, M., Pantea, M.C., Pastore, F., Pausits, A., Poder, K., Puukka, J., and Velissaratou, J. (2022). [Investing in our future: quality investment in education and training](#), Final report of the Commission expert group on quality investment in education and training, Luxembourg: Publications Office of the European Union.
- Fryer, R. G. (2017). The Production of Human Capital in Developed Countries: Evidence From 196 Randomized Field Experiments. In Banerjee, A.V. and Duflo, E. (editors). “Handbook of Economic Field Experiments, Vol. 2, pp. 95–322, Amsterdam: North-Holland.
- García, J.L. and Heckman, J.J. (2022). [Three Criteria for Evaluating Social Programs](#), IZA Discussion Paper No. 15573.
- Jackson, K.C. (2020). Does School Spending Matter? The New Literature on an Old Question. In L. Tach, L., Dunifon, R. and Miller, D.L. (editors). “Confronting Inequality: How Policies and Practices Shape Children’s Opportunities”, pp. 165–86, Washington, DC: American Psychological Association.
- Jackson, K.C. and Mackevicius, C. (2021). [The Distribution of School Spending Impacts](#), NBER Working Paper 28517.
- UNESCO (2023). [Dashboards on the Global Monitoring of School Closures Caused by the COVID-19 Pandemic](#) (accessed on 14 March 2023).

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