



Transforming education in the Western Balkans

PISA 2022 findings from Albania, Kosovo, Montenegro, North Macedonia and Serbia

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FOREWORD FROM UNICEF

On their path towards European Union membership, the Western Balkans countries strive for further economic growth and social development. Education is at the heart of these goals: equitable, high-quality education systems both build human capital and help to create inclusive societies.

This new study, carried out by UNICEF and the Organisation for Economic Co-operation and Development (OECD), provides valuable insights into how education systems in Western Balkans are equipping young people with the skills and knowledge needed to succeed in life and contribute to their societies. The report examines countries' performance in the Programme for International Student Assessment (PISA), which evaluates learning outcomes and identifies areas of progress, as well as remaining challenges.

The 2022 results show significant decreases in performance for almost all Western Balkan countries. These reverse the gains seen in previous PISA cycles. On average, the most disadvantaged students are not only falling behind in their learning but are experiencing greater education resource shortages. This finding underscores the need to improve student performance across the board and address persistent inequities in performance. Areas requiring focused attention are highlighted to provide insight to policymakers and stakeholders.

We hope that the takeaways provided here will contribute to informing policies and programmes that help build inclusive, equitable and resilient education systems. UNICEF remains committed to supporting governments and education partners in Western Balkans in improving learning and education outcomes for all children to achieve each country's economic and social goals.

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FOREWORD FROM THE OECD

The Western Balkan region is at a critical juncture, with its economies striving to achieve sustainable economic growth and greater social cohesion amidst significant challenges. Digitalisation and the green transition offer new avenues for economic diversification and innovation. Education plays a pivotal role if these countries are to fully capitalize on these opportunities. By equipping young people with the right knowledge, skills, attitudes and values, the Western Balkans can build more competitive and diverse economies and create more inclusive societies. The region's aspirations are high, and education is the cornerstone upon which these ambitions can be realised.

The OECD Programme for International Student Assessment (PISA) is a key tool for assessing educational progress and identifying avenues for improvement. PISA provides valuable insights into how well students across the globe are acquiring the essential competencies needed to thrive in the modern world, and it provides a platform for countries to learn from and with each other how to advance education. In 2022, five Western Balkan economies—Albania, Kosovo, Montenegro, North Macedonia, and Serbia—took part in this assessment. PISA results show improvements in learning outcomes over time in the Western Balkan economies. But, like elsewhere in the world, some gains were reversed after the COVID-19 pandemic and the Western Balkan economies still lag behind those in the OECD. Many students in the region struggle to master basic skills, and significant inequities persist, hindering the potential of many young people to achieve their full potential.

Together with the United Nations Children's Fund (UNICEF), the OECD is strongly committed to supporting economies in the Western Balkan region, helping them achieve their economic and social goals and building resilient and adaptable education systems – particularly at a time when countries continue grappling with the aftermath of the COVID-19 pandemic. This study analyses PISA data to identify strengths that countries can build upon and challenges they need to address. Drawing on our knowledge of education policy and practice in the region and beyond, we highlight where policymakers should focus their efforts and provide pointers on how these areas can be improved.

This report can serve as a resource for policymakers, educators, and stakeholders across the Western Balkans and contribute to the ongoing debate on how to achieve excellent and equitable education systems. The study can further strengthen OECD's ties to the Western Balkans and reinforce our valuable partnerships with UNICEF.

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EXECUTIVE SUMMARY

In 2022, five Western Balkan economies – Albania, Kosovo,¹ Montenegro, North Macedonia and Serbia – participated in the Programme for International Student Assessment (PISA), which measures what 15-year-old students know and can do in mathematics, reading and science. PISA 2022 was the first large-scale study to collect data on student performance, well-being and equity before and after the COVID-19-related disruptions. Using data from PISA 2022, this report examines student outcomes, equity in performance and education opportunities, and the learning environment in and outside of school in the Western Balkans. The report focuses particularly on mathematics performance, which was the main subject assessed in 2022. The analysis provides insights to identify key areas for policymaking that can lead to improved schooling and student outcomes in the region.

Student performance

The Western Balkans' poor performance in PISA 2022 signals an urgent need to improve education quality in the region. Even before COVID-19, large proportions of students in the Western Balkans performed below minimum proficiency levels in previous PISA cycles. Following the pandemic, the learning crisis appeared to worsen in the region, with mathematics, reading and science scores showing significant declines from 2018 to 2022 in all Western Balkan economies except Serbia. In 2022, only about one third of students on average across the region reached the minimum proficiency level in mathematics. Mean mathematics performance across Western Balkan economies was more than 80 points lower than the average performance across OECD and EU countries – equivalent to at least four years of learning in OECD member

states. PISA data also suggest that increased education expenditure in the Western Balkans could raise student achievement: across PISA-participating countries, cumulative spending per student was associated with mathematics performance up to a certain spending threshold; however, spending per student in Western Balkan economies remained well below OECD and the EU averages.

In every Western Balkan economy, advantaged students significantly outperformed their disadvantaged peers.²

On average across the region, the performance gap between advantaged and disadvantaged students was equivalent to more than three years of schooling in OECD member states. This inequality extends beyond academic performance: advantaged students report a greater sense of belonging at school and were more likely to report expecting to complete tertiary education than their disadvantaged peers. Gender performance varies by country, with girls outperforming boys in Albania and North Macedonia, while boys achieve higher scores in Serbia.

While urban students consistently outperform their rural peers across all economies in the region, these differences largely reflect socio-economic factors rather than school location alone. In linguistically diverse contexts such as Montenegro and North Macedonia, students who speak the test language at home performed better than those who do not, even after accounting for socio-economic background. Performance gaps were also observed regarding the language of instruction in Montenegro and North Macedonia, where students learning in Albanian tended to score lower than their peers learning in Montenegrin and Macedonian, respectively.

¹ All references to Kosovo in this report should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

² PISA typically uses a socio-economic index, which is a composite measure based on family wealth, parental education, and parental occupation and is used to classify students into different socio-economic categories. The exact cutoffs for categorizing students as “advantaged” or “disadvantaged” can differ across countries and PISA cycles, but students are generally divided into: High socio-economic background (advantaged) and Low socio-economic background (disadvantaged).



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Access to resources and education opportunities

Western Balkan school principals report more severe material and digital resource shortages than their OECD counterparts, particularly in socio-economically disadvantaged schools. In Albania, Kosovo and North Macedonia, public school principals express greater concern about shortages of material resources – including textbooks and physical infrastructure such as buildings – than their private school counterparts.

While shortages of education staff in the Western Balkans appear less problematic than the OECD average, significant inequalities were observed within education systems. Public schools report greater concerns than private schools in Albania and Kosovo, rural schools face more challenges than urban schools in Albania, and disadvantaged schools experience more difficulties than advantaged schools in Montenegro.

Pre-primary education participation shows marked variations across the Western Balkans, with persistent equity gaps and

mixed evidence on its relationship with student performance. The region's average pre-primary attendance rate of 77 per cent falls significantly below the OECD and EU average of 95 per cent. While Serbia achieves near-universal participation (96 per cent), rates are notably lower in Kosovo (70 per cent) and North Macedonia (63 per cent).

Within countries, socio-economically advantaged students and those in urban areas demonstrate consistently higher pre-primary education attendance, with some economies showing disparities exceeding 15 percentage points. The relationship between pre-primary education duration and mathematics performance varies significantly across the region. Albania shows positive associations, while Kosovo, Montenegro and North Macedonia demonstrate negative associations, even after accounting for socio-economic factors. This mixed evidence, supported by international research, highlights that improving student performance requires a comprehensive approach: expanding access to quality pre-primary education while simultaneously ensuring high standards across all education levels, from pre-primary through lower secondary.

Learning environment in and outside of school

During school closures, Western Balkan students reported more significant remote learning challenges than their OECD and the EU counterparts, with limited teacher support being a key concern. Across the region, only about two thirds of students reported that their teacher was available when they needed help during school closures. Students perceived a lack of teacher support during mathematics lessons. Students also perceived a lack of teacher support during mathematics lessons. For instance, a third of students reported that the following happens in only some lessons, hardly ever or never: the teacher shows an interest in every student's learning, helps students with their learning and continues teaching until students understand. The learning environment faces additional challenges, with more than a third of students reporting that their peers do not listen to what the teacher said in most lessons or every lesson.

Use of devices can be both beneficial and distracting for learning. In almost all Western Balkan countries, students who spent up to one hour per day on digital devices for learning and leisure activities at school generally scored

similarly to or higher in mathematics than those who did not spend time on the same. However, average scores were lower among students spending three or more hours on digital devices for learning activities and more than one hour on leisure activities with digital devices at school. Many students reported that they get distracted by using digital devices or by other students who are using digital devices during their mathematics lessons. Notably, Western Balkan results in PISA 2022 differ from the general trend observed across OECD countries whereby students who spend up to one hour per day on digital devices for learning activities in school scored 24 points higher in mathematics than students who do not use devices.

Beyond classroom and school factors, family involvement is crucial to supporting students' learning outcomes. Parental involvement in students' learning decreased significantly across almost all Western Balkan education systems between 2018 and 2022. The role of family is key to supporting student outcomes: family support was associated with more positive attitudes, including a stronger sense of belonging at school and lower levels of mathematics anxiety. Across nearly all Western Balkan education systems, family support was also associated with mathematics performance, even after accounting for socio-economic factors.



Strategic priorities for educational improvement

The Western Balkans education systems show strengths in fostering student belonging and educational aspirations, yet PISA 2022 results reveal significant challenges. High proportions of students fail to achieve basic proficiency levels, and substantial equity gaps persist in learning outcomes. Analysis identifies five interconnected strategic priorities requiring comprehensive reform approaches to address these challenges:

1. Address resource inequities and improve funding efficiency

Current government expenditure remains below international benchmarks of 4–6 per cent of GDP and/or at least 15–20 per cent of total public expenditure for education. Cumulative spending per student falls significantly lower than OECD and EU averages. Some countries require government expenditure above these international benchmarks to compensate for long periods of insufficient investment in education.

Key recommendations:

- **Implement transparent per capita funding formulas:** This approach ensures more equitable resource distribution by considering factors such as geographic location, school size, minority status, and special needs populations. Success stories like Poland's model demonstrate how incorporating multiple equity criteria can effectively address disparities while maintaining transparency.
- **Develop targeted funding streams:** Special consideration for disadvantaged populations, exemplified by Albania's transport subsidies for rural teachers, help address specific needs and barriers to education access.
- **Optimize resource allocation:** Given demographic changes and declining student populations, particularly in countries like Montenegro and Serbia, strategic school network rationalization becomes crucial. This includes careful consolidation of schools while ensuring access through transportation services or digital learning options for remote areas.
- **Strengthen monitoring and accountability:** Building on Serbia's successful experience with improved financial management systems, implementing transparent tracking systems helps ensure efficient resource use, particularly important in Kosovo and Montenegro where resource efficiency challenges are most acute.

2. Ensure mastery of basic skills

Only about one third of students achieve basic proficiency in mathematics at age 15, with significant gaps in reading performance. While international assessments show relatively stronger performance in early primary grades (PIRLS and TIMSS), student achievement declines markedly through the education system.

Key recommendations:

- **Strengthen learning progression:** This comprehensive approach involves implementing systematic assessment frameworks across grade levels to track progress and identify emerging gaps. This includes providing targeted interventions at key transition points, particularly in upper primary and lower secondary levels, while ensuring curriculum coherence throughout the education journey.
- **Enhance instructional effectiveness:** This requires strengthening pedagogical preparation in initial teacher education, focusing on evidence-based teaching practices. This includes providing structured guidance for core subjects and implementing classroom observation systems that support teacher growth, emphasizing practical approaches that teachers can effectively implement across all grade levels.
- **Develop comprehensive learning recovery:** Programmes should include accelerated learning initiatives that maintain high expectations while addressing gaps. This requires extended learning opportunities through well-designed after-school programmes, and systematic use of formative assessment to guide instruction and monitor student progress throughout primary and lower secondary education.

3. Revitalize teaching quality and teacher support

Significant challenges exist in teaching quality and effectiveness, with inconsistent relationships between teacher support and student performance.

Key recommendations:

- **Strengthen initial teacher education:** Programmes need commonly agreed core standards and specialized training for subject teachers. This is particularly crucial in contexts like Albania where programmes currently lack standardization, and Serbia where teachers may enter classrooms with limited pedagogical training.
- **Implement stricter selection criteria:** Addressing oversupply issues in countries like Albania and North Macedonia through more stringent entry standards linked to workforce projections and improved certification processes that emphasize practical pedagogy.
- **Enhance professional prestige:** Given challenges like Serbia's aging teaching workforce, implementing merit-based scholarships, improved working conditions, and clear career advancement opportunities can help attract and retain quality teachers.
- **Provide continuous professional development:** Training should focus on practical classroom management strategies, family engagement techniques, and differentiated instruction methods. Participation should be linked directly to career advancement opportunities.

4. Harness the potential of edtech to improve access to and quality of education

The region faces significant challenges in both access to and effective use of digital technologies, particularly in disadvantaged contexts.

Key recommendations:

- **Ensure equitable access:** Digital infrastructure needs to be upgraded, particularly in disadvantaged and rural schools. This includes providing reliable internet connectivity and access to quality digital learning platforms and content as foundational elements for digital learning.
- **Strengthen teachers' digital competencies:** Digital competencies should be integrated into national teacher standards throughout the continuum of teacher education and professional development. This focus should emphasize pedagogical application and approaches, rather than merely basic digital skills or specific digital tool usage.
- **Develop students' digital skills:** Following Montenegro's example of aligning with the European Digital Competence Framework, education systems should establish clear frameworks for integrating digital competencies into curricula.
- **Prioritize regulation of technology use in the best interest of children and for academic benefits:** Given that over 25 per cent of students report frequent digital distractions, clear protocols for device use in classrooms are essential. These protocols must be supported by digitally competent teachers and a curriculum that meaningfully integrates digital skills and literacy.

5. Strengthen educational pathways and support high educational aspirations

Over three quarters of 15-year-old students in Western Balkan countries expect to complete tertiary education – higher than OECD averages – yet only about one third achieve basic proficiency in mathematics. While these high aspirations reflect positive student motivation, significant socio-economic gaps in expectations persist across the region.

Key recommendations:

- **Strengthen academic preparation:** Implement early warning systems and targeted academic support programmes. This becomes particularly crucial in countries like Albania, where performance has declined while aspirations increased.
- **Diversify educational pathways:** Improve the quality and prestige of vocational education while maintaining high standards. This requires creating more flexible pathways between academic and vocational tracks and developing stronger school-employer partnerships across the region.
- **Enhance career guidance services:** Integrate comprehensive career guidance into lower secondary education. Particular attention must address significant socio-economic gaps in educational expectations, which exceed 29 percentage points in North Macedonia.
- **Build system capacity:** Develop teacher and counsellor expertise in supporting educational planning and transitions. Additionally, strengthening data systems to track student outcomes ensures initiatives effectively support students in achieving their aspirations.

6. Strengthen student engagement and well-being

While students report stronger sense of belonging to school than OECD averages, concerning trends emerge in attendance and classroom engagement.

Key recommendations:

- **Address engagement barriers:** Early warning systems should identify disengaged students while simultaneously addressing root causes like boredom or family responsibilities. This becomes particularly important given varying challenges across countries, notably in Serbia where 40 per cent of students report that their peers do not listen to teachers in most lessons.
- **Rebuild school-family partnerships:** Given the significant deterioration in family involvement between 2018 and 2022, particularly in Montenegro, systematic efforts to engage families take on heightened importance. This priority becomes crucial considering the strong positive association between family support and student performance in countries like Albania.
- **Strengthen support services:** Comprehensive guidance and counselling services should address both academic and social-emotional needs. This becomes particularly important given the mixed findings on mathematics anxiety and growth mindset across the region. Support services should focus specifically on reducing socio-economic disparities in student well-being measures, as observed in North Macedonia.
- **Implement social-emotional programmes:** Targeted support for students experiencing academic anxiety or motivation challenges should be integrated into regular school programming. These programmes require particular attention to socio-economic disparities in student well-being measures, ensuring support reaches those most in need across all socio-economic groups.



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1. EDUCATION IN THE WESTERN BALKANS

The Western Balkans region comprises six countries – Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia and Serbia. The region maintains strong ties with the European Union (EU), with all Western Balkan economies being either candidates or potential candidates for EU membership through the Stabilisation and Association Process, the EU's policy framework for the Western Balkans countries. Integration with the EU remains a key strategic priority, with education playing a crucial role.

While these countries differ in aspects such as population size, language, stage of EU accession, they share important commonalities in their recent history and current development challenges. All underwent transition to market economies in the early 1990s and face similar challenges in economic growth, competitiveness, and poverty reduction due to historical legacies and ongoing structural reforms. Education remains central to addressing these challenges and supporting regional development and EU integration.

While there have been some improvements in educational participation and outcomes over recent decades, progress remains uneven across population groups, with many students struggling to master basic competencies. The COVID-19 pandemic further complicates this picture. Between February 2020 and June 2022, schools in the Western Balkans were fully closed for an average of 19 weeks and partially closed for an additional 28 weeks (UNESCO-UIS 2022).³ With schools now reopened, education systems face twin challenges: addressing learning losses from school closures and while tackling the pre-existing learning crisis.

Previous studies conducted by UNICEF and the OECD, including analysis of PISA 2018 results, highlighted educational challenges faced by Western Balkan economies (OECD 2020). This report demonstrates that low learning levels and disparities across equity dimensions have persisted – and often worsened – post-COVID. Data-informed efforts to improve education quality are urgently needed to recover and accelerate learning in the region.

1.1 Purpose, sources and structure of the report

This report analyzes PISA 2022 results from five Western Balkan economies: Albania, Kosovo, Montenegro, North Macedonia and Serbia. The analysis examines common strengths and challenges across their education systems, including school, home, and student-related

learning factors. Using PISA 2022 data, the analysis explores several key issues previously identified, such as overall student performance, adequacy and equity of education resources (material, digital and human), and teacher practices and quality. The analysis also enriches the existing knowledge base by providing insight into learning environments both in and outside of school, including during COVID-19 closures, to highlight key policy areas for improving student learning in the region.

To situate the region’s PISA 2022 findings, this report draws on comprehensive knowledge about education in the Western Balkans. This includes analyses of the region’s participation in previous PISA cycles (OECD 2020; OECD and UNICEF 2021) and other significant studies. These include the OECD’s Multi-dimensional Review of the Western Balkans, which highlights education as a strategic priority, and country policy reviews by the OECD and UNICEF for Albania (Maghnouj et al. 2020a), Bosnia and Herzegovina (Guthrie et al. 2022), North Macedonia (OECD 2019a) and Serbia (Maghnouj et al. 2020b).

The report is structured in the following way:

The report first presents findings on student outcomes, examining learning achievement, expectations for education and work, and attitudes toward school. It then explores equity issues in equity in student performance and education opportunities alongside aspects of the learning environment both in and outside school. Mathematics receives primary focus as it was the main domain assessed in 2022, taking nearly half the total testing time. Additionally, performance patterns remain similar across mathematics, reading and science, and many key indices related to teacher and classroom factors specifically address mathematics lessons. Finally, insights are drawn from the analyses to identify relevant areas for policymaking that can lead to improved schooling and student outcomes in the region.

³ Data are available for Albania, Bosnia and Herzegovina, Montenegro, North Macedonia and Serbia. Schools are considered ‘fully closed’ when closures affect most or all (at least 80 per cent) of the student population enrolled from pre-primary through upper secondary levels. Schools are considered ‘partially closed’ when schools are either closed in certain areas only, for some grade levels/age groups only, or are operating with limited capacity.

Box 1.1 Areas for further analysis

This report focuses on insights from PISA 2022 most relevant to common education issues in the Western Balkans. While PISA offers extensive data, certain aspects receive limited analysis as they are not pressing concerns for the region's education systems. For example, although PISA typically examines immigrant student outcomes in OECD countries,⁴ this report touches only briefly on this dimension since immigrant students comprise only 4 per cent of students on average across the Western Balkans. The report addresses issues common across Western Balkans countries, though additional country-specific analyses could further support individual education systems. Some significant regional concerns fall outside PISA's scope. Students with disabilities are excluded from the PISA sampling, and data disaggregation by different ethnic groups, particularly Roma populations, is not available. However, the report examines equity through the lens of language spoken at home as a proxy for exploring some ethnicity-related performance variations.

1.2 Overview of PISA and Western Balkan participation in PISA

PISA is a triennial survey providing internationally comparable evidence on 15-year-old students' performance. Beyond assessing core knowledge in mathematics, reading and science, PISA evaluates how students apply their learning both in and outside school. Through context questionnaires, PISA also captures valuable policy-relevant information on students' backgrounds, learning attitudes and key environmental factors at school and home.

In 2022, 81 countries and economies participated in PISA. Originally planned for 2021,

the eighth cycle was postponed to 2022 due to COVID-19 pandemic challenges (see Box 1.2). PISA 2022 marks the first large-scale study to collect data on student performance, well-being and equity before and after the COVID-related disruptions (OECD 2023b). One core subject is tested in detail during each PISA cycle, with mathematics being the main subject assessed in 2022. As such, analyses in this report focus primarily on mathematics performance. In addition to the three core subjects, creative thinking was assessed as an innovative domain for the first time in PISA 2022.

Box 1.2 PISA in the pandemic

As a triennial survey administered since 2000, the eighth round of the PISA test was planned to take place in 2021 but was delayed by one year due to the COVID-19 pandemic. The pandemic created exceptional circumstances for education systems throughout this period, including lockdowns and school closures, which occasionally complicated data collection. The vast majority of countries and economies met PISA's technical standards, including all participating Western Balkan countries. However, a small number did not meet these standards. In previous PISA rounds, countries and economies that did not comply with the technical standards, and which the PISA Adjudication Group assessed to be consequential, could face exclusion from the main part of reporting. However, given the unprecedented challenges caused by the pandemic, PISA 2022 results include data from all participating education systems, including those where there were issues such as low response rates.

The PISA Adjudication Group assessed the limitations and implications in June 2023. Further subsequent adjustments may be needed as new evidence on the quality and comparability of the data emerges. PISA will return to standard reporting procedures for the 2025 assessment.

Source: OECD 2023b.

⁴ PISA defines immigrant students as students whose mother and father were both born in a country/economy other than that where the student took the PISA test. Non-immigrant students are students who have at least one parent born in the country of assessment.

Five Western Balkans education systems took part in PISA 2022: Albania, Kosovo, Montenegro, North Macedonia and Serbia.

As Table 1.1 suggests, the region's participation across PISA cycles has been inconsistent, limiting

trend monitoring and comparisons within and across countries. Continuous and consistent participation remains necessary for benchmarking performance, identifying crucial policy areas, and monitoring reform impacts on learning outcomes.

TABLE 1.1 Participation of Western Balkan economies in PISA cycles

	Albania	Bosnia and Herzegovina	Kosovo [†]	Montenegro	North Macedonia	Serbia
PISA 2000	X				X	
PISA 2003						X
PISA 2006				X		X
PISA 2009	X			X		X
PISA 2012	X			X		X
PISA 2015	X		X	X	X	
PISA 2018	X	X	X	X	X	X
PISA 2022	X		X	X	X	X

Note: [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

By 2022, all five Western Balkan economies had transitioned to computer-based assessment, including North Macedonia which previously used paper-based testing in 2018. This transition enables PISA to measure new and expanded aspects of the domain constructs and include material leveraging the use of digital environments, such as spreadsheets, simulators and data generators.

PISA administers mandatory background questionnaires to students and school principals, alongside optional questionnaires to students, teachers and parents. Beyond the main assessment of mathematics, reading

and science and creative thinking, PISA offered an optional financial literacy assessment. The student background questionnaire examines attitudes, dispositions, beliefs, home and school environments and their learning experiences. School principals completed a questionnaire covering management, organization and learning environment. Additional optional questionnaires were provided, namely: (a) ICT familiarity questionnaire for students, (b) parent questionnaire, (c) teacher questionnaire and (d) well-being questionnaire for students. Table 1.2 summarizes features of Western Balkan economies' participation in PISA 2022.

TABLE 1.2 Features of participation in PISA 2022

	Albania	Kosovo [†]	Montenegro	North Macedonia	Serbia
Computer format of the assessment	X	X	X	X	X
Creative thinking	X			X	X
Financial literacy					
Optional questionnaires	ICT familiarity	X			
	Parent				
	Teacher		X		
	Well-being				
Language of the assessment	Albanian	Albanian	Montenegrin, Albanian	Macedonian, Albanian	Serbian, Hungarian

Note: [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

PISA employs a two-stage stratified sampling design to select schools and students. Eligible students were between the ages of 15 years and 3 months and 16 years and 2 months, enrolled in an educational institution at 31,000 students participated in PISA 2022, representing over 131,000 15-year-old students in the region.

National contexts of each participating country significantly influenced student sampling. This report also explores the key contextual features of Western Balkan economies and how these are reflected in their PISA 2022 student samples (see *Table 1.3*). The association between these different contextual factors and students' learning and well-being receives detailed examination in Chapter 3.

TABLE 1.3 Characteristics of the students in the PISA 2022 sample

			Albania	Kosovo [†]	Montenegro	North Macedonia	Serbia
How well does the sample of students who took the PISA test represent the population of 15-year-olds in each country/economy?	Number of participating students (i.e., students who took the PISA test)		6,129	6,027	5,793	6,610	6,413
	Number of students represented by the PISA sample ¹		28,426	21,045	6,340	16,548	59,250
	Percentage of the 15-year-old population covered by the PISA sample (Coverage Index 3)		79	86	93	91	87
What is the socio-economic background of students who took the PISA test?	PISA index of economic, social and cultural status (ESCS)	All students	-0.75	-0.34	-0.21	-0.28	-0.20
		Disadvantaged students ²	-2.15	-1.51	-1.31	-1.51	-1.28
		Advantaged students ³	0.65	0.75	0.87	0.87	0.86
		Advantaged – Disadvantaged (diff.)	2.80	2.26	2.18	2.37	2.14
What is the demographic background of students who took the PISA test?	Students who are girls (%)		48	50	49	48	49
	Students with an immigrant background (%)		1	1	6	2	11
	Students who speak a different language at home than at school (%)		5	2	4	7	3
	Students enrolled in school located in (%):	Village or rural area (fewer than 3,000 people)	21	10	1	3	1
		Towns (from 3,000 to about 100,000 people)	43	64	67	50	47
		Cities (over 100,000 people)	36	27	32	46	52
In which grade levels are the students who took the PISA test?	Modal grade (grade most represented by 15-year-olds)		10	10	10	10	9
	Students in upper secondary education (%)		70	81	95	100	98

Note: [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

¹ Weighted number of participating students, i.e. the number of students in the nationally defined target population that the PISA sample represents.

² Socio-economically disadvantaged students are those among the 25 per cent of students with the lowest values on the ESCS index in their country or economy.

³ Socio-economically advantaged students are those among the 25 per cent of students with the highest values on the ESCS index in their country or economy.

Source: OECD 2023a.

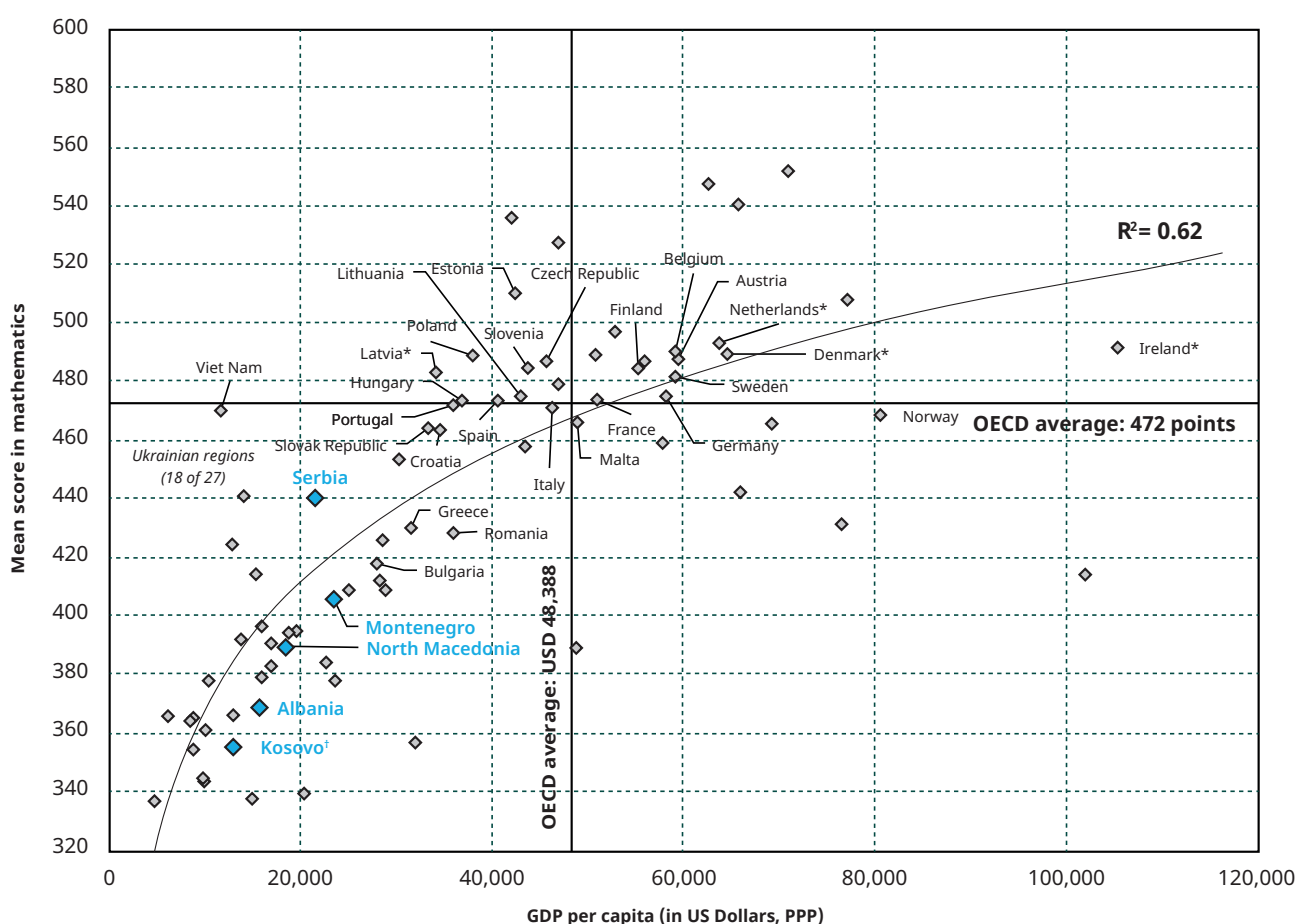
1.3 Key features of Western Balkan economies and education systems

1.3.1 Economic context and investment in education

As socio-economic contexts and student performance are closely related, countries' level of economic development warrants careful consideration when interpreting and comparing educational outcomes. The relationship in Figure 1.1 shows the mathematics performance of education systems relative to their per capita GDP. The relationship suggests that

62 per cent of the variation in education systems' mean scores is related to their GDP per capita. Apart from Serbia, Western Balkan countries' mean scores fall below predictions based on their level of economic development. Moreover, some countries with similar or even lower per capita GDP achieve higher mean scores compared to Western Balkan countries, as demonstrated by Viet Nam and Ukrainian regions (18 of 27). These findings highlight that while national wealth is related to performance up to a certain threshold, education policies can maximize available resources and overcome constraints to effectively support student learning.

FIGURE 1.1 Per capita GDP and mathematics performance



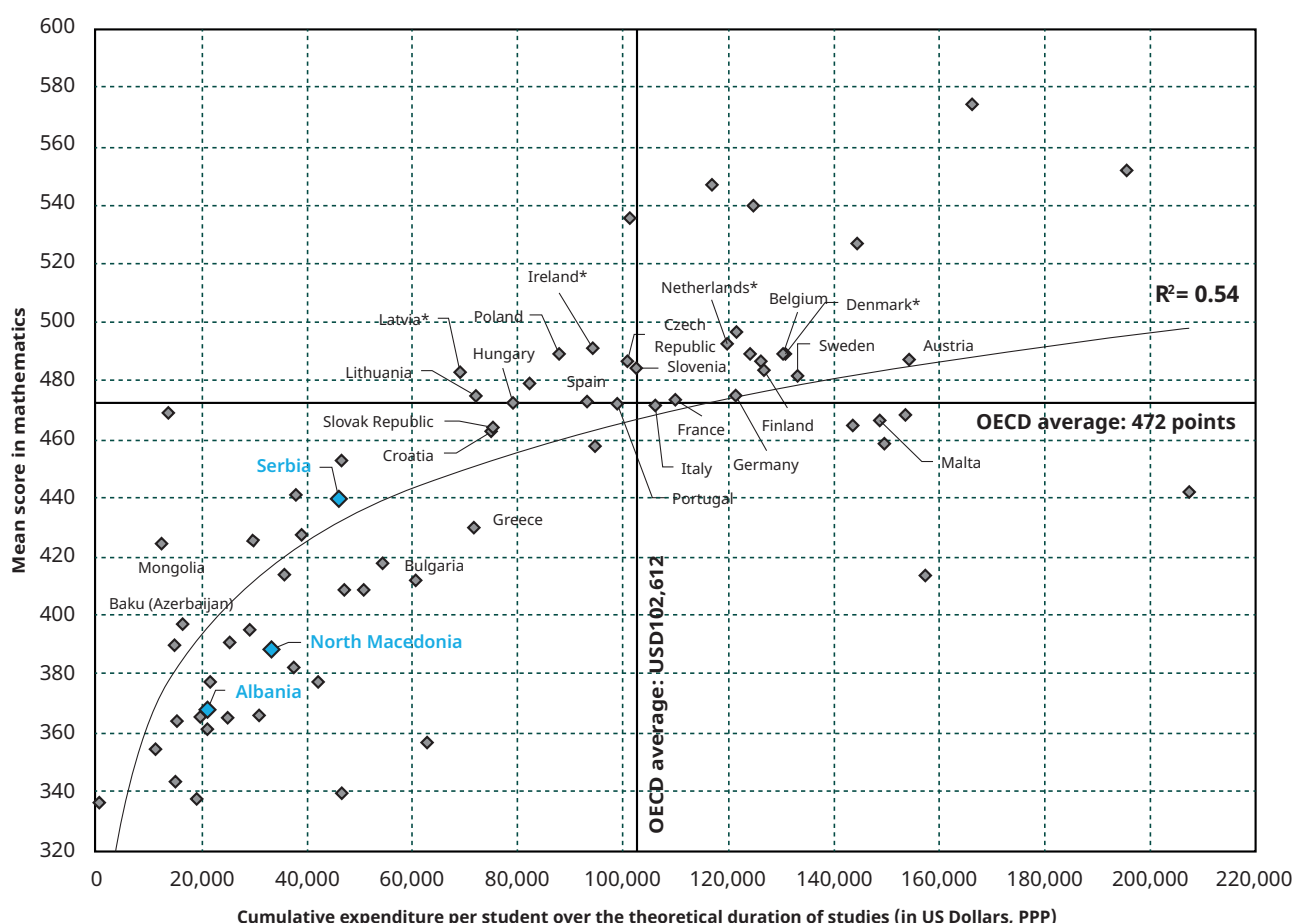
Note: † Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

Source: OECD 2023a (Tables I.B1.2.1 and I.B3.2.1).

Beyond economic development levels, investment in education requires consideration when interpreting and comparing student learning outcomes. Figure 1.2 presents countries' average mathematics performance relative to their cumulative spending per student from age 6 up to 15, accounting for purchasing power parities. Across the three Western Balkan economies with available data, cumulative spending per student was roughly USD 33,460 – only about one third of the OECD average (USD 102,612 per student) and the European Union average (USD 101,581 per student).

Comparing spending data against mathematics mean scores reveals Serbia performed higher while Albania and North Macedonia performed lower than expected given their spending levels. Moreover, education systems like Mongolia and Baku (Azerbaijan) outperformed Albania and North Macedonia, despite lower spending levels. These findings emphasize that while overall education funding matters, efficient and equitable use of available resources proves equally important for supporting student learning.

FIGURE 1.2 Spending on education and mathematics performance



Note: * Caution is required when interpreting estimates because one or more PISA sampling standards were not met.

Source: OECD 2023a (Tables I.B1.2.1 and I.B3.2.2).

1.3.2 Social and cultural context

In Western Balkan countries, the average student typically has a lower socio-economic status compared to students in OECD countries (see Table 1.3). PISA measures this through an index of economic, social and cultural status (ESCS), a composite score derived from three variables related to family background: home possessions, parents' highest level of education and parents' occupational status. The ESCS index is standardized so that the OECD average is zero with a standard deviation of one. A lower ESCS index value indicates lower average socio-economic status, while a higher value indicates higher socio-economic status. Across Western Balkan economies, the average socio-economic status of students is lowest in Albania and highest in Montenegro and Serbia.

Within the Western Balkans, socio-economic inequality as measured by the ESCS index is highest in Albania. Inequality in students' socio-economic status can be measured by the difference in socio-economic status (i.e., ESCS index value) between advantaged students (those in the top quarter of the ESCS index in their country) and disadvantaged students (those in the bottom quarter). In Albania, this gap is equal to 2.80 points in the ESCS index (see Table 1.3). This difference exceeds that observed in other Western Balkan economies (gaps ranging from 2.14 points in Serbia to 2.37 points in North Macedonia) and across the OECD (a gap of 2.31 points).

Additionally, most Western Balkan economies, have relatively few students attending schools in rural areas. PISA defines rural areas as areas with fewer than 3,000 people. About 8 per cent of students on average across the OECD attend schools in rural areas. Within the Western Balkans, Albania shows the highest percentage of students attending rural schools at 21 per cent (see Table 1.3). By comparison, only 1 per cent of students in Montenegro and Serbia attend rural schools. This finding reflects how students eligible for PISA are almost exclusively enrolled in upper secondary school, which generally operates in urban areas.

Western Balkan countries face sweeping demographic changes. Similar to the OECD, the share of rural population has declined steadily in

Western Balkan countries over the recent decades. Montenegro shows a particularly steep decline: rural population as a share of total population decreased steadily from 81 per cent in 1960 to only 31 per cent in 2023 (World Bank 2023). Beyond increasing urbanization, countries in the region have been experienced depopulation over the last thirty years, showing no signs of slowing based on population prospects. Declining birth rates have also contributed to declining and ageing populations in Western Balkan countries (Marchais 2023). These demographic changes have resulted in overcrowded schools in some areas and underutilized schools in others, reflecting issues in inefficient and inequitable resource allocation (OECD 2020).

1.3.3 Grade level distribution of 15-year-olds

To ensure comparability of the PISA target population across countries, PISA assesses students at a specific age rather than at grade level. This approach accounts for grade level variations across different school systems which vary across countries. The 15-year-olds in PISA may be distributed across different grade levels in different countries and economies. In some systems, students may be in lower secondary education, while in others they may be in upper secondary education. Additionally, 15-year-olds may move between these two levels; thus, PISA samples may include students from both lower secondary and upper secondary levels. In the Western Balkans, most students were in upper secondary level at the time of testing.

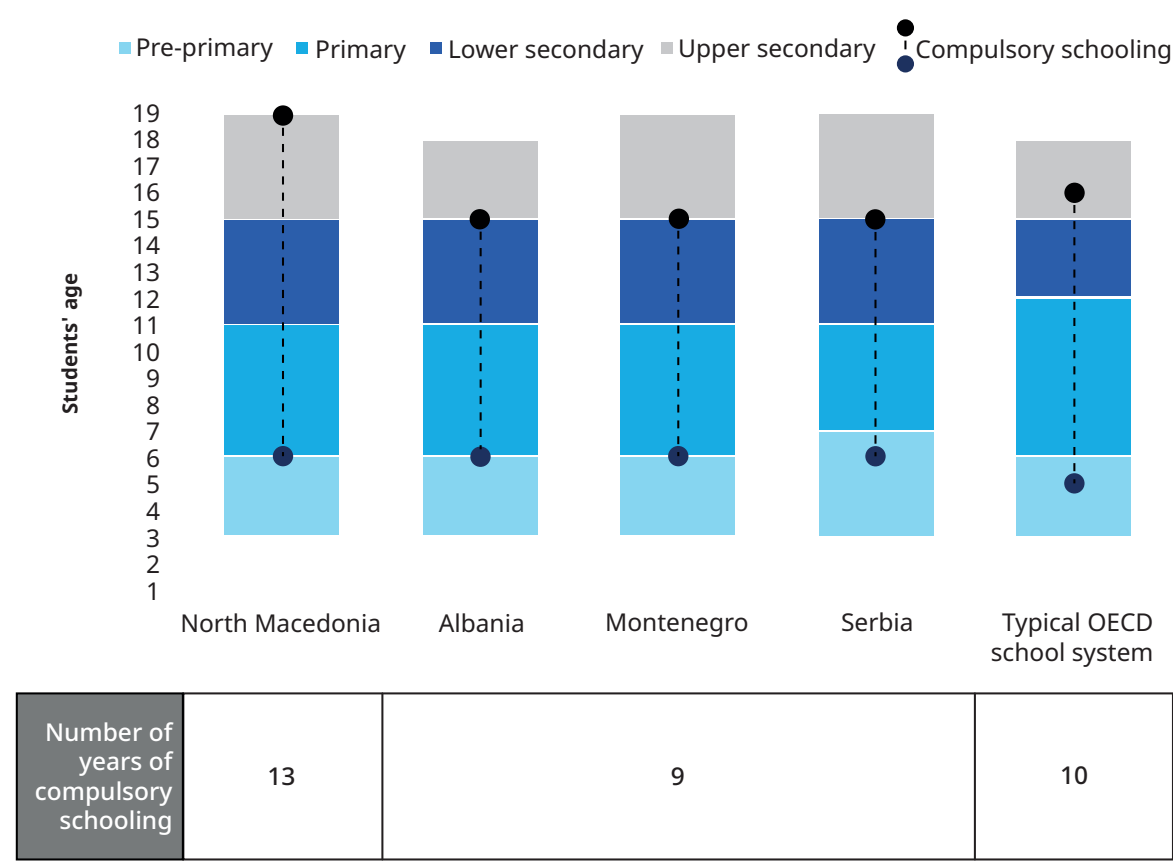
In Albania, Montenegro and North Macedonia, 15-year-old students who have not repeated a grade typically enroll in Grade 10, marking the beginning of upper secondary education in these countries (see Figure 1.3). While almost all 15-year-old students in Montenegro and North Macedonia who took the PISA were in Grade 10 at the time of testing, only 70 per cent of students in Albania were enrolled in this grade (see Table 1.3). The large share of 15-year-old students below this typical grade level may stem from issues in student progression, such as grade repetition or delayed entry into primary school. These challenges appear in PISA data: in Albania, about 6 per cent of students reported having repeated a grade at least once.

The country's share of repeaters has increased significantly since PISA 2018 and ranks highest among all Western Balkan economies.

In Serbia, 15-year-old students who have not repeated a grade typically enrol in Grade 9. Students in Serbia typically fall one grade level 'behind' 15-year-old students in other Western Balkan countries because primary school starts one year later: in Serbia, children enter primary school at age 7, while in other Western Balkan economies and most PISA-participating countries, primary school entry occurs at age 6. This might suggest that 15-year-old students in Serbia have

been exposed to a school curriculum for a shorter period than peers of the same age in other countries. However, Serbia's education system compensates through introducing compulsory schooling earlier: compulsory education in Serbia begins in the last year of pre-primary education (around 6 years old), whereas most other Western Balkan countries begin compulsory schooling at the primary level (also at 6 years old). Additionally, Serbia's theoretical duration of pre-primary education is longer at four years, compared to three years in the remaining Western Balkan countries.

FIGURE 1.3 The vertical structure of Western Balkan education systems



Note: Data are not available for Kosovo. Typical OECD school system is based on modal values across countries and economies.
Source: OECD 2023a (Tables B3.1.1 and B3.1.2). Data for Serbia provided by UNICEF Serbia.



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2. STUDENT OUTCOMES: Performance in PISA, expectations for education and work, and feelings about school

This chapter analyses student learning outcomes, well-being and future expectations in Western Balkan economies as measured in PISA 2022. The first section examines student performance in terms of average scores and proficiency levels, both for PISA 2022 and over time. The second section discusses students' expectations for education and work. The third section explores students' well-being through their sense of belonging and feelings of safety in school.

2.1 Student performance in mathematics, reading and science

2.1.1 Average performance

On average, students in Western Balkan education systems scored at least 80 points lower than their peers in the OECD and the EU. This gap is equivalent to at least four years' worth of schooling in an OECD country (see Figure 2.1).⁵ The learning gaps relative to the OECD and the EU were smallest in mathematics for all economies in the region and largest in reading for three out of the five economies (i.e., Albania, Kosovo and North Macedonia). Among the Western Balkan economies, Serbia comes closest to the OECD and EU averages in all three subjects, while Kosovo shows the largest gaps.

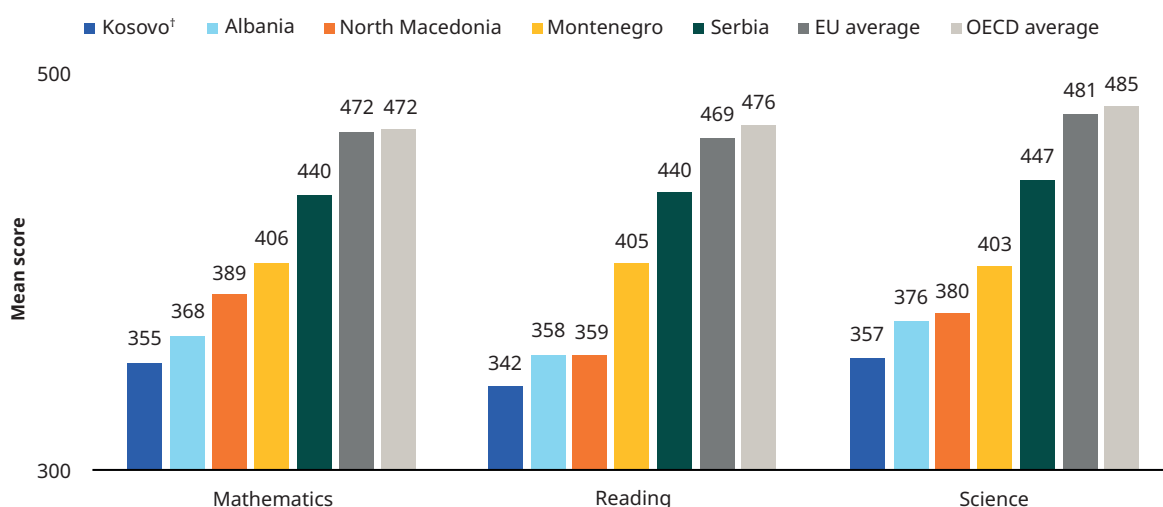
Across most PISA participating countries, average mathematics and reading performance dropped between 2018 and 2022.

On average across the OECD, student performance saw an unprecedented drop in 2022, with mean mathematics scores falling by almost 15 points compared to 2018. This decline is three times greater than any previous consecutive change. Average performance dropped by 10 score points in reading but did not change significantly in science.

In the Western Balkans, all countries except Serbia showed significant declines across all three subjects. Mean mathematics performance among students in the Western Balkans declined by about 24 score points on average, representing over a year's worth of schooling in OECD member states. The decline was particularly acute in Albania, where the average mathematics score dropped by 69 score points between 2018 and 2022 – the largest decline observed across all PISA participating countries. Smaller but still significant decreases were observed in reading and science. In Serbia, mean performance did not change significantly between 2018 and 2022 across all three subjects.

Among the Western Balkan countries, three countries – Albania, Montenegro and Serbia – have sufficient PISA data to analyse long-term trends in student performance. In Serbia, no significant negative or positive trends emerged across the three subjects. However, in Albania and Montenegro, the overall trajectory across the three subjects showed an upward trend until recent years (see Figure 2.2). In Albania, improvements in average scores occurred for mathematics up to 2018 and for reading and science up to 2015, until these positive trends began to shift. In Montenegro, average scores improved in mathematics up to 2018 and in reading up to 2015, while mean performance has remained flat for science.

FIGURE 2.1 Performance in mathematics, reading and science in PISA 2022



Note: † Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).
Source: OECD 2023a.

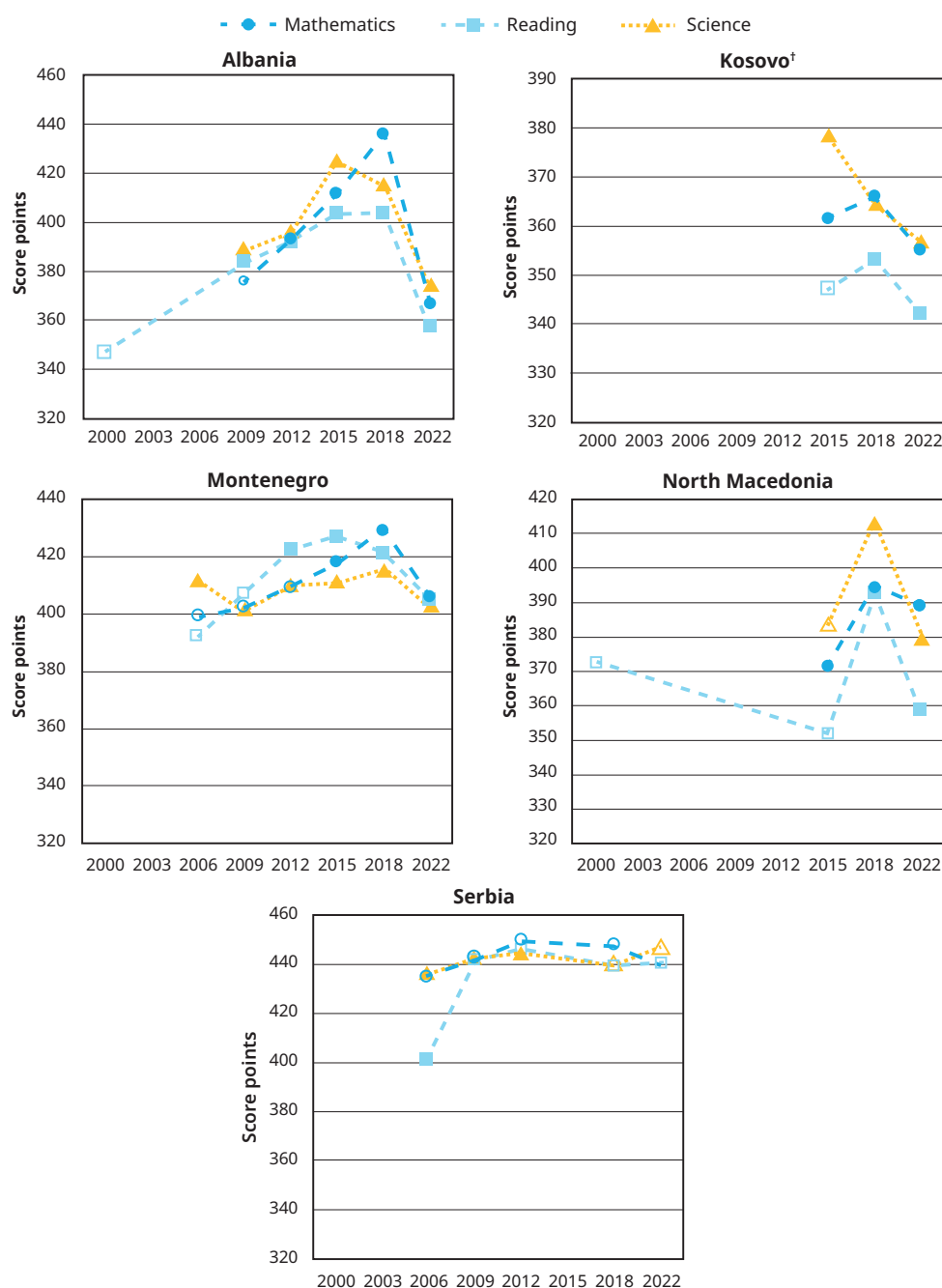
⁵ In this report, 20 score points reflects approximately the average pace of learning of 15-year-olds in countries and economies that participate in PISA (OECD 2023b).

The positive long-term trend in Albania and Montenegro up to 2015 contrasts with a longer-term declining trend in the OECD.

Although the OECD experienced an unprecedented decline in mathematics and reading performance between 2018 and 2022, average scores were already declining in many OECD countries even before the pandemic. In reading and science,

performance peaked in 2012 and 2009, respectively, before starting a downward trend. This perspective underscores the complexity in understanding the relationship between the COVID-19 pandemic and performance trends. While the pandemic may have influenced recent developments, other factors are likely to contribute.

FIGURE 2.2 Trends in mathematics, reading and science performance across PISA cycles



Note: White markers (dots, squares or triangles) indicate mean-performance estimates that are not statistically significantly above/below PISA 2022 estimates. The first full assessment of each subject sets the scale and starting point for future comparisons (i.e., for Albania and North Macedonia, trend comparisons start from 2000 for reading). [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

Source: OECD 2023a (Tables I.B1.5.4, I.B1.5.5 and I.B1.5.6).

2.1.2 Proficiency levels

PISA test scores in mathematics, reading and science align with proficiency scales which describe tasks students can successfully complete. Table 2.1 presents the eight proficiency levels for mathematics, which was the main subject in PISA 2022. Across the PISA domains, Level 2 is considered the ‘baseline’ level of proficiency – the minimum level of knowledge and skills that students need to progress in their education and participate fully in society. At this level, students begin to demonstrate the ability and initiative to use mathematics in simple real-life situations.⁶

TABLE 2.1 Summary description of the eight levels of mathematics proficiency in PISA 2022

Level	Lower score limit	Characteristics of tasks
6	669	At Level 6, students can work through abstract problems and demonstrate creativity and flexible thinking to develop solutions. For example, they can recognize when a procedure that is not specified in a task can be applied in a non-standard context or when demonstrating a deeper understanding of a mathematical concept is necessary as part of a justification. They can link different information sources and representations, including effectively using simulations or spreadsheets as part of their solution. Students at this level are capable of critical thinking and have a mastery of symbolic and formal mathematical operations and relationships that they use to clearly communicate their reasoning. They can reflect on the appropriateness of their actions with respect to their solution and the original situation.
5	607	At Level 5, students can develop and work with models for complex situations, identifying or imposing constraints, and specifying assumptions. They can apply systematic, well-planned problem-solving strategies for dealing with more challenging tasks, such as deciding how to develop an experiment, designing an optimal procedure, or working with more complex visualizations that are not given in the task. Students demonstrate an increased ability to solve problems whose solutions often require incorporating mathematical knowledge that is not explicitly stated in the task. Students at this level reflect on their work and consider mathematical results with respect to the real-world context.
4	545	At Level 4, students can work effectively with explicit models for complex concrete situations, sometimes involving two variables, as well as demonstrate an ability to work with undefined models that they derive using a more sophisticated computational-thinking approach. Students at this level begin to engage with aspects of critical thinking, such as evaluating the reasonableness of a result by making qualitative judgements when computations are not possible from the given information. They can select and integrate different representations of information, including symbolic or graphical, linking them directly to aspects of real-world situations. At this level, students can also construct and communicate explanations and arguments based on their interpretations, reasoning, and methodology.
3	482	At Level 3, students can devise solution strategies, including strategies that require sequential decision-making or flexibility in understanding of familiar concepts. At this level, students begin using computational-thinking skills to develop their solution strategy. They can solve tasks that require performing several different but routine calculations that are not all clearly defined in the problem statement. They can use spatial visualization as part of a solution strategy or determine how to use a simulation to gather data appropriate for the task. Students at this level can interpret and use representations based on different information sources and reason directly from them, including conditional decision-making using a two-way table. They typically show some ability to handle percentages, fractions and decimal numbers, and to work with proportional relationships.

⁶ PISA data are used as a primary source for monitoring progress on Sustainable Development Goal Indicator 4.1.1c on the proportion of children and young people at the end of lower secondary education achieving at least a minimum proficiency level (Level 2 on the PISA proficiency scales) in reading and mathematics.

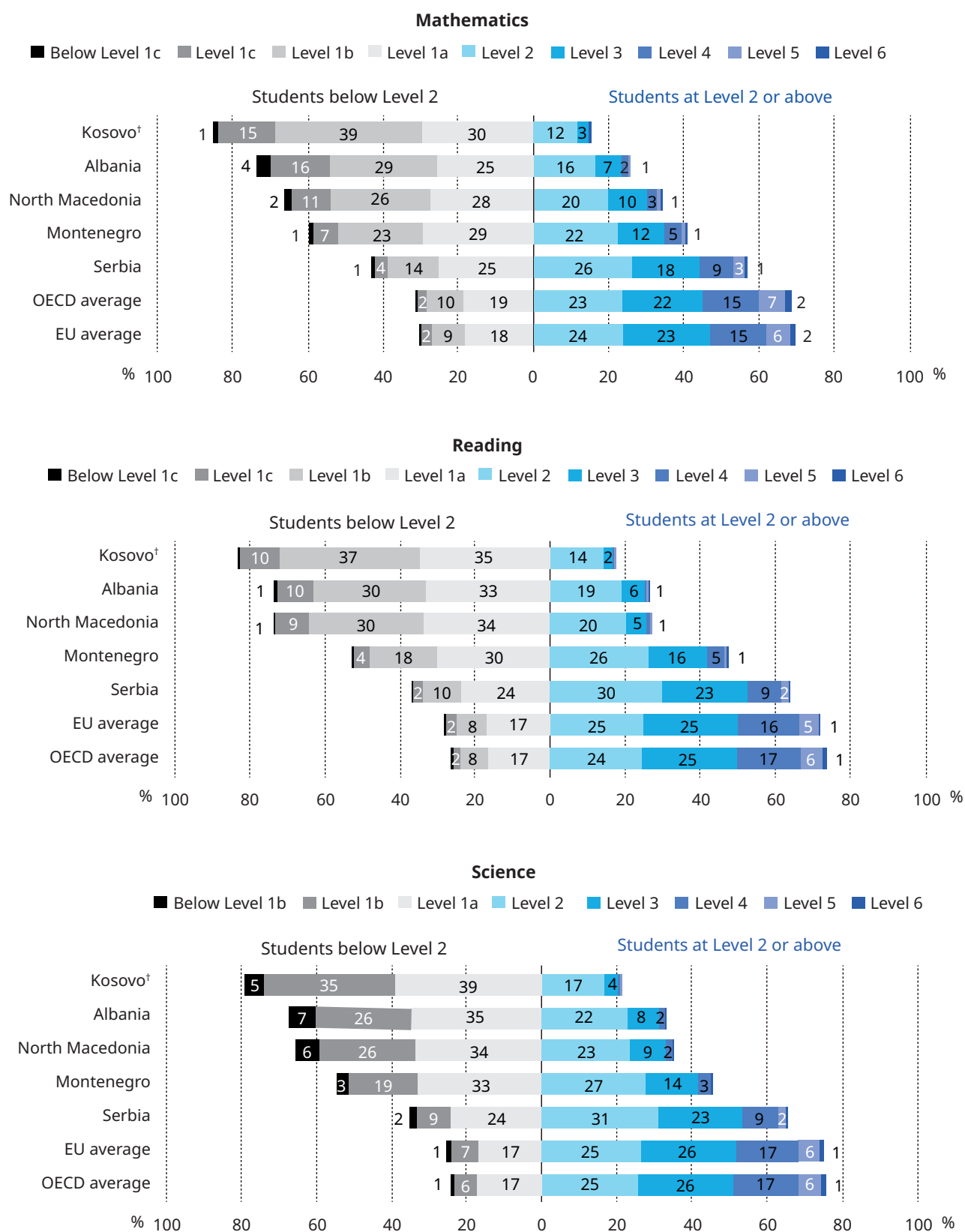
Level	Lower score limit	Characteristics of tasks
2	420	At Level 2, students can recognize situations where they need to design simple strategies to solve problems, including running straightforward simulations involving one variable as part of their solution strategy. They can extract relevant information from one or more sources that use slightly more complex modes of representation, such as two-way tables, charts, or two-dimensional representations of three-dimensional objects. Students at this level demonstrate a basic understanding of functional relationships and can solve problems involving simple ratios. They are capable of making literal interpretations of results.
1a	358	At Level 1a, students can answer questions involving simple contexts where all information needed is present, and the questions are clearly defined. Information may be presented in a variety of simple formats and students may need to work with two sources simultaneously to extract relevant information. They can carry out simple, routine procedures according to direct instructions in explicit situations, which may sometimes require multiple iterations of a routine procedure to solve a problem. They can perform actions that are obvious or that require very minimal synthesis of information, but in all instances the actions follow clearly from the given stimuli. Students at this level can employ basic algorithms, formulae, procedures, or conventions to solve problems that most often involve whole numbers.
1b	295	At Level 1b, students can respond to questions involving easy to understand contexts where all information needed is clearly given in a simple representation (i.e., tabular or graphic) and, as necessary, recognize when some information is extraneous and can be ignored with respect to the specific question being asked. They are able to perform simple calculations with whole numbers, which follow from clearly prescribed instructions, defined in short, syntactically simple text.
1c	233	At Level 1c, students can respond to questions involving easy to understand contexts where all relevant information is clearly given in a simple, familiar format (for example, a small table or picture) and defined in a very short, syntactically simple text. They are able to follow a clear instruction describing a single step or operation.

Source: OECD 2023b.

In every PISA subject, the proportion of students who scored below proficiency Level 2 ('low performers') was greater in all Western Balkan economies than on average across the OECD and the EU. In mathematics, only 34 per cent of students of students on average across the Western Balkans, compared to about 70 per cent on average across the OECD and EU, attained at least proficiency Level 2. The share of low performers ranged from 43 per cent in

Serbia to 85 per cent in Kosovo, underscoring the deep learning crisis in the region. At the opposite end, a negligible share of students – about 0.2 per cent on average across the region – are considered 'high performers' in mathematics, reaching Levels 5 or 6 (see Figure 2.3). Large shares of low performers and very small shares of high performers in the Western Balkans were similarly observed for reading and science.

FIGURE 2.3 Percentage of students scoring at each proficiency level in mathematics, reading and science



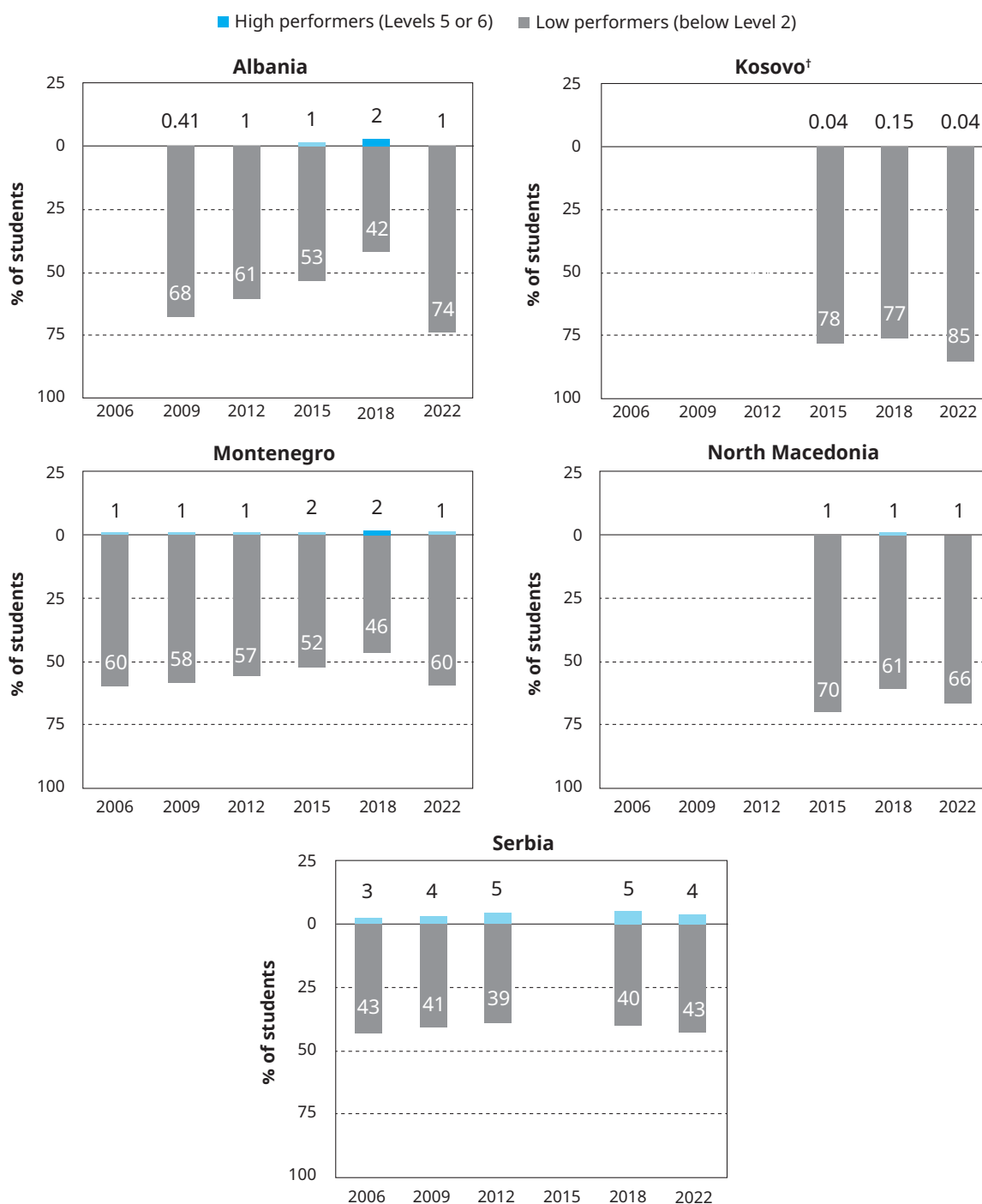
Note: † Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999). Countries and economies are ranked in ascending order of the percentage of students who performed at or above Level 2.

Source: OECD 2023a (Tables I.B1.3.1, I.B1.3.2 and I.B1.3.3).

With the exception of Serbia, Western Balkan countries saw an increase in the share of low performers scoring below Level 2 in mathematics, reading and science between 2018 and 2022. Figure 2.4 zooms in on trends in mathematics. The share of low performers in mathematics in 2022 was significantly larger compared to 2015 and 2018 for all Western Balkan

economies except Serbia. In Albania, the share of low performers in mathematics in 2022 exceeded those observed in every PISA cycle dating back to 2009. While the proportion of low performers generally increased, the share of high performers scoring at Levels 5 or 6 in mathematics saw no change in 2022 for Kosovo, North Macedonia and Serbia but decreased significantly for Albania and Montenegro.

FIGURE 2.4 Trends in proficiency levels in mathematics



Note: Statistically significant differences compared to PISA 2022 are shown in a darker tone. [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

Source: OECD 2023a (Table I.B1.5.1).

2.2 Student expectations for education and work

In all five Western Balkan countries, over three quarters of students reported that they expect to complete tertiary education. These proportions exceed those observed on average across the OECD and the EU, where about two thirds of students reported the same expectation. Across Western Balkan economies, the shares of students expecting to complete tertiary education grew significantly between PISA 2018 and PISA 2022 (see Figure 2.5). In Albania, Kosovo and North

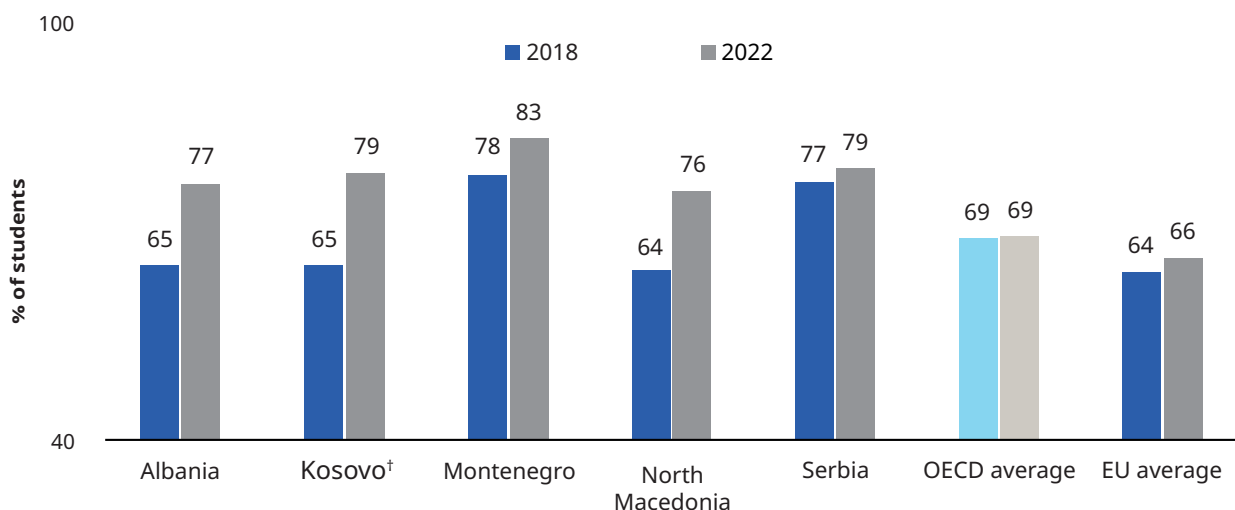
Macedonia, the increases exceeded 10 percentage points.

Rising expectations for tertiary education matter, as higher education is critical to fostering new knowledge and innovation.

However, a comprehensive analysis of the region finds persistent key issues in the higher education sector, such as ensuring equitable access for disadvantaged groups and improving labour market relevance of higher education (OECD 2022). Addressing these issues remains critical to ensuring higher education can contribute to economic and social transformation.

FIGURE 2.5 Students who expect to complete tertiary education, change between 2018 and 2022

Based on students' reports



Note: Statistically significant differences between PISA 2018 and PISA 2022 are shown in a darker tone. Tertiary education corresponds to ISCED levels 5A, 5B or 6 according to the International Standard Classification of Education. The OECD and EU averages in this figure are the arithmetic mean across all OECD member states and EU countries, respectively, with non-missing values in PISA 2018 and PISA 2022. [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

Source: OECD 2023a; OECD 2019b.

Students' expectations for work showed some changes between 2018 and 2022. In almost all Western Balkans countries, the share of students who expect to work in an ICT-related profession (e.g., software and web developer, data miner) when they are about 30 years old significantly

increased between 2018 and 2022 (see Figure 2.6). This pattern mirrors trends across OECD countries, reflecting the rise of the digital sector as a sought-after career path and emphasizing the importance of equipping students with relevant competencies, including digital skills.

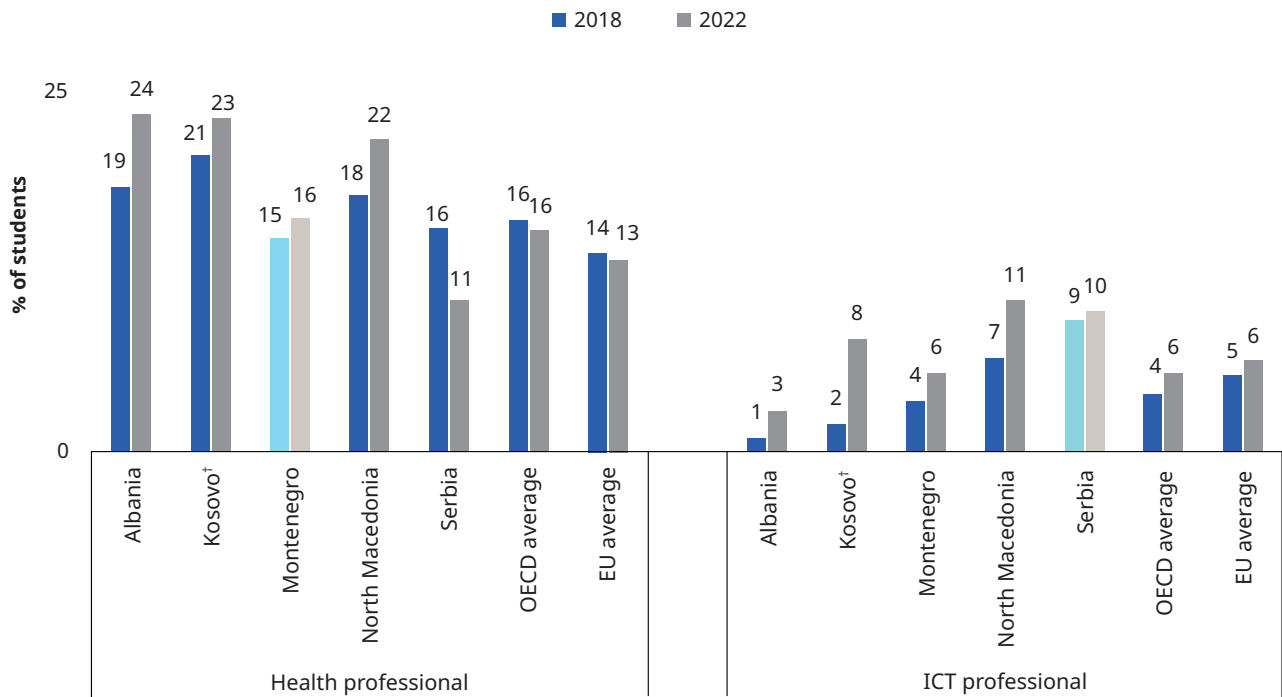
In addition to the ICT field, the health sector also emerged as a desired career path for students in most Western Balkan countries.

In Albania, Kosovo and North Macedonia, the proportion of students expecting to work as a health professionals grew between 2018 and 2022. However, this share decreased significantly in Serbia, similar to the average trend across

the OECD. These mixed results for health career expectations may partly reflect the health sector’s heightened visibility during COVID-19: while the pandemic emphasized the indispensable role of health professionals, it also highlighted the workplace challenges such as long working hours and stressful environments.

FIGURE 2.6 Students who expect to work as health or ICT professionals when they are about 30 years old, change between 2018 and 2022

Based on students’ reports



Note: Statistically significant differences between PISA 2018 and PISA 2022 are shown in a darker tone. The OECD and EU averages in this figure are the arithmetic mean across all OECD member states and EU countries, respectively, with non-missing values in PISA 2018 and PISA 2022. [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999). **Source:** OECD 2023a (Table II.B1.2.4).

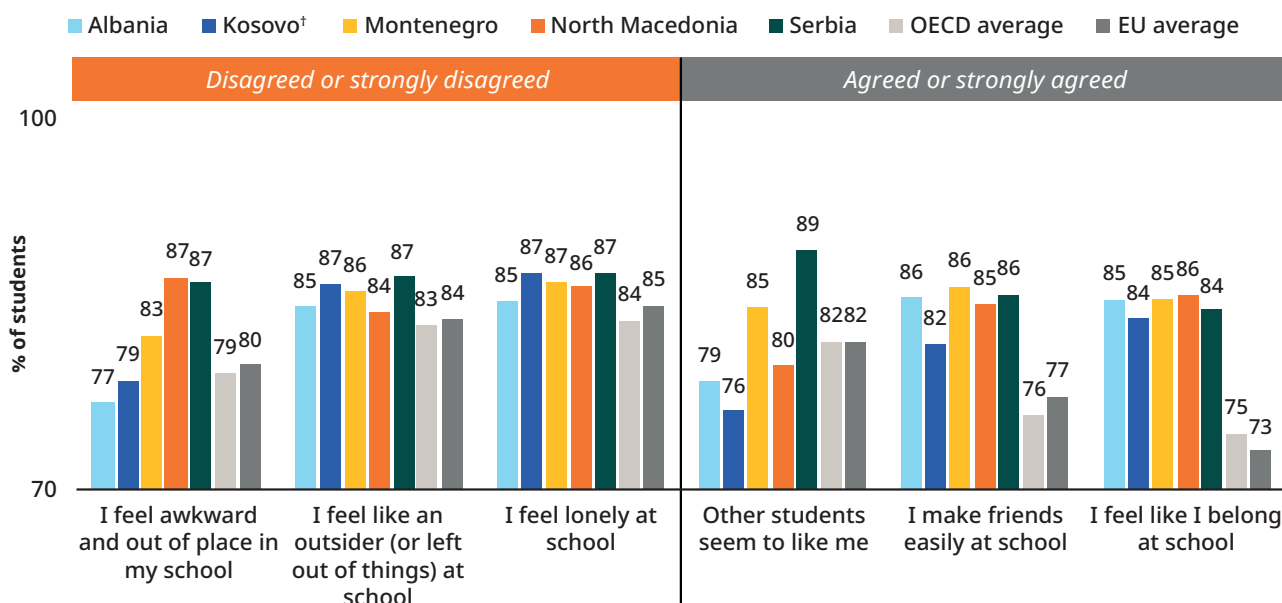
2.3 Students’ sense of belonging and safety in school

Students in Western Balkan countries tended to report a greater sense of belonging at school compared to the OECD and EU averages. In addition to data on learning outcomes, information on students’ feelings about school is collected by PISA. Students’ sense

of belonging emerges as a strong point in the Western Balkans. For instance, 85 per cent of students on average across the Western Balkans, compared to fewer than 75 per cent on average across the OECD and the EU, agreed or strongly agreed that they feel like they belong at school (see *Figure 2.7*). Some variation was observed across countries in the region: nearly 9 in 10 students in Serbia, compared to about three in four students in Kosovo, agreed or strongly agreed that other students seem to like them.

FIGURE 2.7 Sense of belonging at school

Percentage of students who disagreed/strongly disagreed and agreed/strongly agreed with the following statements



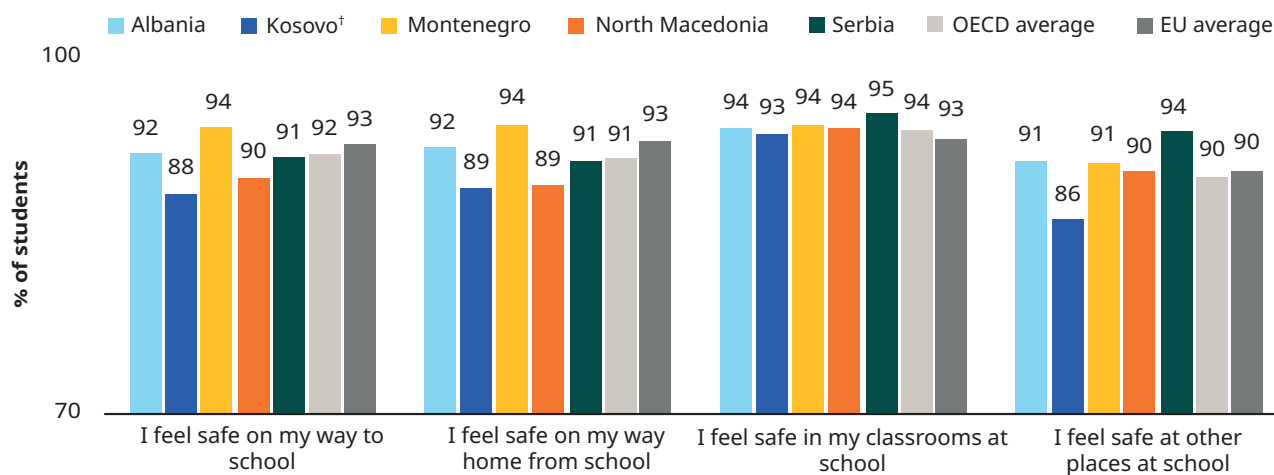
Note: [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).
Source: OECD 2023a (Table II.B1.1.1).

Overall, most students in the Western Balkans also reported feeling safe at school, with these proportions similar to OECD and EU averages. At least 85 per cent of students in Western Balkan countries agreed or strongly agreed with each statement on school safety (see Figure 2.8). Still, some differences emerged

across countries in the proportions of students who reported feeling safe, with these shares appearing lowest in Kosovo. For instance, 86 per cent of students in Kosovo, compared to 94 per cent in Serbia, agreed or strongly agreed that they feel safe at other places at school besides their classroom.

FIGURE 2.8 Feeling safe at school

Percentage of students who agreed or strongly agreed with the following statements



Note: [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).



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3. EQUITY IN STUDENTS' OUTCOMES AND ACCESS TO EDUCATION RESOURCES

This chapter examines various equity issues related to student outcomes, including performance, well-being and expectations for future education and careers. The first section explores equity in student performance by various background characteristics, including socio-economic status, gender and school location. The second section discusses equity regarding students' future expectations and sense of belonging at school. The third section examines equity in terms of access to material, digital and human resources in school. The analysis of equity focuses on mathematics performance, the main subject assessed in PISA 2022.

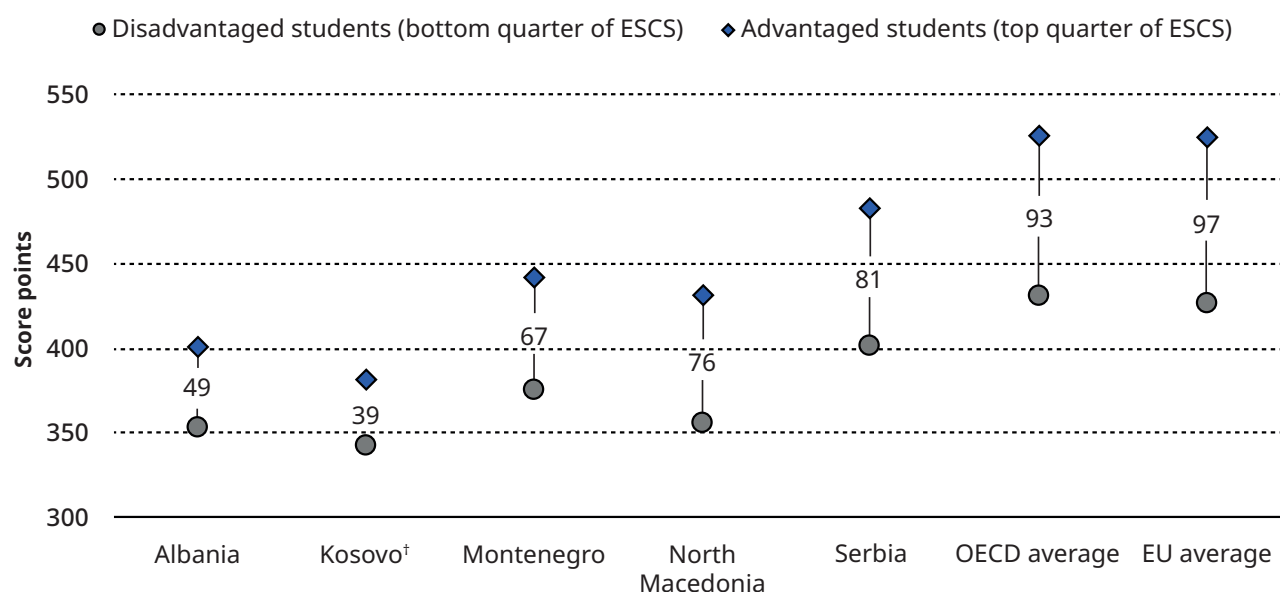
3.1 Differences in performance, by student background

3.1.1 Socio-economic status and student resilience

Across all participating countries and economies, socio-economically advantaged students significantly outperformed their disadvantaged peers. As previously noted, in PISA, a student's socio-economic status is estimated by the index of economic, social and cultural status (ESCS). A socio-economically disadvantaged (advantaged) student is a student in the bottom top quarter of the ESCS index in his or her own country or economy.

The socio-economic gap in mathematics performance appears narrower in Western Balkan economies than on average across the OECD and the EU. In Western Balkan economies, the gap in mean mathematics scores between disadvantaged and advantaged students ranged from 39 score points in Kosovo to 81 score points in Serbia (see Figure 3.1). By contrast, gaps of over 90 score points appear on average across the OECD and the EU. However, these disparities must be interpreted alongside overall performance. In Albania and Kosovo, for example, socio-economic gaps are relatively narrow, but the vast majority of students perform below Level 2 – indicating poor achievement across the board, regardless of students' socio-economic status.

FIGURE 3.1 Mean performance in mathematics, by national quarter of socio-economic status



Note: Statistically significant differences are shown in a darker tone. [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

Source: OECD 2023a (Table I.B1.4.3).

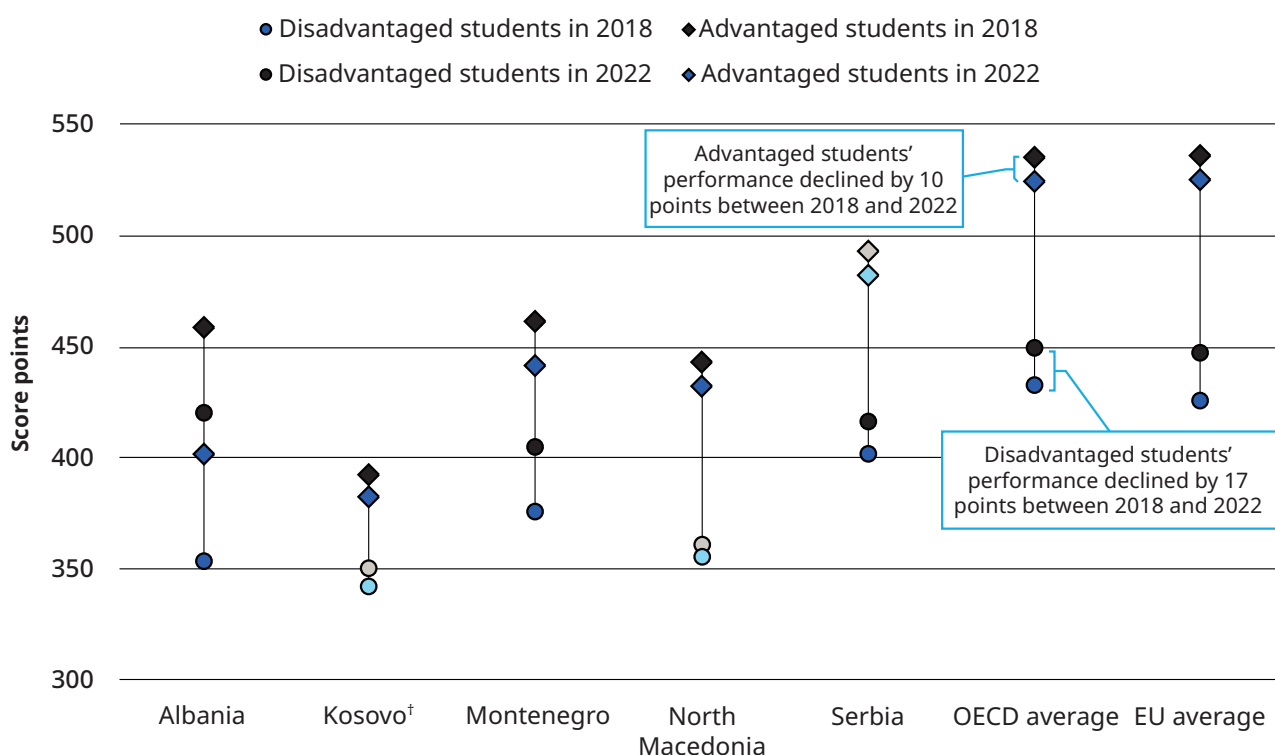
In all five Western Balkan economies, the socio-economic gap in mathematics performance showed no significant change since PISA 2018. Socio-economic gaps can shift based on changes in the performance of advantaged and disadvantaged students. For example, the gap increased on average across the OECD because disadvantaged students'

performance declined more than that of advantaged students. Among Western Balkan economies, the socio-economic gap remained stable between 2018 and 2022. In Albania and Montenegro, both advantaged and disadvantaged students showed declines in performance over this period, so the socio-economic gap did not change (see Figure 3.2). In Serbia, advantaged students'

performance remained stable, and disadvantaged students' performance declined. The opposite was observed in Kosovo and North Macedonia, where

disadvantaged students' performance did not change, while advantaged students' performance declined.

FIGURE 3.2 Change between 2018 and 2022 in mean performance in mathematics, by national quarter of socio-economic status



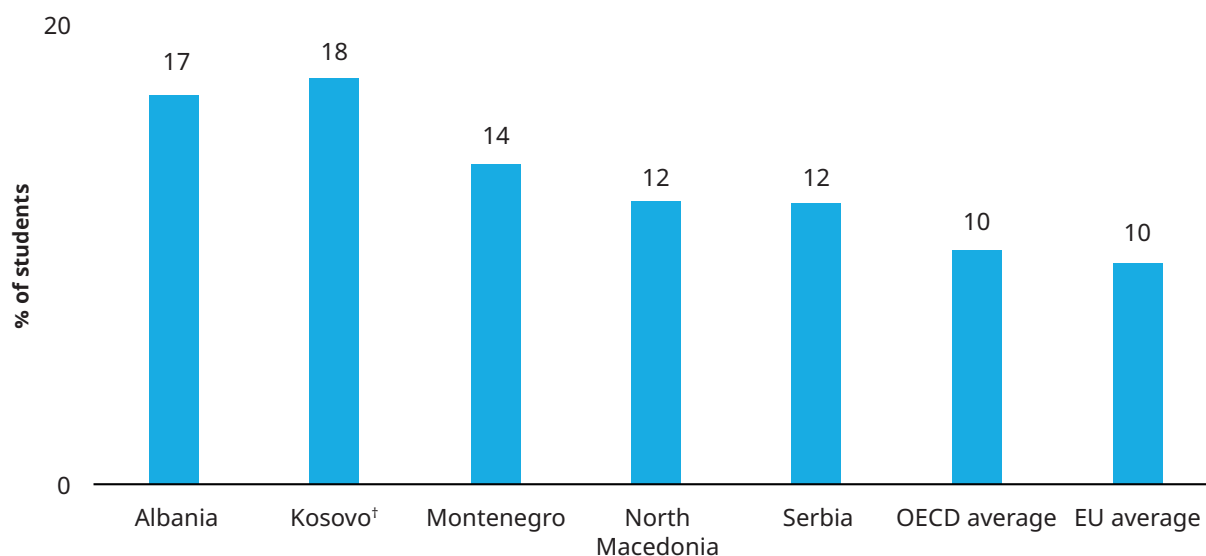
Note: Statistically significant differences between PISA 2018 and PISA 2022 are shown in a darker tone. The OECD and EU averages in this figure are the arithmetic mean across all OECD member states and EU countries, respectively, with non-missing values in PISA 2018 and PISA 2022. [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

Source: OECD 2023a (Table I.B1.5.19).

Although disadvantaged students tend to score lower than their advantaged peers, the relationship between socio-economic status and student performance is far from deterministic. In PISA, academically resilient students are defined as socio-economically disadvantaged students who score in the top quarter in their country or economy. On average across the Western Balkans, 15 per

cent of students are academically resilient. The proportions of academically resilient students in Albania, Kosovo, Montenegro and North Macedonia significantly exceed OECD and EU averages (see Figure 3.3). Notably, Albania and Kosovo have among the largest proportions of academically resilient students across all PISA participating countries and economies.

FIGURE 3.3 Percentage of academically resilient students in mathematics



Note: Academically resilient students are defined as students who are in the bottom quarter of the PISA index of economic, social and cultural status (ESCS) in their own country/economy but scored in the top quarter in that country/economy. [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

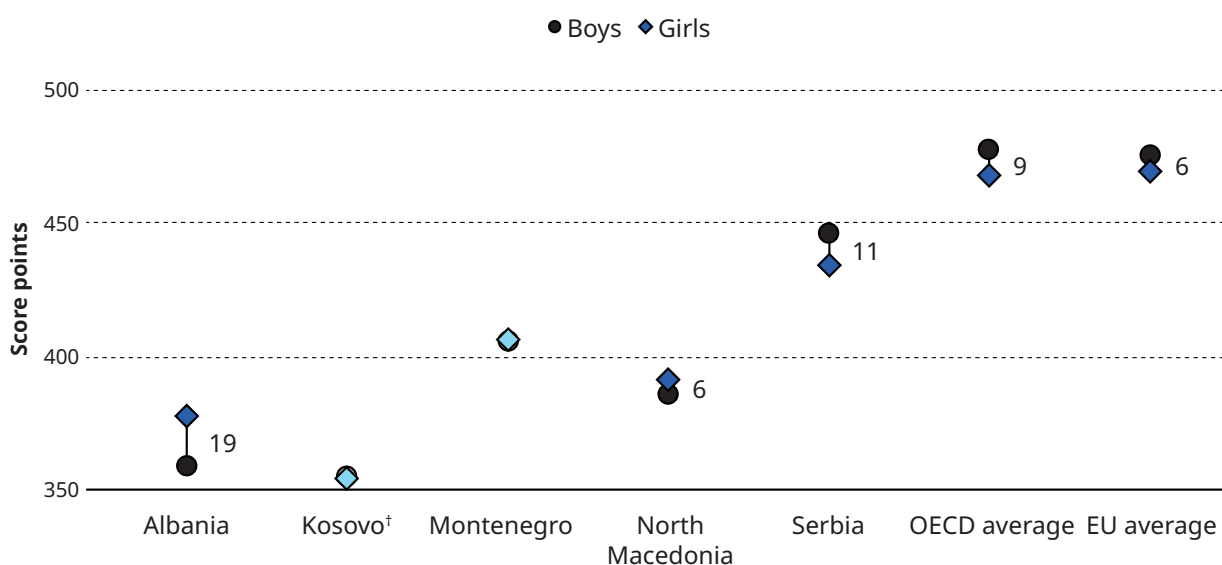
Source: OECD 2023a (Table I.B1.4.3).

3.1.2 Gender

Gender gaps in mathematics performance were observed in Albania, North Macedonia and Serbia. In Serbia, boys outperformed girls in mathematics – a pattern similarly observed on average across the OECD and the EU (see

Figure 3.4). The opposite was observed in Albania and North Macedonia, where girls significantly outperformed boys. Across all PISA participating countries and economies, the gap favouring girls was widest in Albania.

FIGURE 3.4 Mean performance in mathematics, by gender



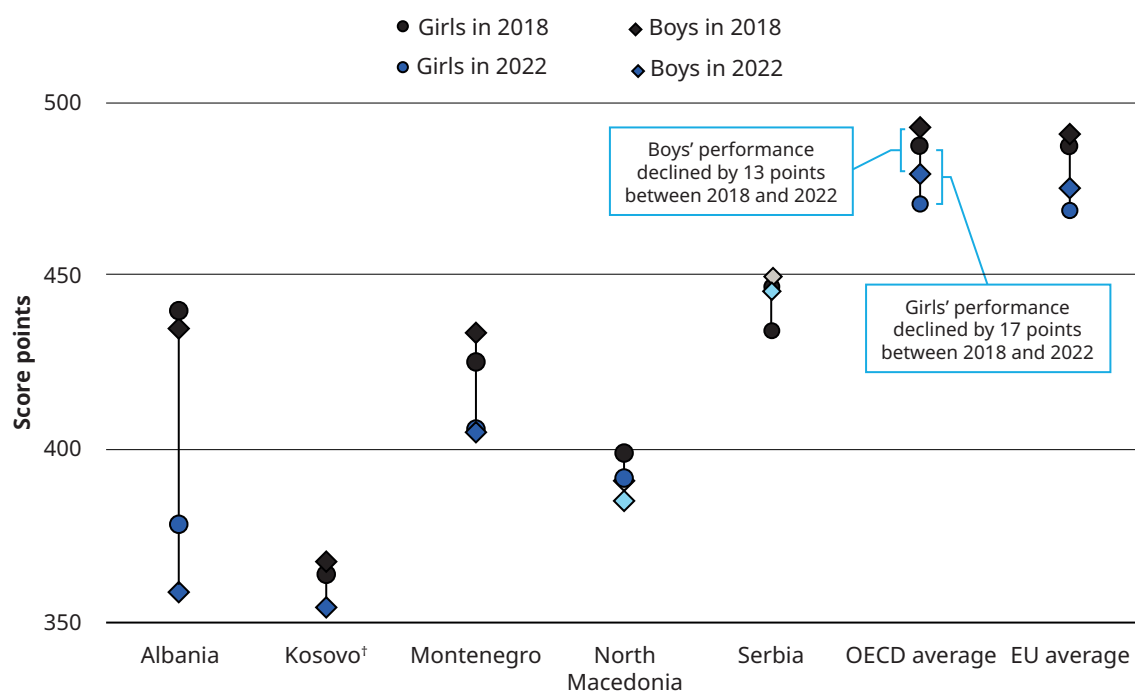
Note: Statistically significant differences are shown in a darker tone. [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

Source: OECD 2023a (Table I.B1.4.17).

In Albania and Montenegro, the gender gap in mathematics performance narrowed between 2018 and 2022. However, both boys and girls in these two countries experienced significant declines in their average scores (see Figure 3.5). In the remaining three countries, gender gaps did

not change over this period for various reasons. In Kosovo, mean performance declined for both boys and girls. In North Macedonia and Serbia, boys' performance remained stable while girls' performance declined.

FIGURE 3.5 Change between 2018 and 2022 in mean performance in mathematics, by gender



Note: Statistically significant differences between PISA 2018 and PISA 2022 are shown in a darker tone. The OECD and EU averages in this figure are the arithmetic mean across all OECD member states and EU countries, respectively, with non-missing values in PISA 2018 and PISA 2022. [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

Source: OECD 2023a (Tables I.B1.5.38 and I.B1.5.39).

Unlike mathematics, reading performance showed a consistent gender gap favouring girls across all Western Balkan economies.

This pattern mirrors trends across OECD and EU averages. The gender gap in reading was proved particularly acute in Albania, where girls outperformed boys by 40 score points – almost double the gender gap of 24 score points observed on average across the OECD.

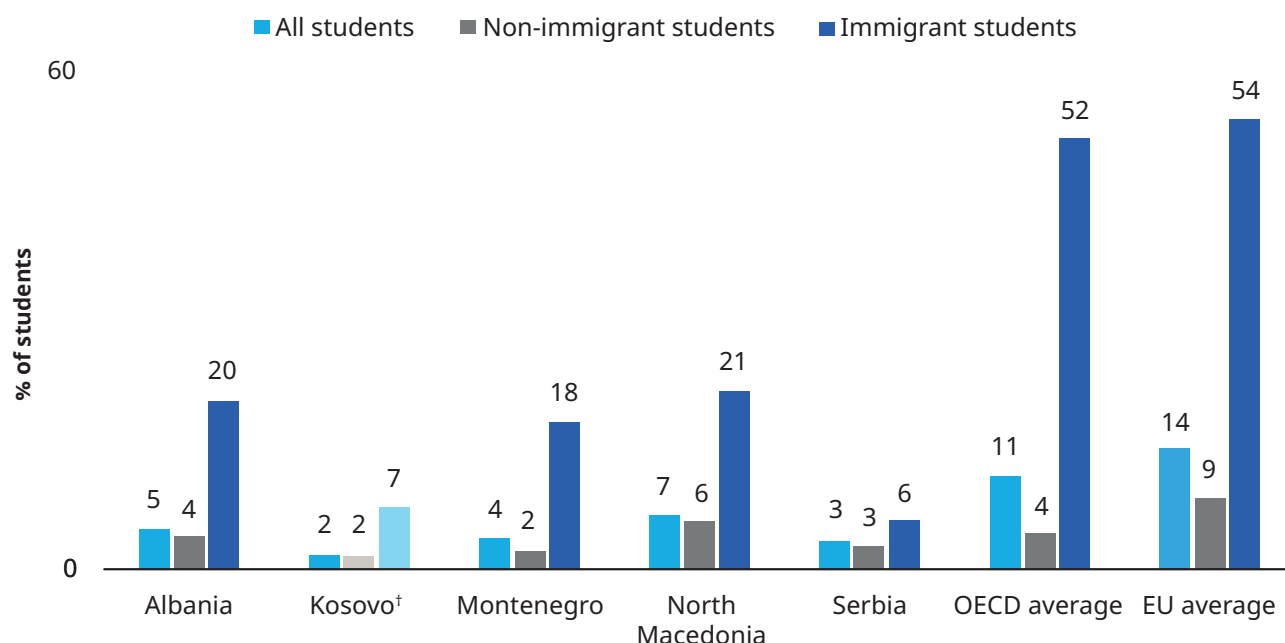
3.1.3 Language spoken at home

Only 4 per cent of PISA students on average across the Western Balkans have

an immigrant background. Moreover, only in Serbia do immigrant students comprise an immigrant population greater than 10 per cent. In contrast, over 10 per cent of PISA students have an immigrant background on average across the OECD and EU. Figure 3.6 shows the percentages of students who speak a language at home different from their PISA test language. In all Western Balkan countries except for Kosovo, immigrant students were more likely than non-immigrant students to report speaking a language at home that is different from the PISA test language.

FIGURE 3.6 Language spoken at home, by immigrant background

Percentage of students who speak mainly another language at home that is different from the PISA test language



Note: Statistically significant differences between immigrant and non-immigrant students are shown in a darker tone. Fewer than 3 per cent of all students in Albania (1 per cent), Kosovo (1 per cent) and North Macedonia (2 per cent) are immigrant students.

[†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

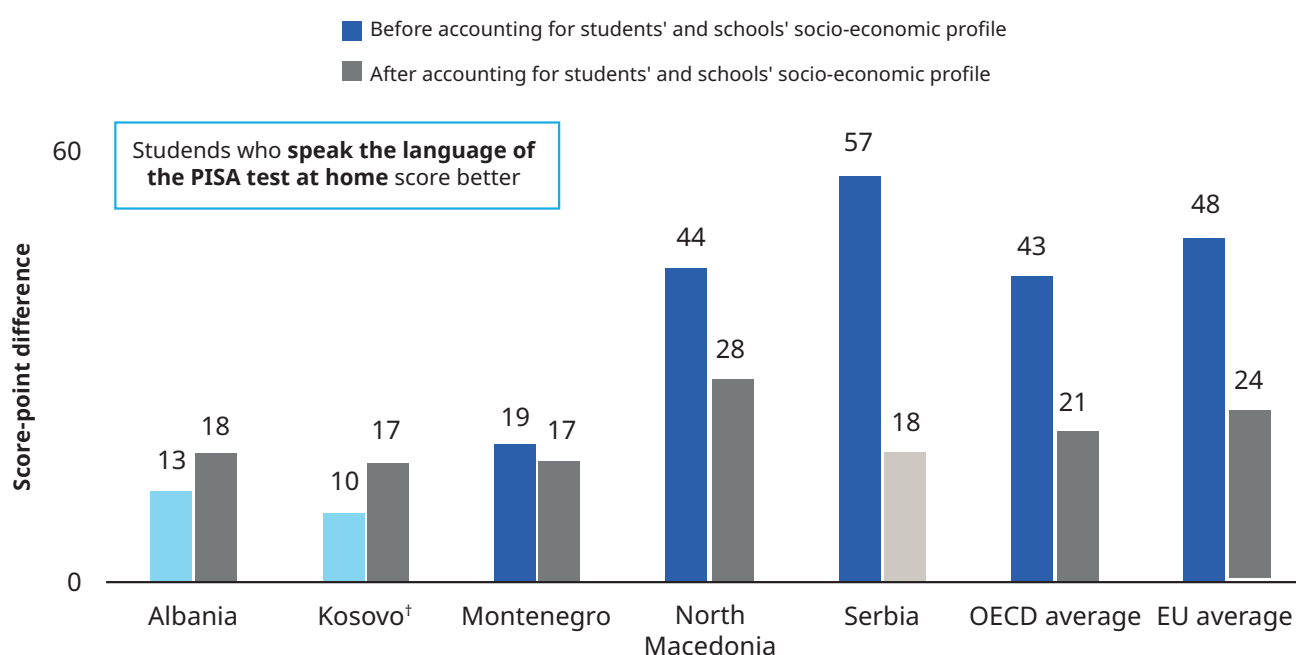
Source: OECD 2023a (Table I.B1.7.9).

In Montenegro and North Macedonia, students who speak the language of the PISA test at home scored significantly higher in mathematics than students who speak a different language at home. Language

differences pose significant barriers to learning, especially for children from ethnic minority groups such as the Roma community. Significant differences in mathematics performance by language spoken at home are observed in Montenegro and North Macedonia, even after accounting for socio-economic profiles of student and schools (see Figure 3.7). However, in Serbia,

the gap favouring students who speak the test language becomes non-significant, indicating that much of the disparity by language spoken at home appears to be explained by socio-economic factors. In Albania and Kosovo, the gap favouring students who speak the test language at home becomes significant after accounting for socio-economic profiles. This finding could be attributed to the higher average socio-economic status among students who speak a different language at home compared to those who speak the test language at home in Albania and Kosovo.

FIGURE 3.7 Difference in mean mathematics performance, by language spoken at home



Note: Statistically significant differences are shown in a darker tone. [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

Source: OECD 2023a.

Additionally, differences in performance were observed by the specific test language – which is also the language of instruction – in Montenegro and North Macedonia, further emphasizing the need to improve learning outcomes of ethnic minority groups.

The PISA test is administered to students in the language of instruction provided by the sampled school. In 2022, the assessment was offered in two languages in Montenegro (Montenegrin and Albanian), North Macedonia (Macedonian and Albanian) and Serbia (Serbian and Hungarian). No significant differences in mathematics performance were observed by test language in Serbia. However, students in Montenegro who took the test in Montenegrin and students in North Macedonia who took the test in Macedonian outperformed their peers who took the test in Albanian. As the language of instruction and testing predominantly coincides

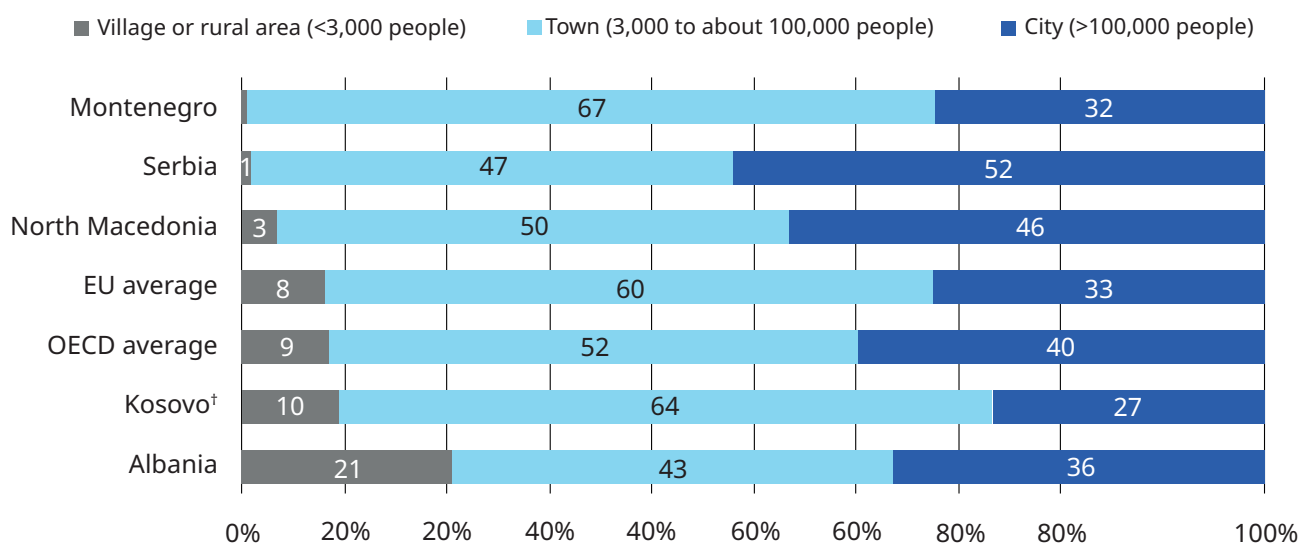
with students' ethnicity (as proxied by the PISA data on language spoken at home), these findings further underscore the need to improve the quality of education provided to children from ethnic minority groups.

3.1.4 School geographic location

Across Western Balkan countries, wide variations appeared in the share of students enrolled in schools located in rural areas, towns and cities.

About one fifth of students in Albania, compared to fewer than 1 per cent of students in Montenegro and Serbia, attend schools in villages or rural areas with fewer than 3,000 people (see Figure 3.8). Over half of students in Serbia, compared to only about a quarter of students in Kosovo, attend schools in cities with over 100,000 people.

FIGURE 3.8 Percentage of students by geographic location of school



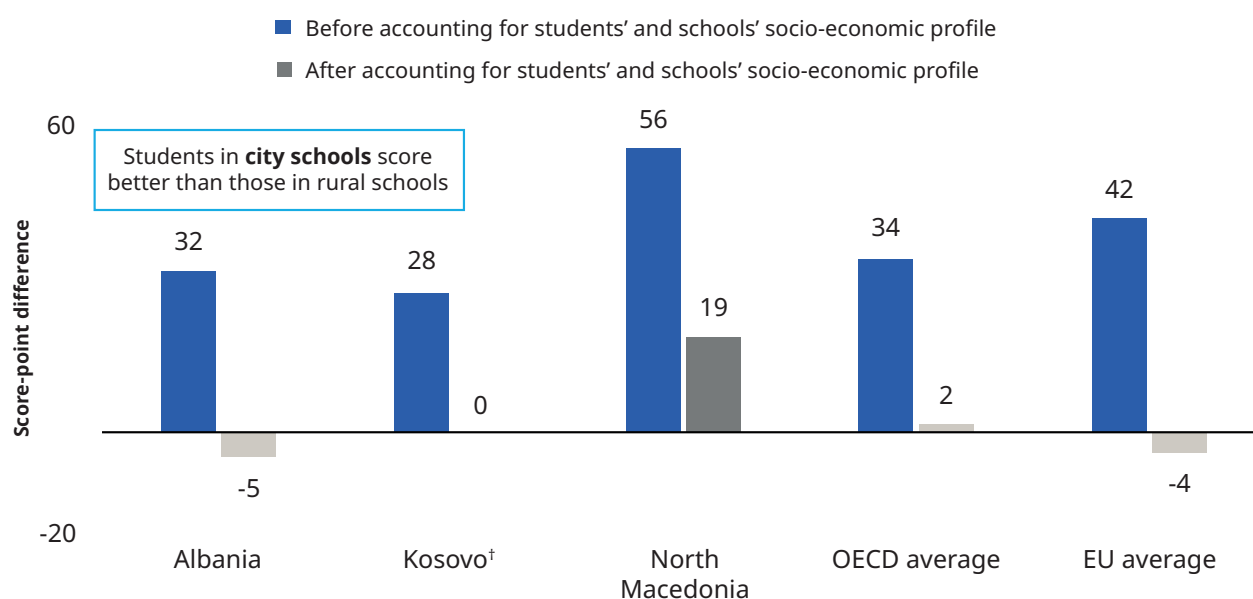
Note: Countries are arranged in ascending order of the percentage of students attending schools in rural areas. [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

Source: OECD 2023a.

Across all Western Balkan countries, mathematics performance tended to be highest among students enrolled in schools in cities. In Albania and Kosovo, the gap in average mathematics scores between students attending schools in villages or rural areas and those in cities was about 30 score points, similar to the OECD average. In North Macedonia, the disparity favouring students enrolled in schools in cities was much larger at 56 score points, amounting to over two years' worth of schooling in OECD member states.

However, much of the achievement gap by school geographic location appears to be explained by the relatively lower socio-economic status of students and schools in rural areas. After accounting for students' and schools' socio-economic profiles, students attending schools in villages or rural areas and those in cities perform similarly in mathematics in Albania and Kosovo (see Figure 3.9). By contrast, in North Macedonia, the disparity by school geographic location remains significant even after accounting for socio-economic factors, suggesting other factors contribute to these differences.

FIGURE 3.9 Mean performance in mathematics, by geographic location of school



Note: Statistically significant differences compared to students attending schools in cities are shown in a darker tone. Results for students attending schools in villages or rural areas in Montenegro and Serbia (fewer than 1 per cent of students) are not presented because the sample sizes are too small to make meaningful inferences. [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

Source: OECD 2023a.

Large disparities in performance by school location highlight the importance of addressing inequities in the resource allocation.

Moreover, issues with resource availability in schools may be compounded by students' socio-economic conditions. In the Western Balkans, schools in rural areas tend to have higher concentrations of socio-economically disadvantaged students, while schools in cities tend to be more heavily populated by advantaged students. Students in rural areas may therefore not only experience resource shortages in school but also have less favourable living conditions – such as food insecurity and lack of access to home learning resources – which are important to help them succeed in school.

3.1.5 Pre-primary education attendance

On average, approximately 77 per cent of students in the Western Balkans, compared to 94–95 per cent in the OECD and the EU, reported attending pre-primary education. To provide insight on time spent in pre-primary education, PISA collects data on students' participation in ISCED (International Standard Classification of Education)

programmes.⁷ This proportion of students varied across Western Balkan countries: while pre-primary education was near-universal (96 per cent) in Serbia, only 70 per cent of students in Kosovo and 63 per cent of students in North Macedonia reported attending pre-primary education.

Evidence suggests that access to early childhood education remains a challenge for children who live in poverty and in rural areas

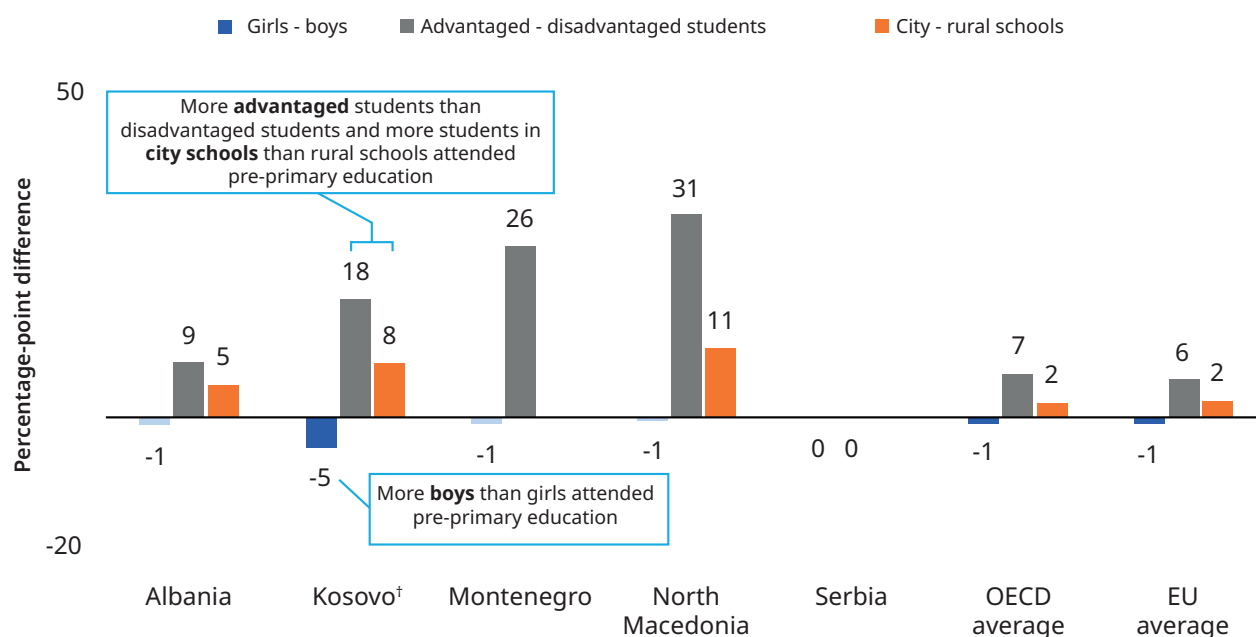
(UNICEF 2019). These disparities are reflected in results for Western Balkan countries in PISA 2022.⁸ In all Western Balkan countries except Serbia, socio-economically advantaged students were more likely than disadvantaged students to have attended pre-primary education; in Kosovo, Montenegro and North Macedonia, the gaps in attendance exceeded 15 percentage points (see Figure 3.10). In Albania, Kosovo and North Macedonia, students attending city schools were more likely than those in rural schools to have participated in pre-primary education. Gender gaps were not observed within the Western Balkan countries, except for Kosovo, where girls were more likely than boys to have attended pre-primary education.

⁷ PISA asks students to report the age at which they started ISCED 1 and ISCED 0. The PISA index on duration of time spent in early childhood education and care is built as the difference between the starting age of ISCED 1 and ISCED 0 plus the value of '2'.

⁸ In this report, pre-primary education and early childhood education are used interchangeably. Both terms are used to refer to organized learning programmes for children aged 3 years and up to the start of primary education (UNESCO and UNICEF 2024).

FIGURE 3.10 Difference in percentage of students who attended pre-primary education, by background characteristics

Based on students' reports



Note: Statistically significant differences are shown in a darker tone. There were too few observations to provide reliable estimates on students' attendance in pre-primary education by school location and school type for Montenegro, and by school location for Serbia. [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

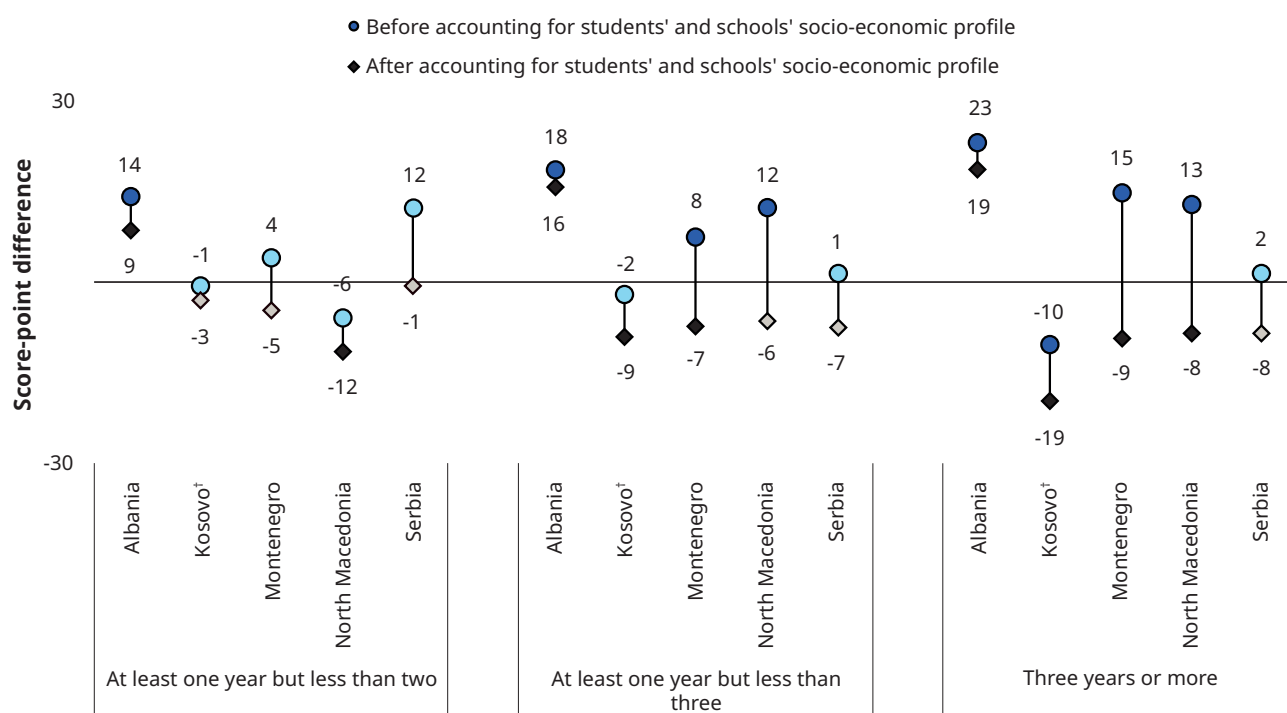
Source: OECD 2023a (Tables II.B1.4.2 and II.B1.4.3).

In the Western Balkans, findings on the relationship between the duration of pre-primary education and mathematics performance showed mixed results. In Albania, students who attended pre-primary education for longer tended to achieve better mathematics scores, after accounting for students' and schools' socio-economic profiles (see *Figure 3.11*). However, the opposite emerged in Kosovo, Montenegro and North Macedonia, while no significant differences were observed in Serbia. Previous studies have also found that while high-quality pre-primary education can show immediate benefits across

multiple domains, the long-term impacts are more nuanced (DHHS 2010; Burchinal 2018; Kaspar 2010). The Head Start Impact Study found that initial positive effects on cognitive development, health outcomes, and parenting practices tend to fade by the end of first grade for most children (DHHS 2010). The analysis of PISA data and findings from these studies suggest that simply providing access to pre-primary education may not necessarily lead to higher achievement in later grades without sustained focus on educational quality throughout primary and lower secondary education.

FIGURE 3.11 Attendance at pre-primary school and mathematics performance

Change in mathematics performance when students had attended pre-primary school for the following length of time, compared to not having attended or having attended for less than a year



Note: Statistically significant differences are shown in a darker tone. [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

Source: OECD 2023a (Table II.B1.4.5).

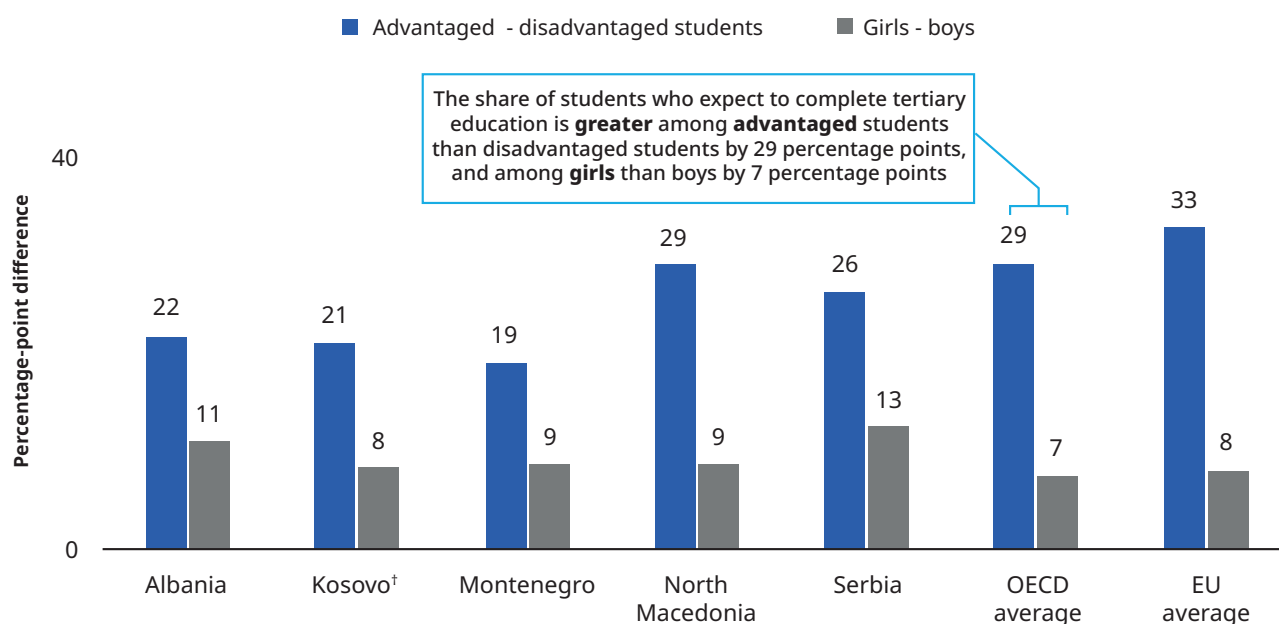
3.2 Differences in students' educational expectations and sense of belonging, by student background

While most students in Western Balkans countries report expecting to complete tertiary education, disparities emerged across student groups. In all Western Balkan countries, socio-economically advantaged students were

more likely than disadvantaged students to expect to complete tertiary education (see Figure 3.12). The socio-economic gap in these educational expectations reached at least 19 percentage points across the Western Balkans; in North Macedonia, this gap amounted to 29 percentage points. In all Western Balkan countries, smaller but significant gaps appeared by gender, with girls more likely to report expecting to complete tertiary education.

FIGURE 3.12 Difference in the percentage of students who expect to complete tertiary education, by socio-economic status and gender

Based on students' reports



Note: Statistically significant differences are shown in a darker tone. [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

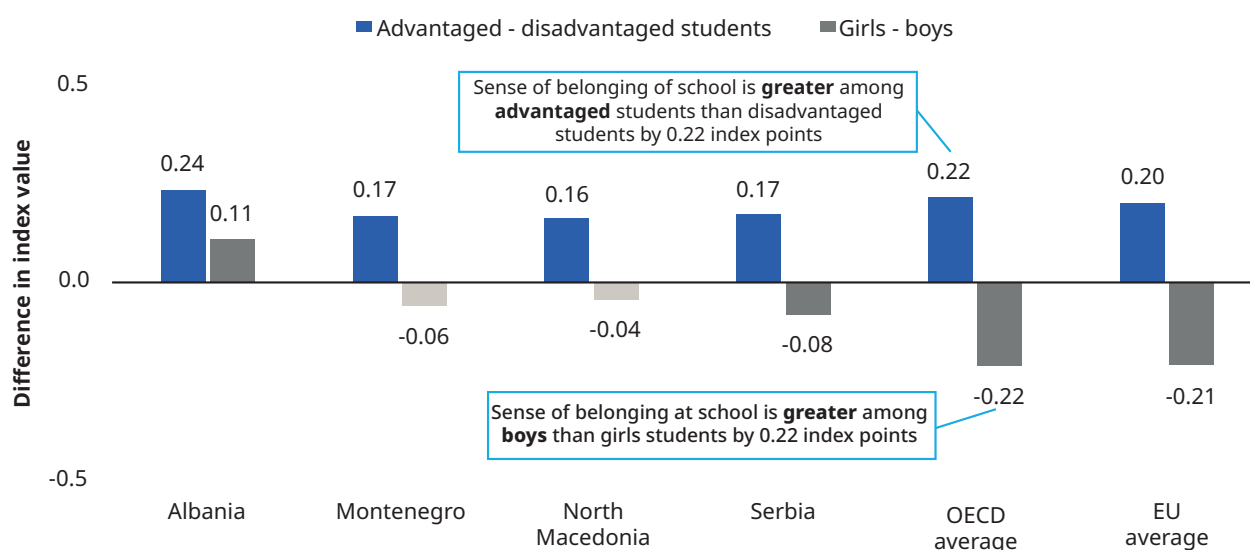
Source: OECD 2023a.

Sense of belonging at school appeared stronger among socio-economically advantaged students. While students' sense of belonging at school is generally favourable in the Western Balkans, disparities appeared across background characteristics appeared for some countries in the region (see *Figure 3.13*). In all

Western Balkan countries with data, advantaged students tended to report a greater sense of belonging at school than disadvantaged students. Differences were also observed by gender: in Albania, students' sense of belonging tended to be greater among girls than boys, while the reverse was observed in Serbia.

FIGURE 3.13 Difference in sense of belonging at school, by socio-economic status and gender

Based on students' reports



Note: Data are not available for Kosovo. Statistically significant differences are shown in a darker tone.

Source: OECD 2023a (Table II.B1.1.2).

These findings shed light on disparities not just in academic performance, but also in the futures and well-being of students. Socio-economic and gender differences in educational expectations highlight the need to support all students in understanding and pursuing educational opportunities that can shape the trajectory of their careers and their quality of life. Similarly, disparities in students' sense of well-being at school, often in favour of advantaged students and girls, must be addressed by ensuring inclusive, welcoming and positive school climates where all students feel socially connected.

3.3 Differences in performance, by access to education resources

PISA 2022 asked principals about the extent to which different resource shortages hinder instruction at their school. To shed light on resource shortages in schools, PISA collects data on material resources (i.e., educational material and school infrastructure), digital resources (e.g.,

laptops, internet access) and human resources (i.e., teachers and support staff). PISA 2022 asked school principals to report how their school's capacity to provide instruction is hindered by shortages of these resources. While these findings indicate the resource situation in secondary schools, self-reported data from principals could be subject to various biases.

3.3.1 Material resources

PISA collects data on shortages of educational materials and physical infrastructure in schools. PISA 2022 asked principals to report on the extent to which the school's capacity to provide instruction is hindered by shortages of educational materials (textbooks, ICT equipment, library or laboratory materials) and physical infrastructure (building, grounds, heating/cooling systems, lighting and acoustic systems). An index of material resource shortages is constructed based on principals' responses. An index mean of zero indicates the average level of shortages across OECD countries, and values above zero suggest more severe shortages than the OECD average.

On average, principals from Western Balkan countries were more likely than those from OECD and EU countries to report that material resource shortages hindered their school's capacity to provide instruction.

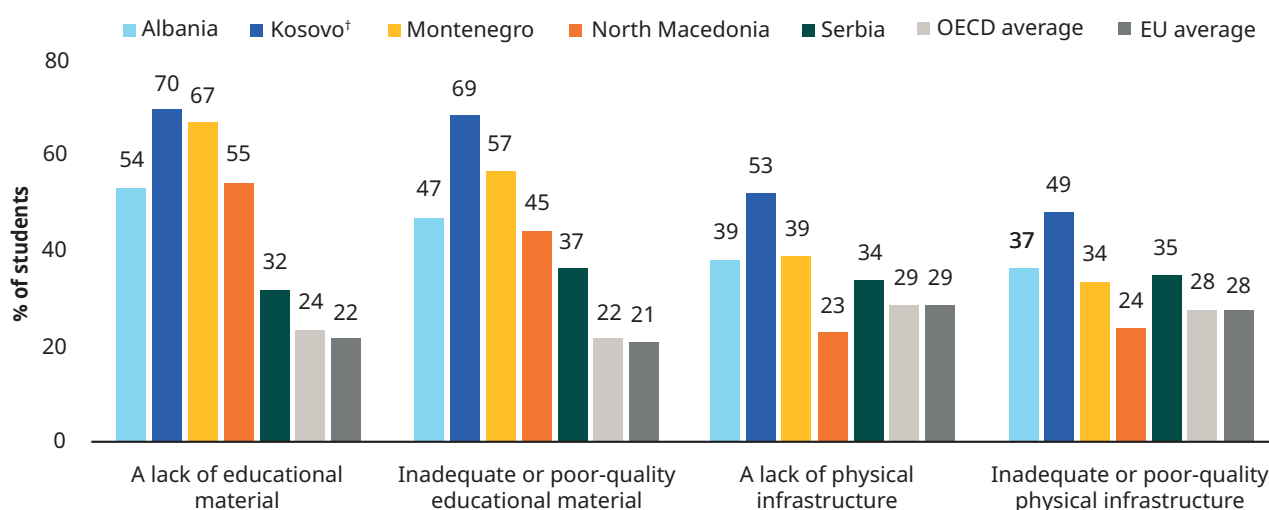
Particularly large gaps between Western Balkan averages and OECD and EU averages were observed in terms of the availability and quality of educational material. Over half of students on average across the Western Balkans, compared to fewer than a quarter of students on average across the OECD and the EU, were in schools where principals reported that a lack of or poor-

quality educational material hindered instruction (see Figure 3.14).

In most Western Balkan countries, principals expressed greater concerns over the availability and quality of educational material than physical infrastructure. Within the Western Balkans, principals' concerns on material resource shortage appeared to be most severe in Kosovo, with about 70 per cent of students attending schools where principals reported that lack of availability and quality of educational material hindered instruction.

FIGURE 3.14 Shortage of material resources

Percentage of students whose principals reported that the school's capacity to provide instruction was hindered to some extent or a lot by the following



Note: † Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

Source: OECD 2023a (Table II.B1.5.17).

Encouragingly, most Western Balkan economies have shown improvements in material resource availability since PISA 2018.

Compared to 2018, the proportion of students whose principals reported that the lack of or poor-quality educational material hinders instruction was significantly lower in 2022 for Kosovo, North Macedonia and Serbia. Concerns regarding the lack of physical infrastructure decreased in North Macedonia and Serbia, and concerns about poor-quality physical infrastructure decreased in these same countries. However, some aspects of material resource shortages have worsened

since 2018: greater concerns about lack of or poor-quality educational material were reported in Albania and Montenegro.

Beyond examining resource availability issues, assessing how resources are distributed across schools proves equally important.

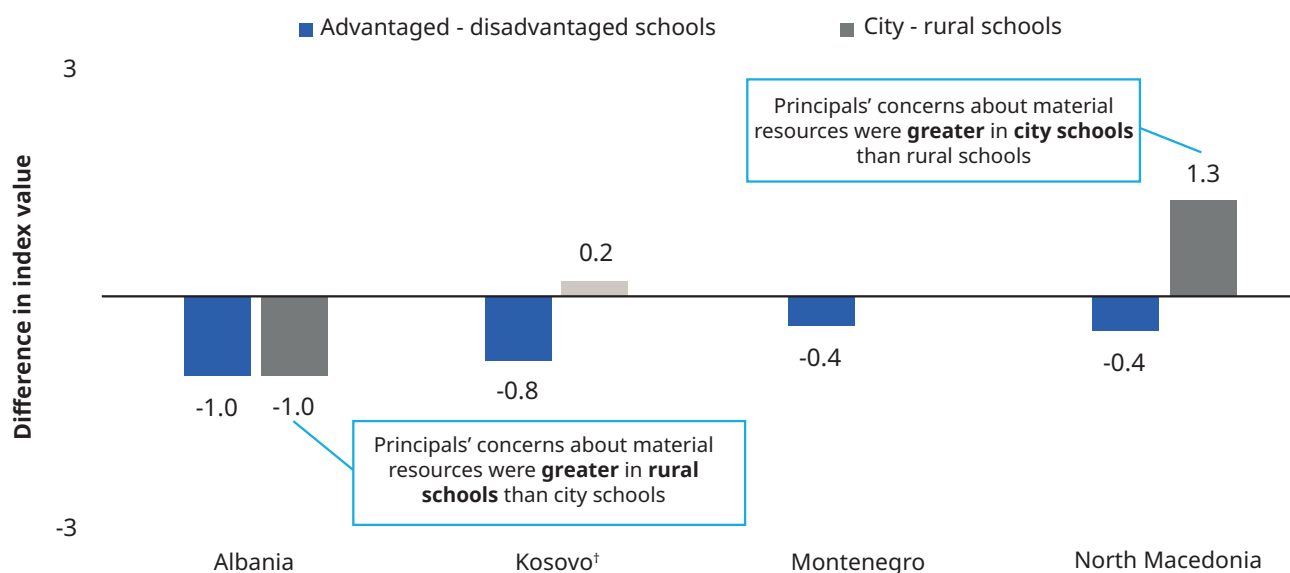
In all Western Balkan countries, socio-economically disadvantaged schools (those in the bottom quarter of the ESCS index in their respective country) were more likely than advantaged schools (those in the top quarter of the index) to experience material resource

shortages (see Figure 3.15). In Albania, principals' concerns about material resource shortages were

greater in rural schools than in city schools, while the opposite was observed in North Macedonia.

FIGURE 3.15 Shortage of material resources, by school characteristics

Difference in mean value on the index of shortage of material resources



Note: Statistically significant differences are shown in a darker tone. Data are not available for Serbia. There were too few observations to provide reliable estimates by school location for Montenegro. [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

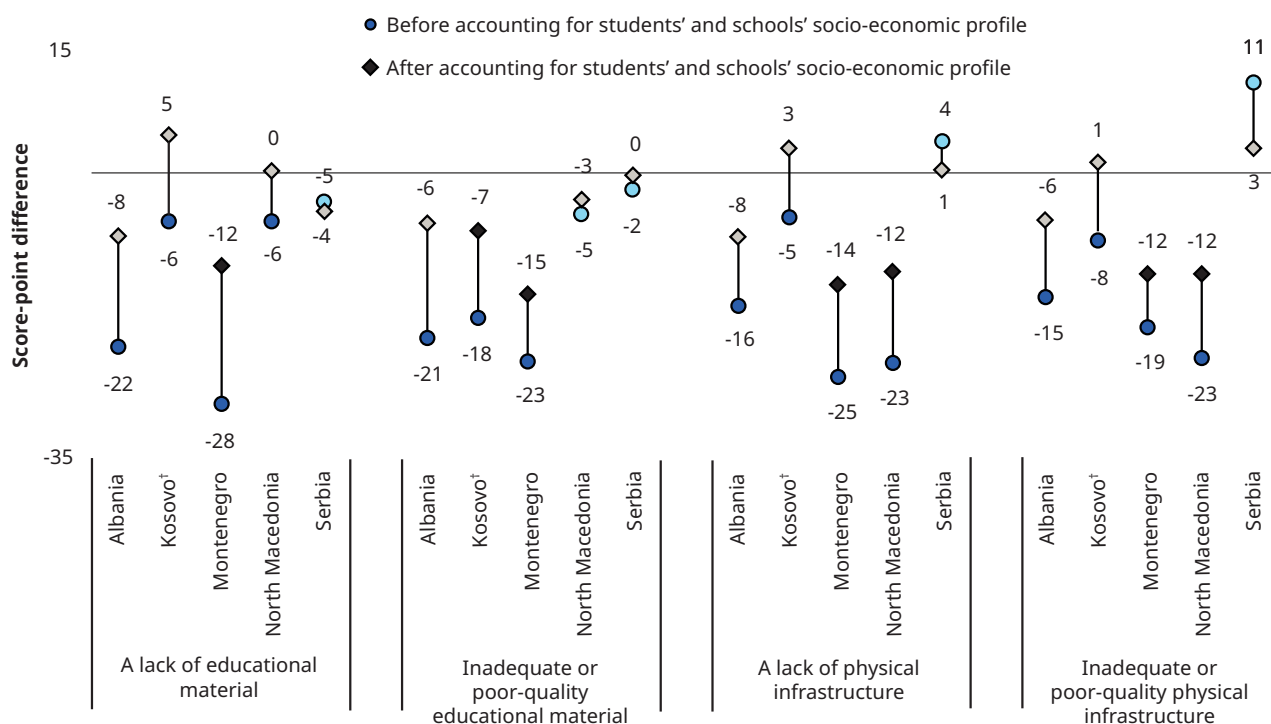
Source: OECD 2023a (Table II.B1.5.18).

In most Western Balkan countries, shortages of material resources were associated with declines in mathematics performance. After accounting for students' and schools' socio-economic profiles, some of these associations remained statistically significant (see Figure 3.16).

In Montenegro and North Macedonia, perceived shortages of educational material and physical infrastructure were associated with decreases of over 10 score points – equivalent to more than half a year's worth of schooling in OECD member states.

FIGURE 3.16 Shortage of material resources and mathematics performance

Change in mathematics performance associated with principals reporting that the school's capacity to provide instruction is hindered to some extent or a lot by the following



Note: Graph shows the change in mathematics performance when students were in schools where principals reported that the capacity to provide instruction is hindered to some extent or a lot by a shortage of material resources. Statistically significant differences are shown in a darker tone. † Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

Source: OECD 2023a (Table II.B1.5.23).

3.3.2 Digital resources

Compared to principals in OECD countries, principals in Western Balkan countries tended to report greater concerns about digital resource shortages in school. PISA

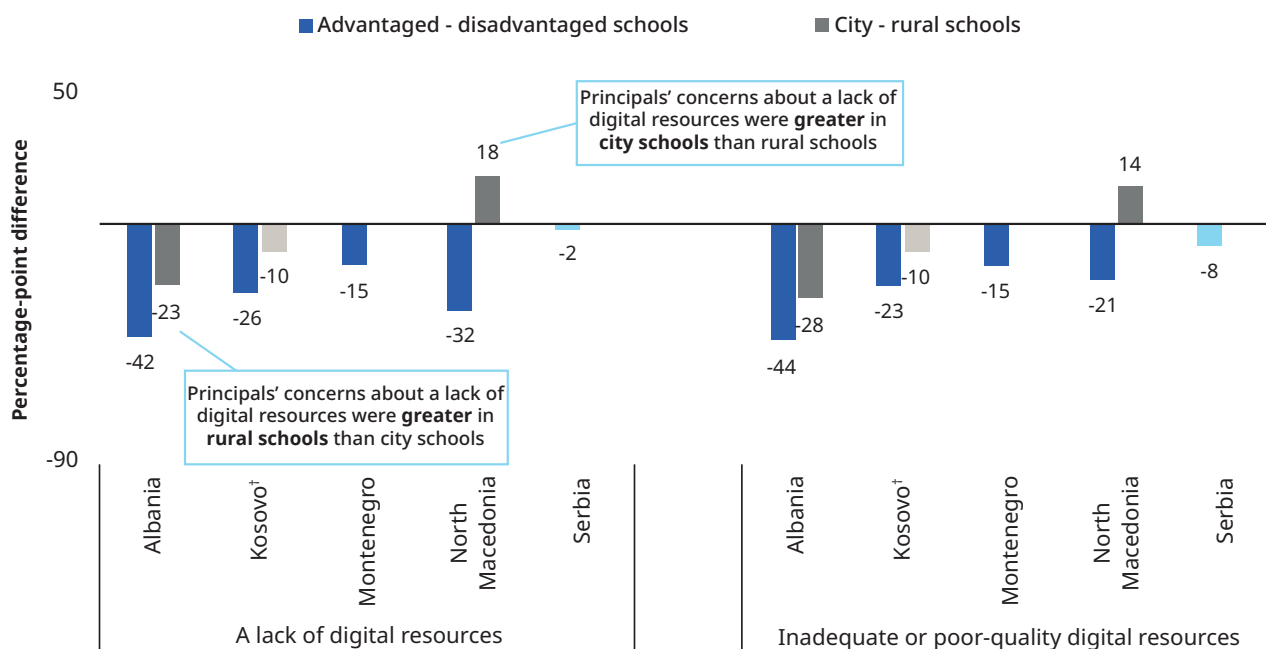
asked principals the extent to which their schools' capacity to provide instruction was hindered by a lack of or inadequate or poor-quality digital resources (desktop or laptop computers, internet access, learning management systems or school learning platforms). Over half of students on average across the Western Balkans, compared to about a quarter of students on average across the OECD, attended schools where principals reported that a lack of or poor-quality digital resources hindered instruction.

Variations in the extent to which digital resource shortages hindered instruction were observed across school characteristics, revealing inequities in resource allocation.

In all Western Balkan countries except Serbia, principals' concerns about digital resource shortages tended to be greater in socio-economically disadvantaged schools than advantaged schools (*see Figure 3.17*). Furthermore, across all Western Balkan countries with data, principals in public schools reported greater concerns about digital resources than principals in private schools. As with material resource shortages, differences in digital resource shortages by school location were mixed: in Albania, principals' concerns regarding digital resources were greater in rural schools, while in North Macedonia, these concerns were greater in city schools.

FIGURE 3.17 Shortage of digital resources, by school characteristics

Percentage-point difference in the shares of students whose principals reported that the school's capacity to provide instruction was hindered to some extent or a lot by the following



Note: Statistically significant differences are shown in a darker tone. There were too few observations to provide reliable estimates on principals' concerns about (i) a lack of digital resources by school location for Montenegro and by school location for Serbia; and (ii) inadequate or poor-quality digital resources by school location for Montenegro. † Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

Source: OECD 2023a (Table II.B1.5.19).

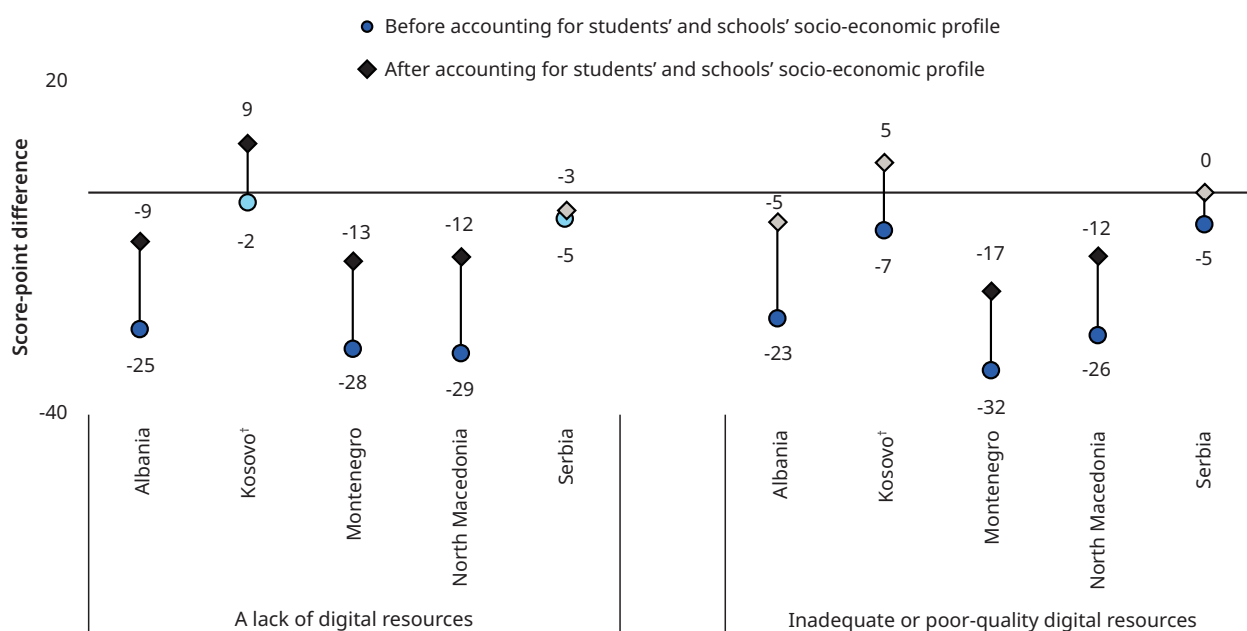
In most Western Balkan countries, digital resource shortages showed negative associations with mathematics achievement.

After accounting for students' and schools' socio-economic profiles, a perceived lack of digital resources was associated with a decrease of at

least 25 score points in Albania, Montenegro and North Macedonia (*see Figure 3.18*). In Montenegro and North Macedonia, inadequate or poor-quality digital resources were associated with a decrease of over 10 score points in mathematics.

FIGURE 3.18 Shortage of digital resources and mathematics performance

Change in mathematics performance associated with principals reporting that the school's capacity to provide instruction is hindered to some extent or a lot by the following



Note: Statistically significant differences are shown in a darker tone. [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

Source: OECD 2023a (Table II.B1.5.23).

To maximize digital technologies' benefits for student learning, efforts must develop in tandem and in a holistic way. The relationship between digital resources and mathematics performance is not conclusive: in Kosovo, lack of digital resources showed a positive association with mathematics scores, while in Serbia, no significant association emerged. These findings suggest that merely providing digital resources may not necessarily improve performance. While schools need adequate, high-quality resources, these resources must be relevant to their needs, and educational staff must have the capacity to effectively utilize them. In the case of Kosovo, for instance, fewer than three quarters of students attended schools where principals agreed or strongly agreed that: effective professional resources are available for teachers to learn how to use digital devices; an effective online learning support platform is available; teachers are provided with incentives to integrate digital devices in their teaching; and the school has sufficient qualified technical assistant staff. Efforts supporting digital technologies – such as teacher

training, national policies and guidance for schools – should not be developed in isolation. Rather, these efforts must be established in tandem to ensure all aspects work together to enhance the teaching and learning processes.

3.3.3 Human resources

The average student-teacher ratio and class size in the Western Balkans mirrors that observed in the OECD. On average across the Western Balkans, principals' reports indicate a student-teacher ratio of about 13 students per teacher and a language-of-instruction class size of about 26 students. Within the region, student-teacher ratios ranged from 11 students per teacher in Serbia to 14 students per teacher in Kosovo, while class sizes ranged from 25 students in Montenegro to 29 students in Albania.

Between 2018 and 2022, some Western Balkan economies saw decreases in student-teacher ratios and class sizes. Over this period, student-teacher ratios decreased in Kosovo, Montenegro

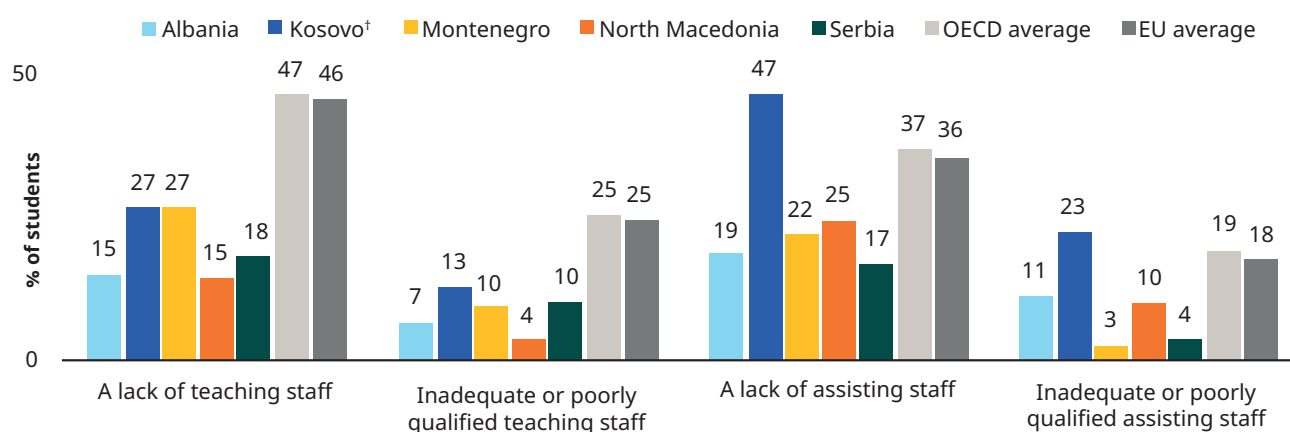
and North Macedonia but remained unchanged in Albania and Serbia. Class sizes decreased in Kosovo, Montenegro and Serbia but increased in Albania and North Macedonia.

Despite decreases in either student-teacher ratio or class sizes, principals in Kosovo, Montenegro and Serbia tended to report greater concerns regarding the shortage of education staff in 2022 than their counterparts in 2018. Several factors might feed this perception: teacher absenteeism, concerns about insufficient teacher qualifications, or issues which not necessarily reflected in teaching staff numbers. Low teachers' salaries and demographic changes, including an ageing teachers' workforce, could also affect such concerns.

Unlike findings for material and digital resources, perceived shortages of education staff tended to be less severe in the Western Balkans than in the OECD. PISA asked principals the extent to which their schools' capacity to provide instruction was hindered by the availability and qualifications of teaching and assisting staff. Only about a fifth of students on average across the Western Balkans, compared to almost half of students on average across the OECD, attended schools where principals reported that a lack of teaching staff hindered the capacity to provide instruction (see Figure 3.19). Across all Western Balkan countries, principals expressed greater concerns regarding the availability rather than the quality of both teaching and assisting staff.

FIGURE 3.19 Shortage of education staff

Percentage of students whose principals reported that the school's capacity to provide instruction was hindered to some extent or a lot by the following:



Note: † Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).
Source: OECD 2023a (Table II.B1.5.1).

Among Western Balkan countries, concerns about the shortage of education staff tended to be highest in Kosovo. This perceived shortage appeared particularly evident for assisting staff. Almost half of students attended schools where principals reported concerns about teaching staff availability, and over one fifth of students were in schools where principals reported concerns about the quality of assisting staff.

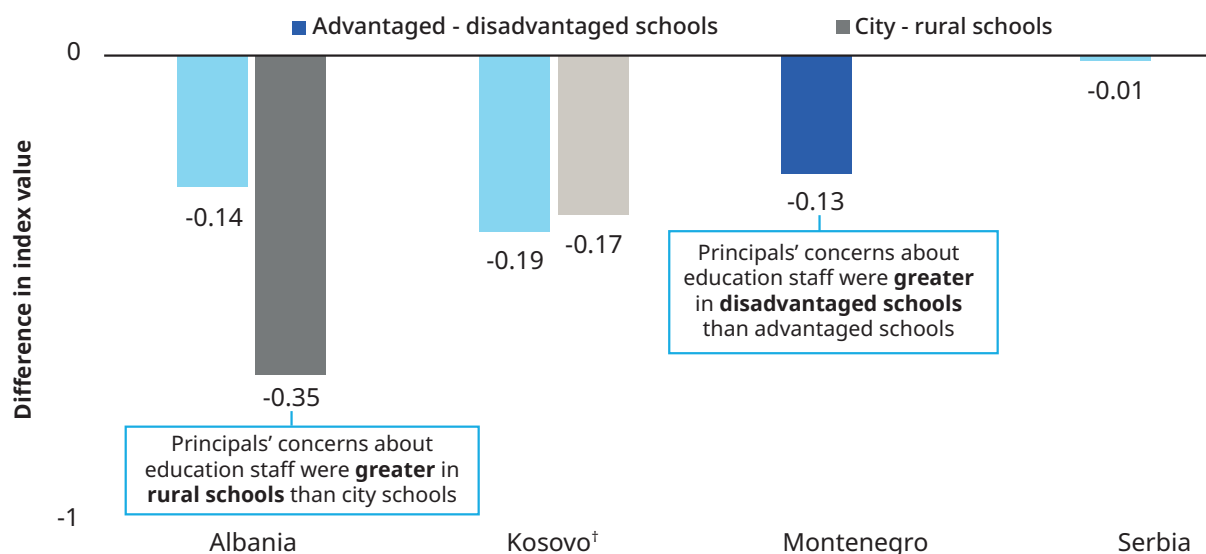
Compared to material and digital resource shortages, education staff shortages showed

less variation across school characteristics.

In Albania and Kosovo, disparities emerged by school type, with principals' concerns about education staff greater in public schools than private schools (see Figure 3.20). Only in Albania did gaps appear by school location, with principals' concerns greater in rural schools than city schools; similarly, only in Montenegro did gaps emerge by schools' socio-economic profile, with concerns greater in disadvantaged schools than advantaged schools.

FIGURE 3.20 Shortage of education staff, by school characteristics

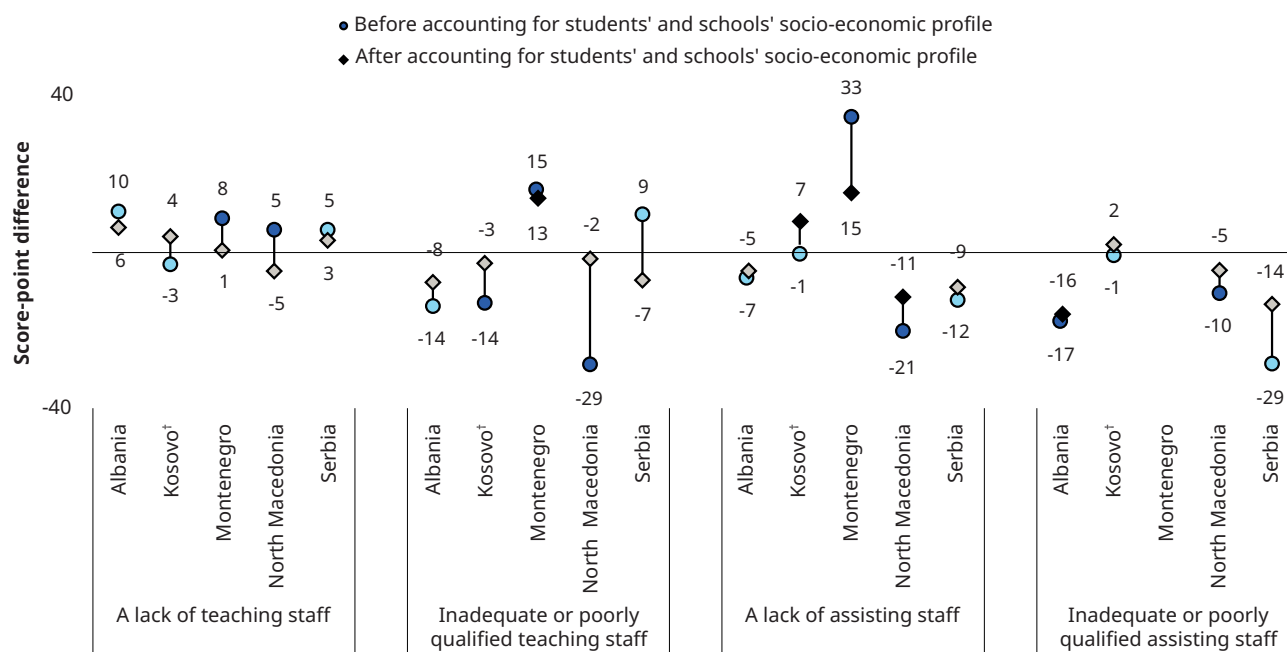
Difference in mean value on the index of shortage of education staff



Note: Statistically significant differences are shown in a darker tone. Data are not available for North Macedonia. There were too few observations to provide reliable estimates by school location for Montenegro, and by school location for Serbia. [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).
Source: OECD 2023a (Table II.B1.5.2).

FIGURE 3.21 Shortage of education staff and mathematics performance

Change in mathematics performance associated with principals reporting that the school's capacity to provide instruction is hindered to some extent or a lot by the following:



Note: Statistically significant differences are shown in a darker tone. There were too few observations to provide reliable estimates on principals' concerns about inadequate or poorly qualified assisting staff for Montenegro. [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

Source: OECD 2023a (Table II.B1.5.5).

After accounting for students' and schools' socio-economic profiles, perceived education staff shortages were associated with decreased mathematics achievement in Albania and North Macedonia.

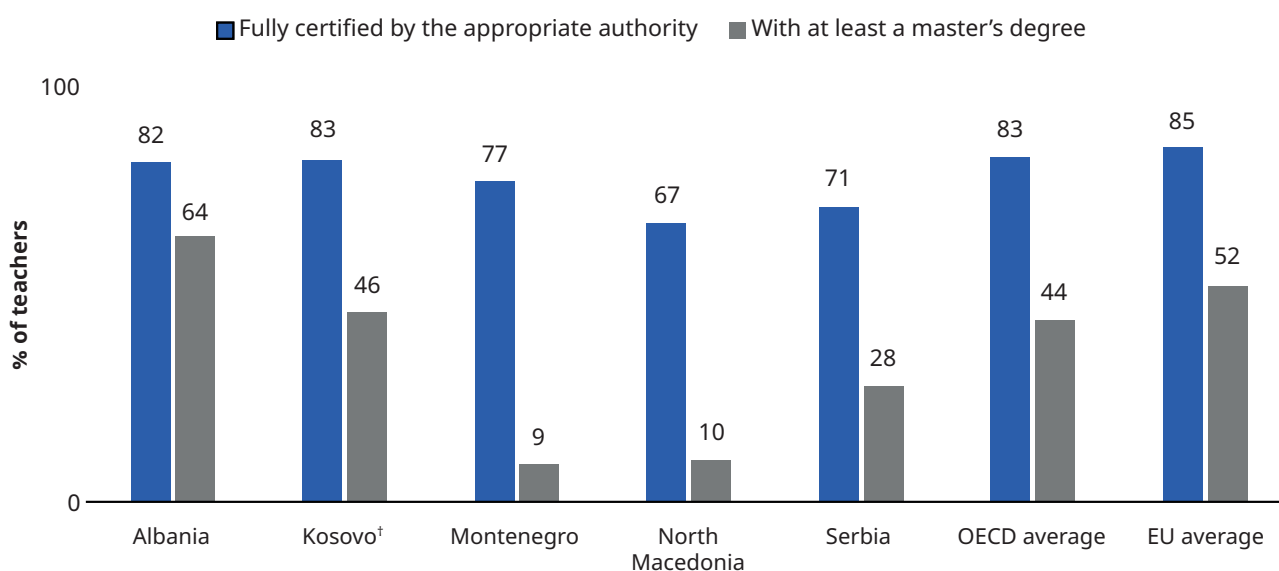
Greater concerns about assisting staff qualifications in Albania and the lack of assisting staff in North Macedonia were associated with a decrease in mathematics performance (see Figure 3.21). Some counterintuitive results were also observed; for instance, in Montenegro, greater concerns about teaching staff quality were associated with increased mathematics performance.

While most teachers in Western Balkan countries were fully certified, relatively few

held at least a master's degree. Across all five Western Balkan countries, most teachers were fully certified (licensed to teach based on standards defined by national or local institutions). On average across Western Balkan countries, about 76 per cent of teachers working in schools with the modal ISCED level for 15-year-old students were fully certified by the appropriate national or local authority (see Figure 3.22). In contrast, more variation across countries was observed in the proportion of teachers holding at least a master's degree. Almost two thirds of teachers in Albania, compared to about one tenth of teachers in Montenegro and North Macedonia, had at least a master's degree.

FIGURE 3.22 Percentage of teachers meeting qualifications

Based on principals' reports



Note: [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

Source: OECD 2023a (Table II.B1.5.7).

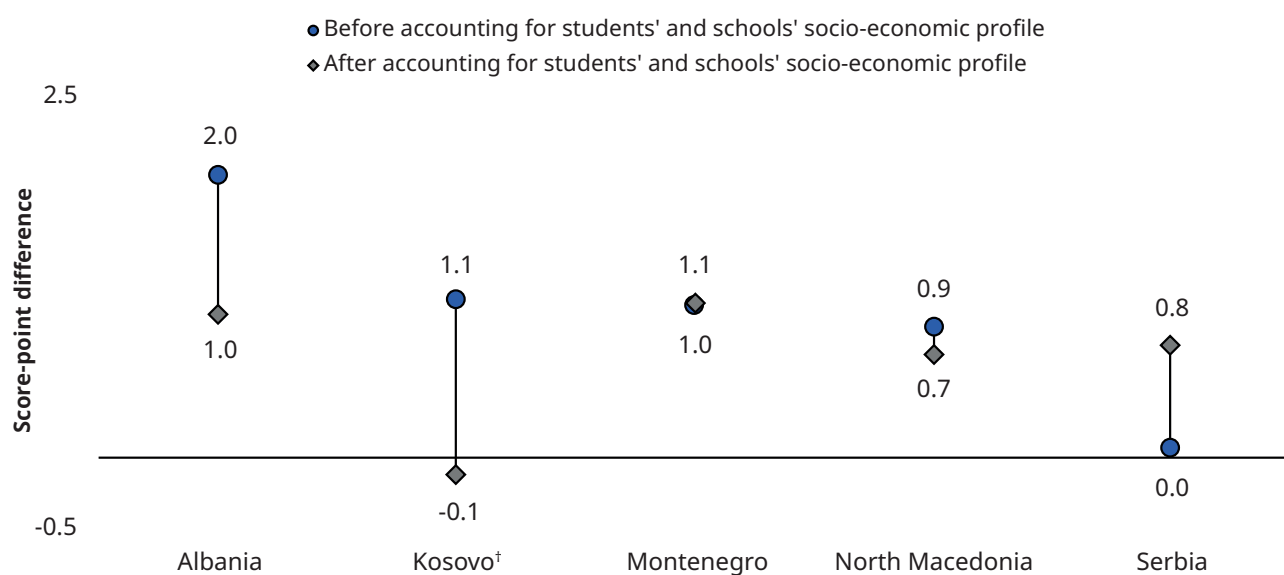
The relationship between teacher qualifications and students' mathematics achievement proved inconclusive in the Western Balkans.

In all countries in the region except Serbia, the proportion of fully certified teachers appeared positively associated with mathematics performance. However, after accounting for students' and schools' socio-economic profiles, the relationship became non-significant for Albania and Kosovo (see Figure

3.22). These findings suggest that screening mechanisms such as teacher certification must be strengthened to ensure they serve as valid and reliable measures of teacher quality. Pre-service teacher training must improve to adequately prepare individuals to enter the teaching force, and continuous professional development must be provided to in-service teachers so they can effectively utilize and build on their acquired skills and knowledge.

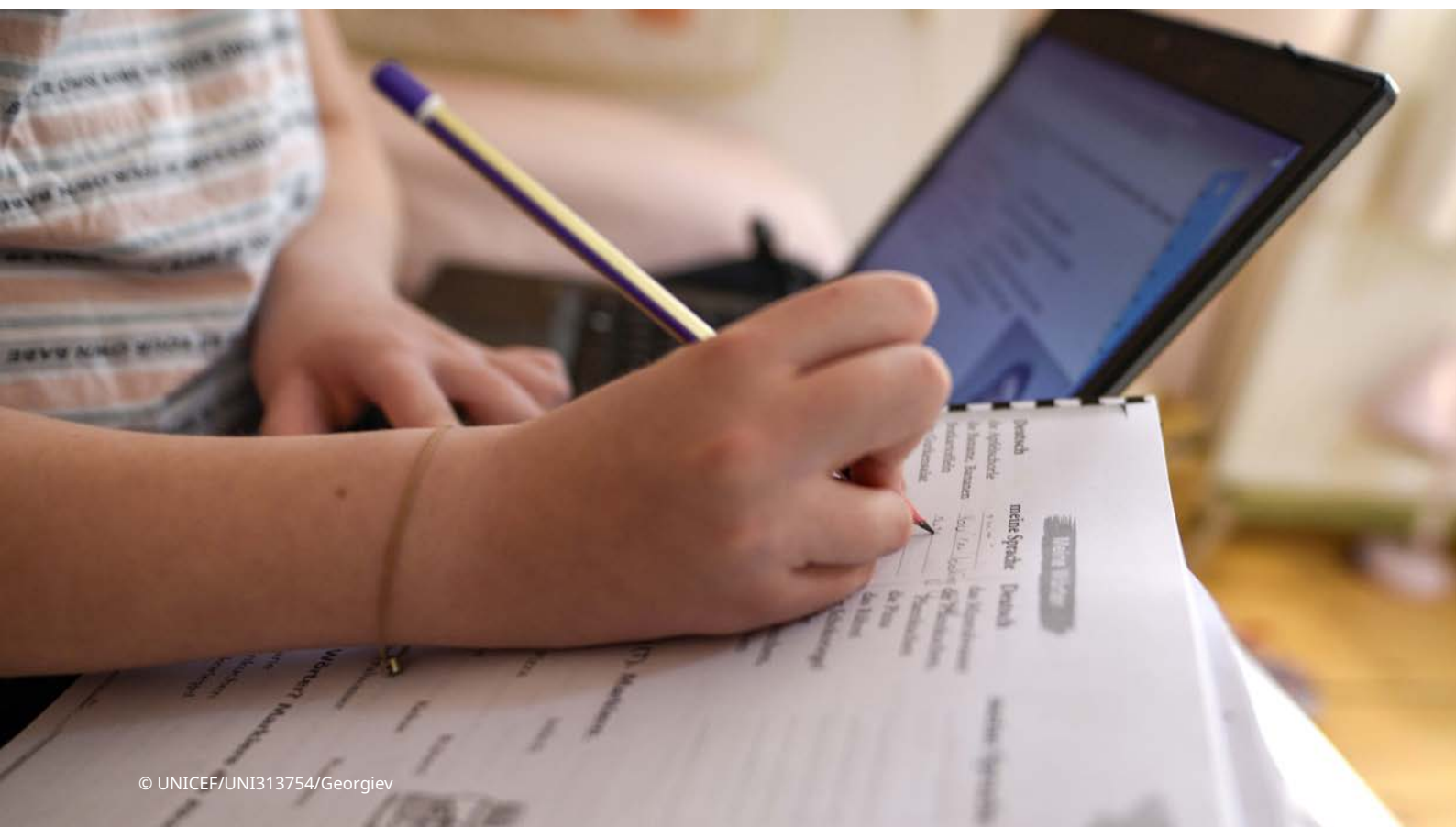
FIGURE 3.23 Teacher certification and mathematics performance

Change in mathematics performance per 10 percentage-point increase in the share of certified teachers, based on principals' reports



Note: Statistically significant differences are shown in a darker tone. [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

Source: OECD 2023a (Table II.B1.5.10).



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4. LEARNING ENVIRONMENT IN AND OUTSIDE OF SCHOOL

This chapter examines the learning environment in classrooms and schools, as well as at home. The first section investigates students' learning experience during school closures brought about by the COVID-19 pandemic, including problems faced with remote learning and teacher support during school closures. The second section discusses various aspects of the learning environment in school after the COVID-19 pandemic, namely, teacher support, disciplinary climate, student truancy and the use of digital devices. The last section explores the learning environment at home through findings on parental involvement at school and family support.

4.1 Learning during school closures

The COVID-19 crisis brought unprecedented disruptions to education systems worldwide, with most countries closing their schools for at least some period of time during the pandemic. Across countries, teachers and students experienced varying degrees of difficulty in the transition to remote learning modalities during school closures. Countries' experiences during COVID-19 reveal opportunities to build resilience in education systems, schools and students to better withstand future disruptions to teaching and learning.

PISA 2022 included questions for students and schools to examine how learning continued while schools were closed. However, caution is advised when interpreting the data on school closures (see Box 4.1). Students were asked whether their school building was closed for more than a week (some schools closed and reopened multiple times during the period) in the previous three years due to COVID-19. On average across the Western Balkans, about 55 per cent of students reported that their school was closed for up to three months, slightly higher than the OECD and EU average of 50 per cent and 48 per cent, respectively. Within the Western Balkans, the proportion of students reporting school closures of up to three months ranged from 42 per cent in North Macedonia to 69 per cent in Serbia.

Box 4.1 Interpreting the data from students on school closures

PISA data on school closures focused on student response (via the student questionnaire) rather than school principals' input, since many students were enrolled in different schools during COVID-induced school closures. On average across the OECD, only 44 per cent of students were enrolled at their school for three or more years; this proportion was even lower at 15 per cent on average across the Western Balkans.

Students' responses to school closure questions, like all self-reported data, are subject to various potential biases such as social desirability and cultural influences. Moreover, students provided information on school closures retrospectively, which may introduce recall errors about their experiences. Additional considerations include systemic bias, given varying timing and duration of school closures across countries, and the particularly high non-response rate for questions about COVID-19 school closures, which limits data representativeness resulting in less precise estimates.

At the system level, students' responses correlated strongly with principals' responses to questions about school closures. While students' responses require careful interpretation, the strong alignment with principals' responses suggests both groups provide similar accounts of average school closure durations in their countries. Minor discrepancies between student and principal reports likely reflect variations in school closure policies in the countries.

Source: OECD 2023c.

4.1.1 Length of school closures, student performance and wellbeing

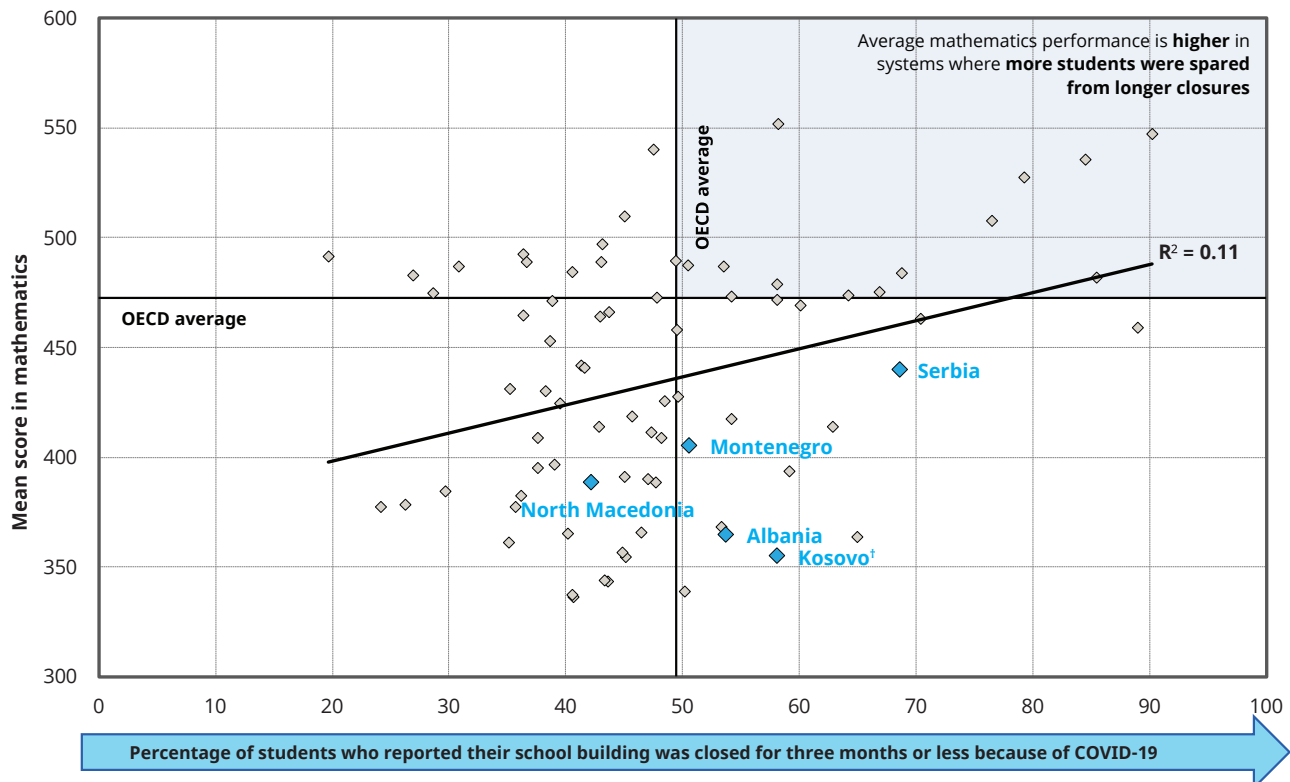
Overall, PISA 2022 student-reported data show that education systems that spared more students from longer school closures (over three months) showed higher average performance in mathematics compared to systems where more schools were closed for longer periods (see Figure 4.1). However, in the

Western Balkans, sparing more students from prolonged school closures did not automatically translate to better student performance. In all Western Balkan economies except North Macedonia, over half of students reported that their schools were closed for three months or less, yet their average mathematics scores were significantly lower than other education systems of similar school closure durations.

These findings suggest that while keeping schools open is important, ensuring the quality of education that schools provide proves equally critical. In the Western Balkans,

large proportions of students fell below minimum proficiency levels even before the pandemic, suggesting the need to address systemic, long-standing challenges in education.

FIGURE 4.1 COVID-19 school closures and mathematics performance



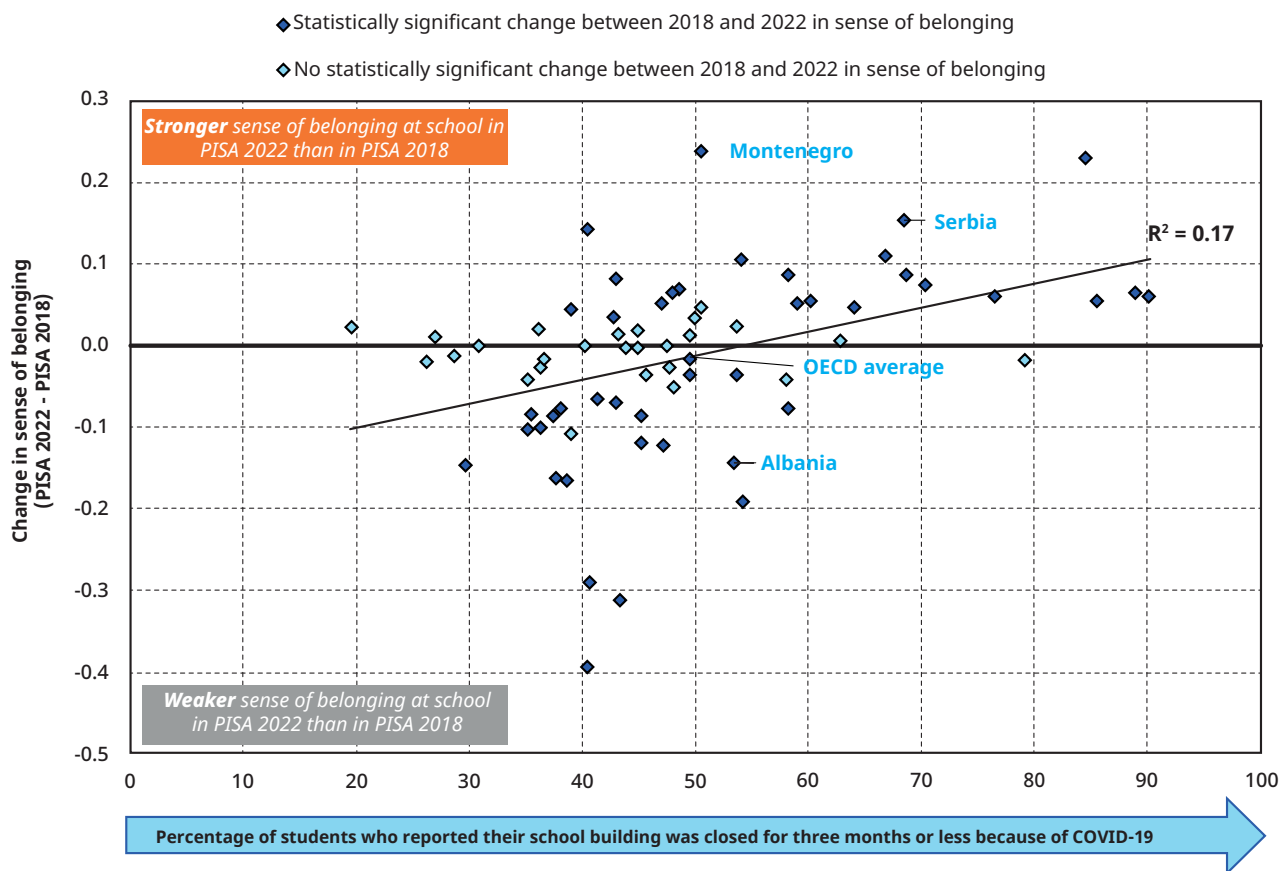
Note: † Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).
Source: OECD 2023a (Tables I.B1.2.1 and II.B1.2.1).

In addition to its relationship with school performance, school closures appeared to be associated with students' psychosocial health and well-being, particularly their sense of belonging at school. Overall, education systems that avoided long school closures for more of their students showed more stable or improving trends in students' sense of belonging at school (see Figure 4.2).

Within the Western Balkans, the same relationship between school closures

and sense of belonging was observed for Montenegro and Serbia. In these two countries, over half of students reported that their schools were closed for three months or less, and students' reported sense of belonging in 2022 showed a significant increase from 2018. However, the opposite was observed in Albania: students' sense of belonging significantly weakened compared to 2018, despite over half of its students spared from long school closures.

FIGURE 4.2 COVID-19 school closures and change between 2018 and 2022 in sense of belonging



Note: † Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).
Source: OECD 2023a (Tables II.B1.2.1 and II.B1.1.5).

During the pandemic, countries implemented various emergency measures in response to the sudden disruptions to schooling.

To support education systems in navigating the crisis, UNICEF, UNESCO, the United States Agency for International Development (USAID), the United Kingdom's Foreign, Commonwealth and Development Office (FCDO), the Bill & Melinda Gates Foundation, and the World Bank developed the RAPID Framework. The framework encapsulates five key actions needed to recover and accelerate learning: (i) Reach every child and keep them in school; (ii) Assess learning levels regularly; (iii) Prioritize teaching the fundamentals; (iv) Increase the efficiency of instruction; and (v) Develop psychosocial health and well-being. Post-

COVID, these actions continue to be important in response to ongoing challenges, including addressing the global learning crisis (UNICEF 2024).

Data suggest that Western Balkan countries took various actions aligned with the RAPID Framework during school closures. To examine how education systems supported students and schools during the pandemic, PISA 2022 collected system-level data on education responses to COVID-19 school closures (see Table 4.1).⁹

Most Western Balkan countries with available data reported collecting information on student absence over the three years covered by the

⁹ This information is from the United Nations Educational, Scientific and Cultural Organization (UNESCO), the United Nations Children's Fund (UNICEF), the World Bank and the Organisation for Economic Co-operation and Development (OECD) Survey on National Education Responses to COVID-19 School Closures. The objective of this survey was to collect information on national education responses to school closures related to the COVID-19 pandemic (UNESCO-UIS et al. 2022).

pandemic and implementing national-level early warning systems to identify students at risk of dropping out, which are important measures to reach every child and keep them in school. Most countries in the region also reported assessing learning levels through standardized testing programmes and the standardized assessment of mathematics and reading.

To prioritize teaching the fundamentals, all four Western Balkan countries implemented adjustments to the curriculum in any subject or grade at the national level. Various approaches were undertaken to increase the efficiency

of instruction, including the national-level implementation of structured pedagogy across the four Western Balkan countries with data.

To develop psychosocial health and well-being, all four countries reported providing nationwide psychosocial and mental health support to its students. Although schools have resumed normal operations, education systems should avoid returning to business as usual and instead build on momentum gained during the pandemic by continuing evidence-based approaches to transform education.

TABLE 4.1 How education systems supported students and schools during the pandemic

Based on system-level information

Legend	
Yes	Yes, at the national/central level.
No	No, not at the national/central level.
Local	Schools/districts/the most local level of governance could decide at their own discretion.
a	Not applicable
M	Missing

		Albania	Montenegro	North Macedonia	Serbia
Tracking students' absence during the pandemic (2019/20, 2020/21, and 2021/22)	Has your education system collected statistics on <u>student absence</u> over the three school years covered by the pandemic?	Yes	Yes	Yes	Yes
Assessment of impact of COVID-19 crisis on education (2020/21 and 2021/22)	Did <u>standardized testing</u> programmes continue to take place in school year 2020/21 (or 2021) / school year 2021/22 (or 2022)?	2020/21: Yes 2021/22: Yes	2020/21: Yes 2021/22: Yes	2020/21: a 2021/22: a	2020/21: Yes 2021/22: Yes
	Have there been studies about the impact of school closures on learning outcomes (standardized <u>national</u> assessment)?	Yes	No	No	Yes
	Have there been studies about the impact of school closures on learning outcomes (standardized <u>subnational</u> assessment)?	No	No	No	Yes

		Albania	Montenegro	North Macedonia	Serbia
	Have there been studies about the impact of COVID on <u>mental health and well-being</u> of students (levels of stress, anxiety and depression)?	No	No	Yes	Yes
	Have there been studies about the impact of COVID on <u>non-cognitive skills</u> ?	Yes	No	No	Yes
	Has <u>mathematics</u> been assessed in a standardized way?	Yes	Yes	No	Yes
	Has <u>reading</u> been assessed in a standardized way?	Yes	Yes	No	Yes
	Have <u>sciences</u> been assessed in a standardized way?	No	Yes	No	Yes
Changes in education policies/regulations to mitigate the impact of learning loss/disruption and student well-being (school year 2020/21 or 2021 / school year 2021/22 or 2022)	Early Warning Systems to identify students at <u>risk of dropping out</u>	2020/21: Yes 2021/22: Yes	2020/21: m 2021/22: m	2020/21: Yes 2021/22: Yes	2020/21: Yes 2021/22: Yes
	<u>Adjustments to the curriculum</u> in any subject or grade	2020/21: Yes 2021/22: Yes	2020/21: Yes 2021/22: Yes	2020/21: Yes 2021/22: Yes	2020/21: Yes 2021/22: Yes
	Increased <u>instruction time</u> (e.g., through summer schools, extended school day, school week or academic year)	2020/21: No 2021/22: No	2020/21: No 2021/22: No	2020/21: Yes 2021/22: Yes	2020/21: Local 2021/22: Local
	Individualized <u>self-learning programmes</u> (computer-assisted or paper-based)	2020/21: No 2021/22: No	2020/21: No 2021/22: No	2020/21: m 2021/22: m	2020/21: a 2021/22: a
	<u>Accelerated education programmes</u> (covering instructional content in a shorter timeframe) or <u>catch-up programmes</u> for students who dropped out of school	2020/21: Yes 2021/22: No	2020/21: No 2021/22: No	2020/21: Yes 2021/22: Yes	2020/21: Local 2021/22: Local
	Psychosocial and <u>mental health support</u> to students (e.g., counselling)	2020/21: Yes 2021/22: Yes	2020/21: Yes 2021/22: Yes	2020/21: Yes 2021/22: Yes	2020/21: Yes 2021/22: Yes
	Additional <u>school nutrition services</u> (e.g., school feeding programmes, free or discount on school meals)	2020/21: a 2021/22: a	2020/21: No 2021/22: No	2020/21: Local 2021/22: Local	2020/21: a 2021/22: a

		Albania	Montenegro	North Macedonia	Serbia
	Structured pedagogy (e.g., programmes to improve instruction with teachers' guides, lesson plans, student materials and teacher training)	2020/21: Yes	2020/21: Yes	2020/21: Yes	2020/21: Yes
		2021/22: Yes	2021/22: Yes	2021/22: Yes	2021/22: Yes
	Teacher training in how to support students' mental health and well-being	2020/21: Yes	2020/21: Yes	2020/21: No	2020/21: Yes
		2021/22: Yes	2021/22: Yes	2021/22: No	2021/22: Yes
	Recruitment of specific personnel to support students' mental health and well-being (e.g., psychologists, counsellors)	2020/21: Yes	2020/21: Yes	2020/21: Yes	2020/21: No
		2021/22: Yes	2021/22: Yes	2021/22: Yes	2021/22: No

Note: Only countries and economies with available data from the Survey on National Education Responses to COVID-19 School Closures are shown. The data in this table correspond to lower secondary education.

Source: OECD 2023a (Tables B3.3.1, B3.3.3 and B3.3.4).

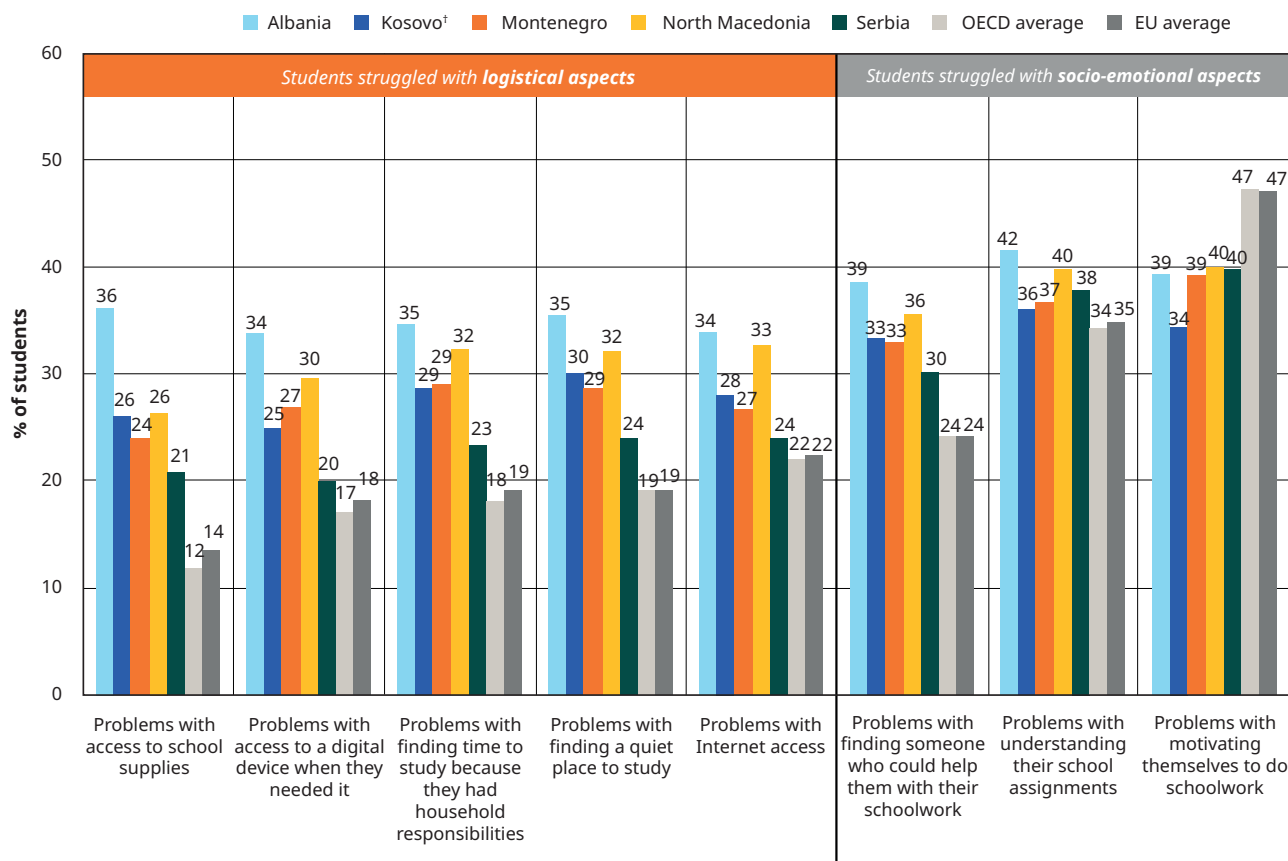
4.1.2 Students' learning experience during school closures

Students in the Western Balkans were more likely to report problems with remote learning compared to their counterparts in the OECD and the EU. Across all Western Balkan countries, more students tended to report difficulties with socio-emotional aspects (such as

problems with self-motivation for schoolwork) than logistical aspects (such as problems with internet access or access to a digital device availability). On average across the Western Balkans, over one third of students reported that when completing their schoolwork during school closures, they struggled at least once a week with lack of support and motivation or with understanding school assignments (see *Figure 4.3*).

FIGURE 4.3 Problems with remote learning

Percentage of students who reported that when their school building was closed because of COVID-19 they had the following problems when completing their schoolwork once a week or every day or almost every day



Note: † Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).
Source: OECD 2023a (Table II.B1.2.30).

Overall, PISA 2022 data show that students who faced fewer problems with remote learning tended to have better mathematics performance and report a stronger sense of belonging (OECD, 2023c). The same trend was observed in Western Balkan economies. To prepare for future crises, education systems in the region must address logistical, pedagogical and socio-emotional obstacles to remote learning such that students can continue learning and feel connected to their school during disruptions.

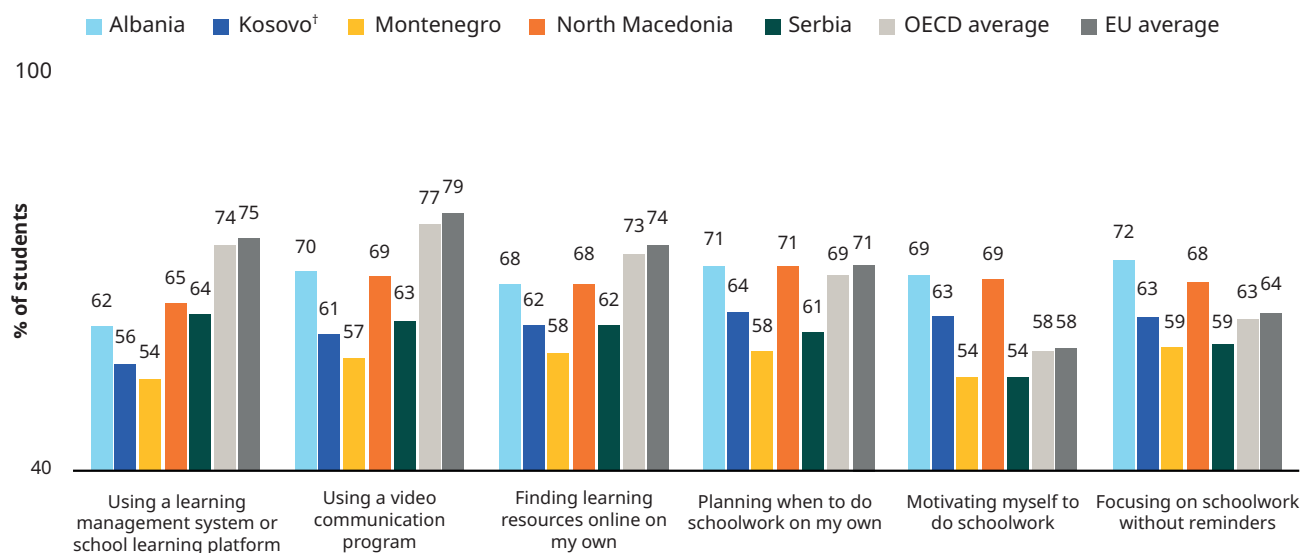
On average, students in the Western Balkans were less likely than their OECD counterparts to report confidence in using digital technology for their own learning.

PISA 2022 explored whether education systems prepared students for autonomous learning by

asking students to report on their capacity for self-directed learning in case their schools close again in the future. On average across the Western Balkans, about three in five students reported feeling confident in motivating themselves to do schoolwork and focusing on schoolwork without reminders, similar to OECD and the EU averages (see Figure 4.4). However, the proportion of students reporting confidence in using digital technology for their own learning was lower on average across the Western Balkans than on average across the OECD and the EU. For instance, fewer than two in three students across the Western Balkans, compared to about three in four on average across the OECD and the EU, reported feeling confident in using learning management systems or school learning platform and finding learning resources online independently.

FIGURE 4.4 Students' confidence in self-directed learning

Percentage of students who reported feeling confident/very confident in taking the following actions if their school building closes again in the future



Note: [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).
Source: OECD 2023a (Table II.B1.2.5).

In most education systems, including all five Western Balkan economies, greater confidence in students' capacity for self-directed learning was associated with better mathematics performance, even after accounting for students' and schools' socio-economic profiles. To build students' resilience against future disruptions, education systems must ensure that students are well-equipped with both digital skills (such as finding learning resources online independently) and socio-emotional skills (such as self-motivation for schoolwork) for autonomous learning. However, building these skills must start with ensuring all students acquire sufficient literacy and numeracy skills – a systemic issue demonstrated by large shares of low performers in the Western Balkans – that are required for independent learning.

4.1.3 Teacher support during school closures

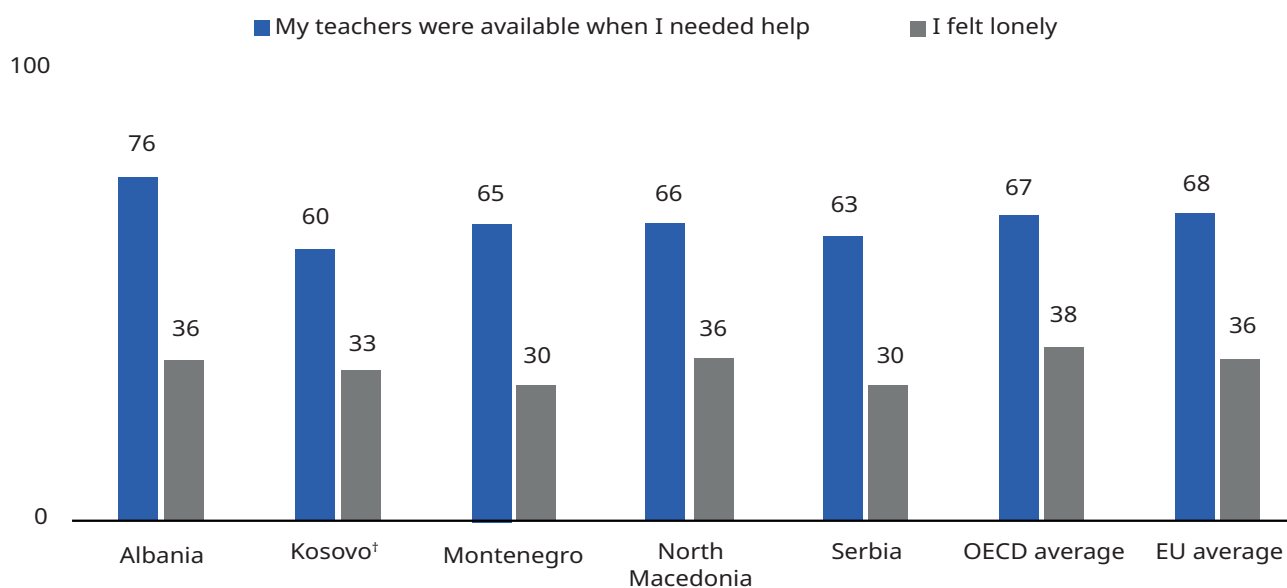
PISA 2022 results suggest that students' experience with remote learning was generally not positive in the Western Balkans.

About one third of students across the region agreed or strongly agreed that they felt lonely, and only about half reported feeling motivated to learn. Moreover, teacher support and preparation appeared to be lacking during remote learning: about one third of students disagreed or strongly disagreed that their teachers were available when they needed help or that their teachers were well-prepared to provide instruction remotely.

Within the Western Balkans, some variations were observed in students' experiences with remote learning, particularly regarding teacher support. For instance, whereas 76 per cent of students in Albania agreed or strongly agreed that their teachers were available when they needed help, only 60 per cent of students in Kosovo reported the same (see Figure 4.5).

FIGURE 4.5 Teacher support and students' loneliness

Percentage of students who agreed or strongly agreed with the following statements about the time when their school building was closed because of COVID-19



Note: † Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

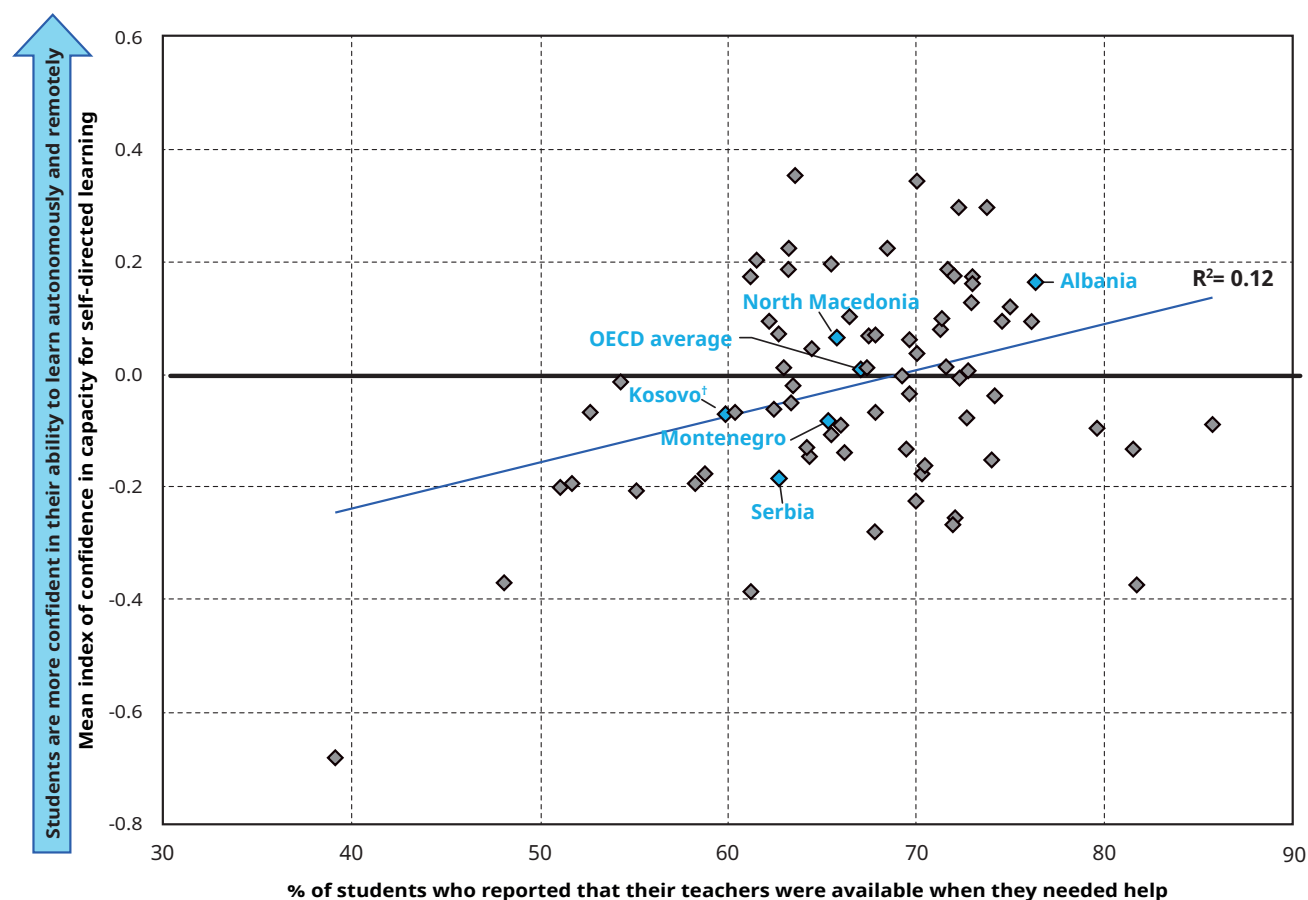
Source: OECD 2023a (Table II.B1.2.24).

Overall, PISA 2022 results suggest that students in education systems that ensured a more positive learning experience during school closures – such as those providing stronger teacher support – showed more confidence in their ability to learn autonomously and remotely if their school closes again in the future. In Albania, three in four students reported that their teacher was

available when they needed help during school closures and demonstrated above-average confidence in their capacity for self-directed learning in 2022. Conversely, in Kosovo, fewer students reported experiencing similar levels of teacher support, and students were also less likely to report feeling confident in their ability to learn independently (see Figure 4.6).

FIGURE 4.6 Teacher support and students' confidence in their capacity for self-directed learning

Based on students' reports of their experience during COVID-19 school closures



Note: † Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

Source: OECD 2023a (Tables II.B1.2.5 and II.B1.2.24).

Providing adequate teacher support proves essential to facilitating student engagement and effective learning during school disruptions. To achieve this, Western Balkan systems must ensure teachers themselves are well-prepared for remote instruction. PISA 2022 data suggest that the pandemic propelled efforts to prepare for remote learning, including increasing teacher preparedness. For instance, when asked about pre-COVID standard practices, only about one fifth of students on average across the region were in schools that provided teaching staff with training on the use of video communication programmes and access to digital resources for remote instruction. In contrast, about three quarters of students were enrolled in schools where these actions have since been implemented in response to the pandemic.

Continuing concrete measures to prepare for remote instruction can help ensure teachers and students receive proper support if schools must close for an extended period in the future.

4.2 Learning environment in school

4.2.1 Teacher support, disciplinary climate and student truancy

Beyond the context of COVID-induced school closures, many students in the Western Balkans did not receive necessary and relevant support from their teachers during their mathematics lessons. On average across the region, about one third of students responded

that the following happens in only some lessons, hardly ever or never: the teacher shows an interest in every student's learning, the teacher helps students with their learning, and the teacher continues teaching until students understand. These proportions mirror those observed on average across the OECD.

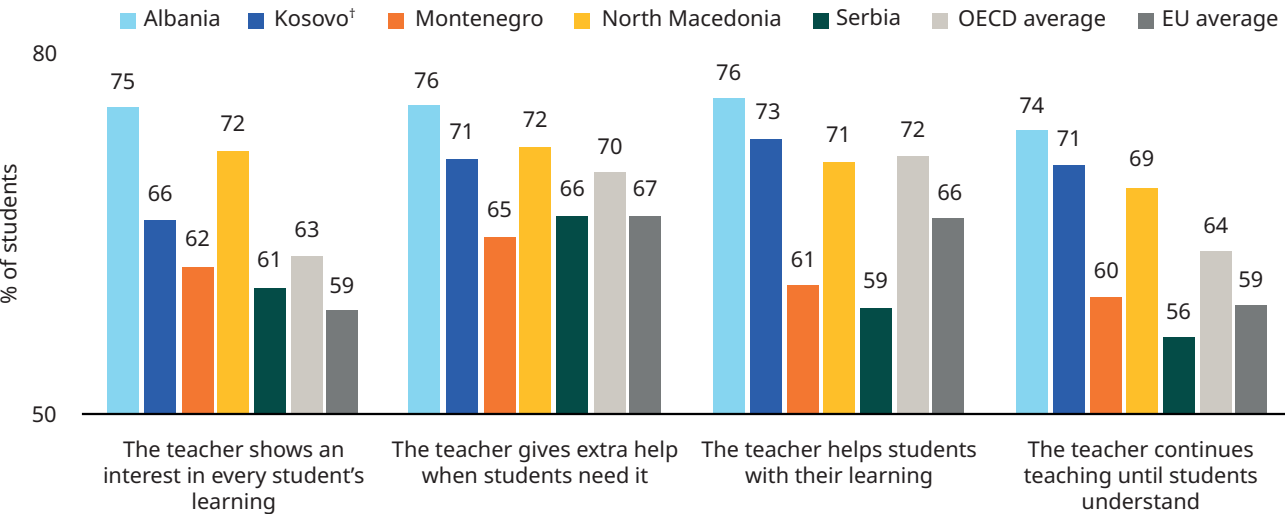
For all Western Balkan countries with data, PISA results suggest that teacher support has deteriorated between 2012 – the most recent PISA cycle where mathematics was also the main domain assessed – and 2022. During this period, Albania, Montenegro and Serbia showed decreases in the proportions of students receiving frequent teacher support. In Albania, for instance,

large declines of 15 percentage points occurred in the proportion of students indicating that in most lessons or every lesson, their teacher helps students with their learning or that their teacher continues teaching until students understand.

Within the Western Balkans, variations emerged in the proportions of students receiving frequent teacher support in their mathematics classes. For instance, at least 70 per cent of students in Albania and Kosovo reported that in most lessons or every lesson, their teacher continues teaching until students understand, whereas just over half of students in Serbia reported the same (see Figure 4.7).

FIGURE 4.7 Teacher support in mathematics classes

Percentage of students who reported that the following happens in most lessons or every lesson:



Note: † Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).
Source: OECD 2023a (Table II.B1.3.1).

In all five Western Balkan economies, students with supportive teachers tended to report less anxiety towards mathematics. After accounting for students' and schools' socio-economic profiles, the relationship between perceived teacher support and mathematics anxiety proved significant across all five countries

in the region (see Figure 4.8). This pattern was similarly observed in most PISA participating countries and economies. These findings underscore the important role of teacher support to student well-being, including fostering positive attitudes towards learning (see Box 4.2).

Box 4.2 Mathematics performance, mathematics anxiety and growth mindset

Across all Western Balkan countries, students who perform better in mathematics tend to show lower levels of mathematics anxiety. The negative relationship between mathematics performance and mathematics anxiety appeared across every education system that participating in PISA 2022, regardless of student and school characteristics (OECD 2023b). On average across the Western Balkans, a one-point increase in the mathematics anxiety index was associated with a decrease of 13 score points in mathematics, after accounting for students' and schools' socio-economic profiles.

PISA data suggest that many students in the Western Balkans report feeling anxious about mathematics. In the five Western Balkan countries, about three in five students reported that they often worry about potential difficulties in mathematics class and about receiving poor marks in mathematics.

Positive attitudes towards learning, such as a growth mindset, can help students reduce mathematics anxiety levels and its negative consequences on performance (Yeager and Walton 2011; OECD 2021c; Yeager et al. 2019). A growth mindset reflects abilities and intelligence are malleable and can develop over time; conversely, a fixed mindset assumes that people are born with unchangeable intelligence levels (Dweck and Molden 2005). Students with a growth mindset are more likely to develop their skills, maintain motivation during setbacks and experience lower anxiety about learning.

About 41 per cent of students on average across the Western Balkans, compared to over 55 per cent on average across the OECD and the EU, reported having a growth mindset (disagreeing or strongly disagreeing that their intelligence cannot change much). Across countries in the region, the relationship between holding a growth mindset and mathematics performance was varied: after accounting for students' and schools' socio-economic profiles, only in North Macedonia and Serbia positive associations between growth mindset and mathematics scores (gains of 14 and 5 score points, respectively).

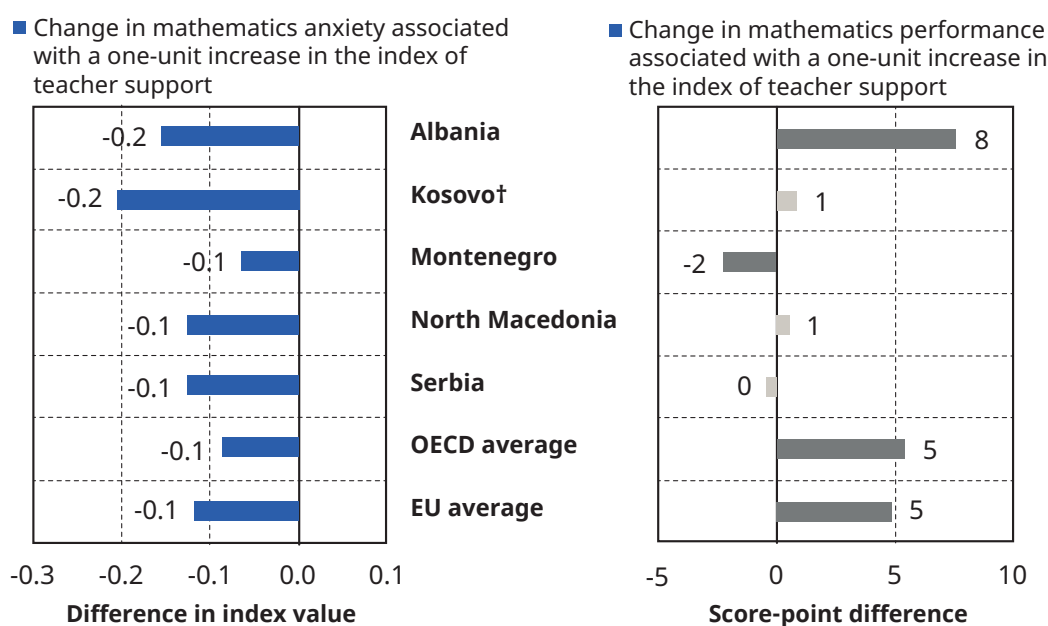
In some Western Balkan countries, having a growth mindset appeared to help alleviate the negative effects of mathematics anxiety on student performance. In North Macedonia and Serbia, students with high mathematics anxiety tended to score better in mathematics by over 10 points if they had a growth mindset than if they had a fixed mindset. Similarly, a growth mindset appeared to be related to performance even among less anxious students: those with low levels of mathematics anxiety scored better by 13 points in Kosovo and by 33 points in North Macedonia if they reported having a growth mindset versus a fixed mindset.

While the association between teacher support and mathematics anxiety remained consistent across Western Balkan countries, the relationship between teacher support and mathematics performance varied.

In Albania, a one-unit increase in the index of teacher support was associated with an improvement of 8 score points in mathematics performance (see Figure 4.8). However, in Montenegro showed the opposite trend: a one-unit increase in the teacher support index associated with a decrease of 2 score points

in mathematics. In the remaining Western Balkan countries, no significant association was found between these variables. The inconsistencies in the relationship between teacher support and mathematics achievement could reflect differences in the effectiveness of the specific teaching strategies, highlighting the need to provide teachers with training in evidence-based instructional approaches and adequate support to implement them successfully.

FIGURE 4.8 Teacher support, and anxiety towards and performance in mathematics



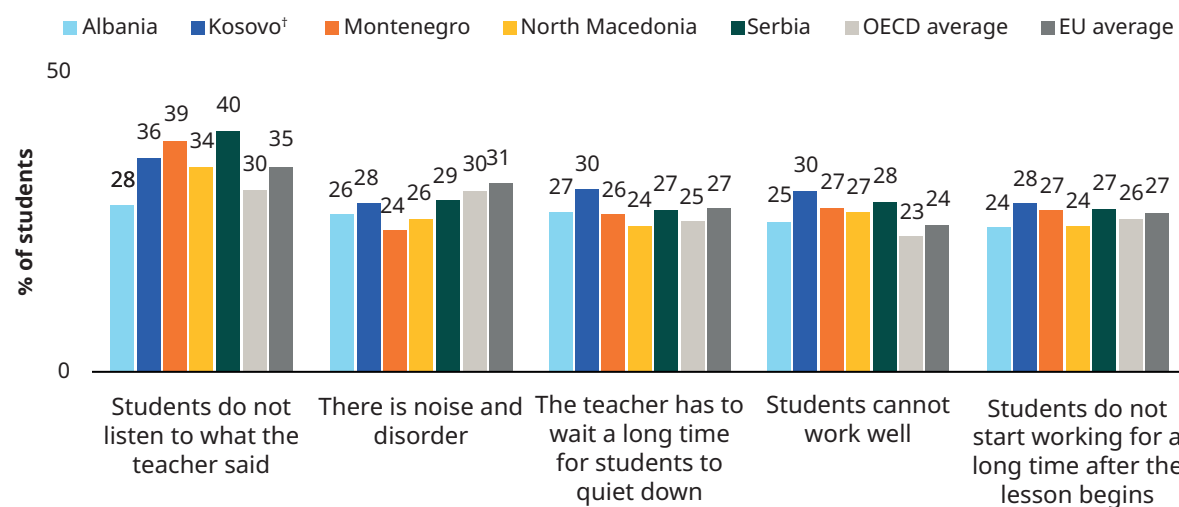
Note: Statistically significant differences are shown in a darker tone. The results are based on linear regression analysis, after accounting for students' and schools' socio-economic profile. † Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).
Source: OECD 2023a (Tables II.B1.3.5 and II.B1.3.7).

PISA results suggest that many students in the Western Balkans study mathematics in a disciplinary climate that is not favourable to learning. Within each Western Balkan economy, over a quarter of students reported that in most lessons or every lesson, disruptions occur such

that students do not listen to what the teacher said or that students cannot work well (see Figure 4.9). In Montenegro and Serbia, close to 40 per cent of students reported that in most lessons or every lesson, students do not listen to what the teacher says.

FIGURE 4.9 Disciplinary climate in mathematics lessons

Percentage of students who reported that the following happens in most lessons or every lesson



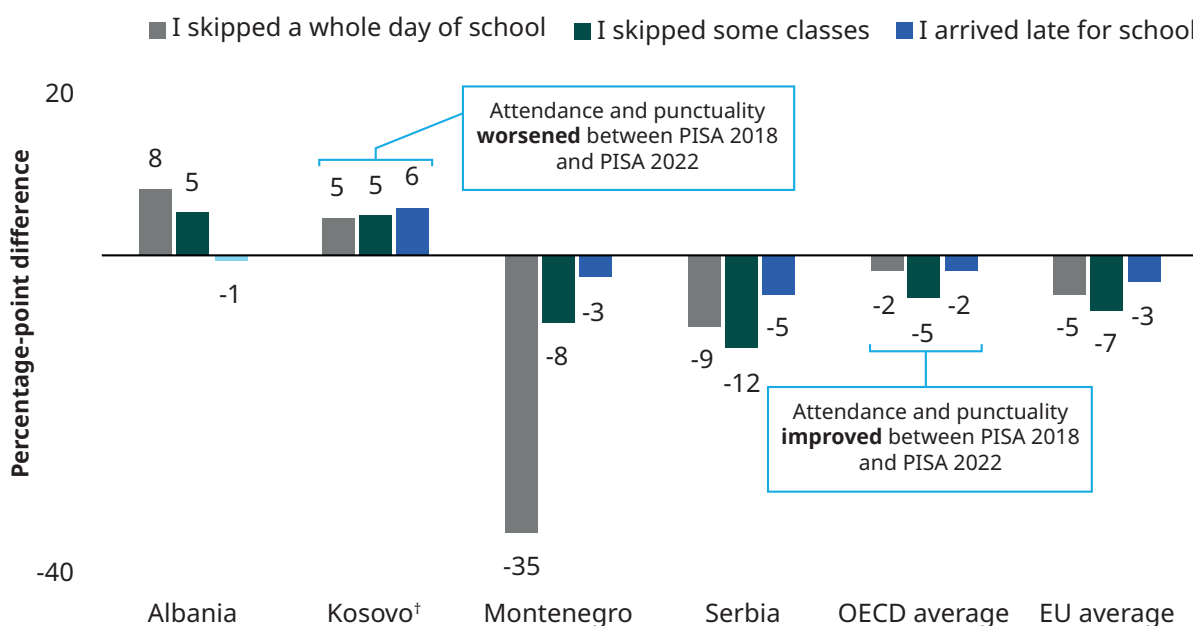
Note: † Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).
Source: OECD 2023a (Table II.B1.3.9).

In Montenegro and Serbia, regular school attendance and punctuality improved between 2018 and 2022. In Montenegro, student truancy decreased substantially: whereas 58 per cent of students reported having skipped a whole day of school in the two weeks prior to the PISA test in 2018, only 23 per cent reported the same in 2022 (see Figure 4.10). However, in Albania and Kosovo, student truancy worsened over the same period; in Kosovo, student lateness also increased. Similar patterns of worsening student attendance and punctuality were observed on average across the OECD and the EU.

Observed improvements in student attendance and punctuality could be transitory due to COVID-induced school closures. Students might have been less likely to provide accurate reports of absenteeism and tardiness during the pandemic due to the unusual circumstances and lack of direct monitoring by teachers. As schools return to normal operations, tracking student attendance becomes critical to determine whether the positive changes persist or if they revert to pre-pandemic levels.

FIGURE 4.10 Change between 2018 and 2022 in student truancy and lateness

Percentage-point difference in the shares of students who reported that the following happened at least once in the two weeks prior to the PISA test



Note: Statistically significant differences between PISA 2018 and PISA 2022 are shown in a darker tone. The OECD and EU averages in this figure are the arithmetic mean across all OECD member states and EU countries, respectively, with non-missing values in PISA 2018 and PISA 2022. Data are not available for North Macedonia. [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

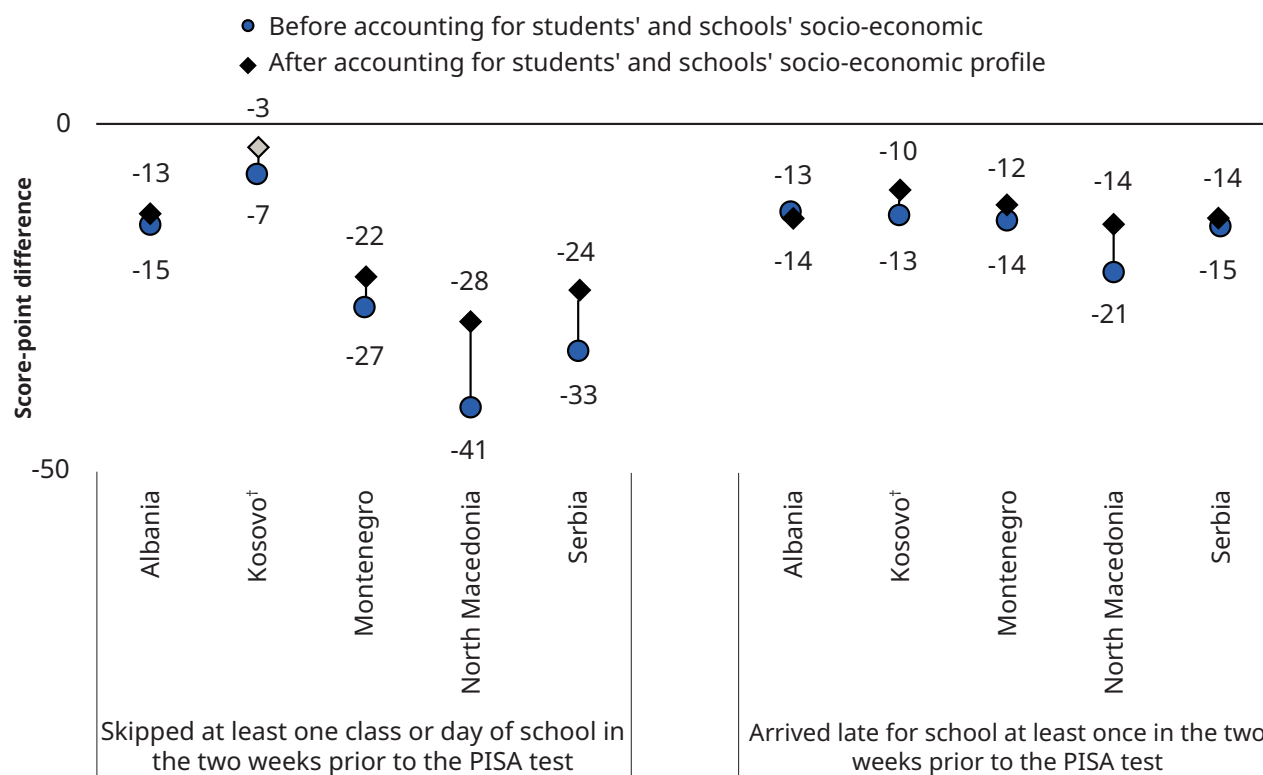
Source: OECD 2023a (Table II.B1.3.43).

In almost all Western Balkan countries, regular attendance and punctuality correlated with better mathematics performance. Only in Kosovo did student lateness show no significant relationship with mathematics scores. However, across all countries in the region, skipping at least one class or day of school in the

two weeks prior to the PISA test was associated with a decline in mathematics achievement, even after accounting for students' and schools' socio-economic profiles (see Figure 4.11). In Montenegro, North Macedonia and Serbia, these associated declines proved substantial, equivalent to over a year's worth of learning in OECD member states.

FIGURE 4.11 Student truancy and lateness and mathematics performance

Change in mathematics performance when students reported that they had skipped at least one class or day of school or arrived late for school at least once in the two weeks prior to the PISA test



Note: Statistically significant differences are shown in a darker tone. [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

Source: OECD 2023a (Tables II.B1.3.44 and II.B1.3.46).

Education systems must address barriers to schooling to encourage regular school attendance. PISA 2022 data show that students stay out of school for longer periods of time (more than three consecutive months) due to a variety of reasons. The most common reason, reported by three in four students on average across the region, was illness. While schools can do little to prevent illness, they can take action to make schools safer such as by improving sanitation and hygiene facilities. Moreover, about a quarter of students on average across the region reported that their long-term absenteeism was due to boredom, having to help with work at home or the family business, or natural disasters. These findings point to issues that can be addressed to

help prevent student truancy, such as providing teachers with the proper tools to increase student engagement, informing parents about the benefits of education,¹⁰ and strengthening disaster risk reduction and resilience in schools.

4.2.2 Use of digital devices

On average across the Western Balkans, students reported spending 1.6 hours per day on digital devices for learning activities and 1.2 hours per day on digital devices for leisure activities at school. Figure 4.12 shows the time spent on digital devices at school for learning and leisure activities and contrasts it to the time spent in regular lessons per day. While Western Balkan

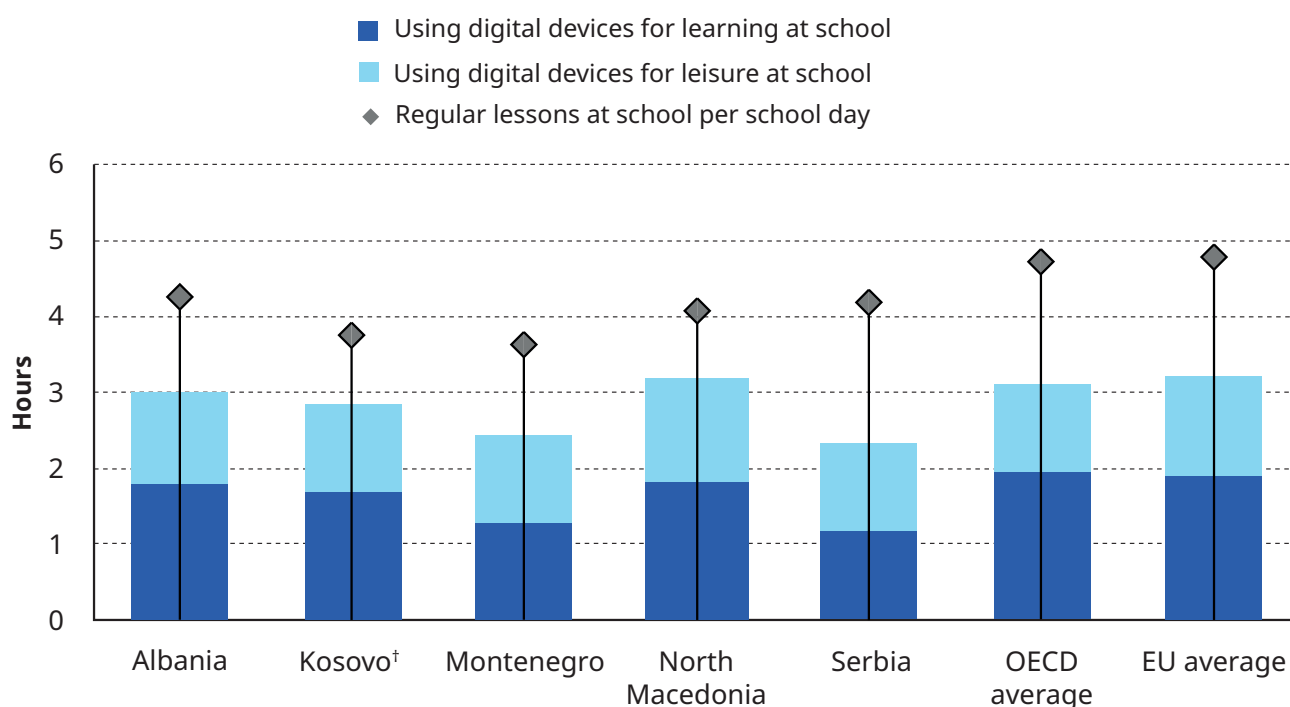
¹⁰ Providing information on the benefits, costs and quality of education is a highly cost-effective intervention to improve student learning, based on an analysis of evidence on the cost-effectiveness of education policies and programmes at scale by the Global Education Evidence Advisory Panel (Akyeampong et al. 2023).

economies showed little difference in time spent on digital devices for leisure activities, slightly greater variation was observed in time spent on digital devices for learning, ranging from 1.3 hours in Montenegro and Serbia to 1.8 hours in Albania

and North Macedonia. These findings pertain only to digital device usage at school; overall digital device usage would likely prove much higher as children and youth spend considerable time online beyond school.

FIGURE 4.12 Time spent at school in regular lessons and on digital devices

Time spent per day by students (in hours)



Note: Time spent in regular lessons at school per school day refers to the time spent in regular lessons per school week divided by five (with the assumption there are five days per school week). [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

Source: OECD 2023a (Tables II.B1.5.52 and II.B1.5.62).

Generally, significant differences in average mathematics scores were not observed between students who spent up to one hour per day on digital devices for learning at school and those who spent no time on devices. This pattern appeared across all Western Balkan economies except Kosovo, where students who spent at least one hour on digital devices for learning scored 9 points higher than those who spent no time, after accounting for students' and schools' socio-economic profiles. However, too much time spent on digital devices was associated with a decline in mathematics scores: on average across the region, students who spent at least 3 hours per day on digital devices for learning

activities scored at least 20 score points lower than those who spent only up to one hour on the same.

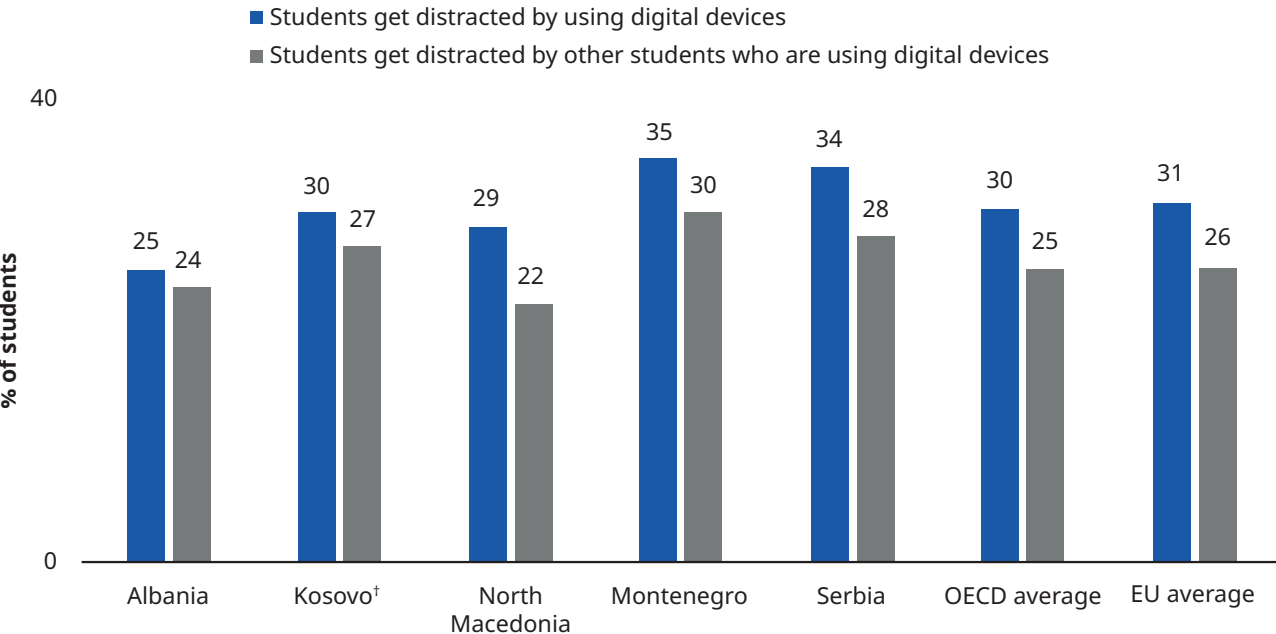
Additionally, beyond one hour of time spent on digital devices for leisure activities at school, average mathematics scores showed a pattern of decline across all Western Balkan countries. However, spending up to only one hour per day on digital devices for leisure activities at school showed mixed results across the region. Compared to those who spent no time on digital devices for leisure activities at school, students who spent up to one hour per day scored higher in Montenegro, North Macedonia and Serbia, but scored lower in Albania and Kosovo.

Moreover, large proportions of students in the Western Balkans reported that distraction from digital devices often occurs in their mathematics lessons. On average across the region, over one in four students reported that

students get distracted by using digital devices, or by other students who are using digital devices, in most lessons or every lesson (see Figure 4.13). These proportions mirror those observed on average across the OECD and the EU.

FIGURE 4.13 Distraction from digital devices in mathematics lessons

Percentage of students who reported that the following happens in most lessons or every lesson



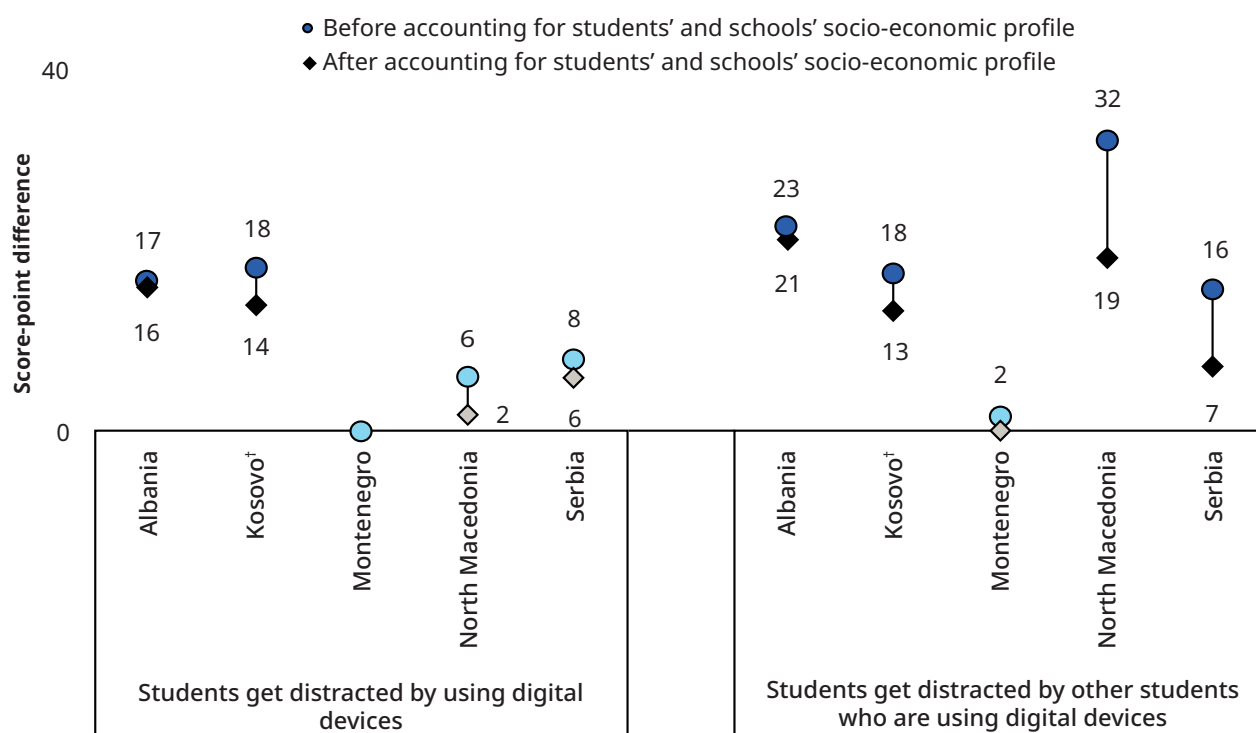
Note: [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).
Source: OECD 2023a (Table II.B1.3.9).

In the Western Balkans, the frequency with which students get distracted by peers using digital devices in class ranks among the disciplinary aspects that shows the strongest associated with mathematics performance. On average across the region, students who reported that this happens in at least some mathematics lessons scored 12 points lower in

mathematics than those who reported that this never or almost never happens, after accounting for students' and schools' socio-economic profiles (see Figure 4.14). In Albania and North Macedonia, the difference proved particularly large at over 20 score points, equivalent to more than a year's worth of learning in OECD member states.

FIGURE 4.14 Distraction from digital devices and mathematics performance

Change in mathematics performance when students reported that the following never or almost never happens in their mathematics lessons



Note: Statistically significant differences are shown in a darker tone. [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

Source: OECD 2023a (Table II.B1.3.13).

Together, these findings highlight how moderate use of digital devices in school can be benefit learning, but overuse and/or misuse can adversely impact student performance. PISA findings suggest that excessive time spent on digital devices at school, as well as frequent distractions from device usage during mathematics lessons, is associated with a decline in mathematics scores. Guidelines on effectively engaging with education technologies, including devices, platforms and content, can help ensure these tools enhance rather than hinder student learning.

4.3 Parental involvement and family support

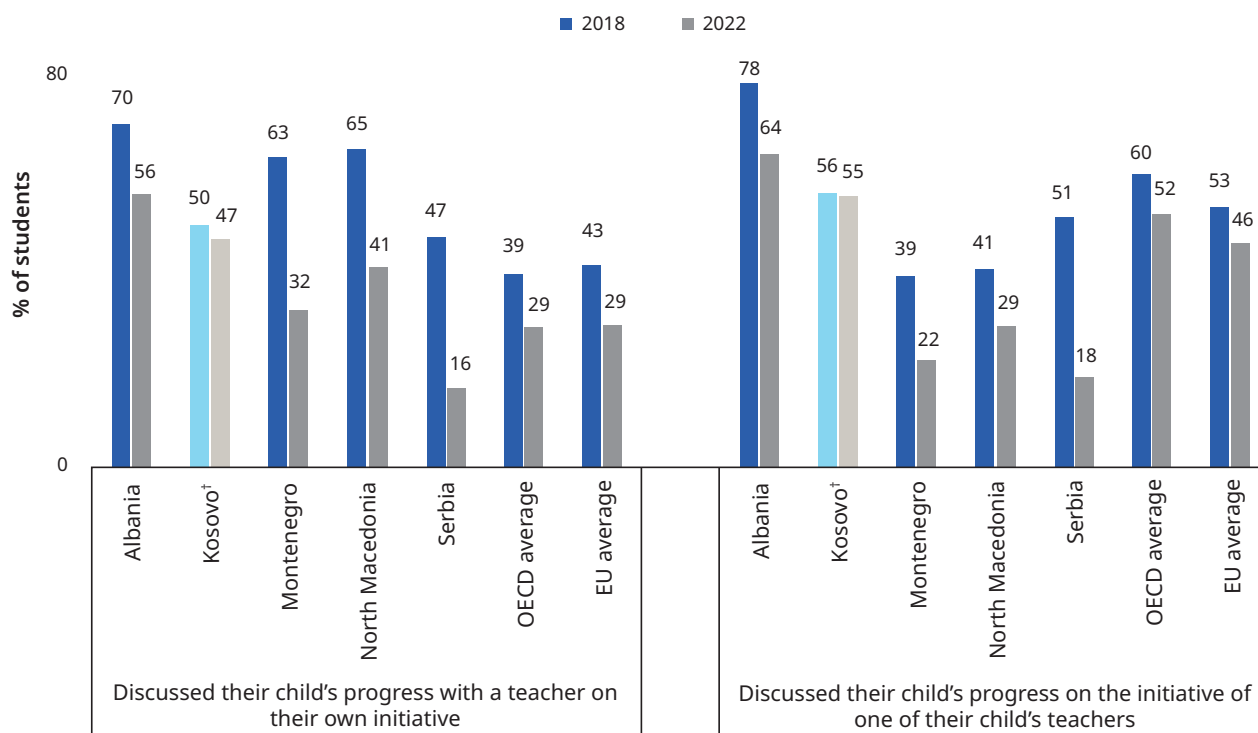
During COVID-related school closures, students' learning depended more than ever on a supportive home environment. However, PISA 2022 results suggest that in many Western Balkan countries, schools did not successfully use

the pandemic as an opportunity to strengthen school-home partnerships. On average across the region, fewer than 40 per cent of students attended schools where principals reported that most parents were involved in school-related activities.

In all Western Balkan education systems except Kosovo, parental involvement in students' learning at school significantly decreased between 2018 and 2022 (see Figure 4.15). On average across the region, the proportion of students in schools where most parents discussed their child's progress with a teacher on their own initiative shrank by 21 percentage points, while teacher-initiated discussions decreased by 15 percentage points. These declines significantly exceed those observed on average across OECD and EU averages. Within the Western Balkans, particularly large declines occurred for parent-initiated discussions, with decreases exceeding 20 percentage points in Montenegro, North Macedonia and Serbia.

FIGURE 4.15 Change between 2018 and 2022 in parent-initiated and teacher-initiated talks about students' progress

Percentage of students in schools whose principal reported that at least 50 per cent of students' parents are involved in discussing their child's progress with a teacher on their own initiative



Note: Statistically significant differences between PISA 2018 and PISA 2022 are shown in a darker tone. The OECD and EU averages in this figure are the arithmetic mean across all OECD member states and EU countries, respectively, with non-missing values in PISA 2018 and PISA 2022. [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

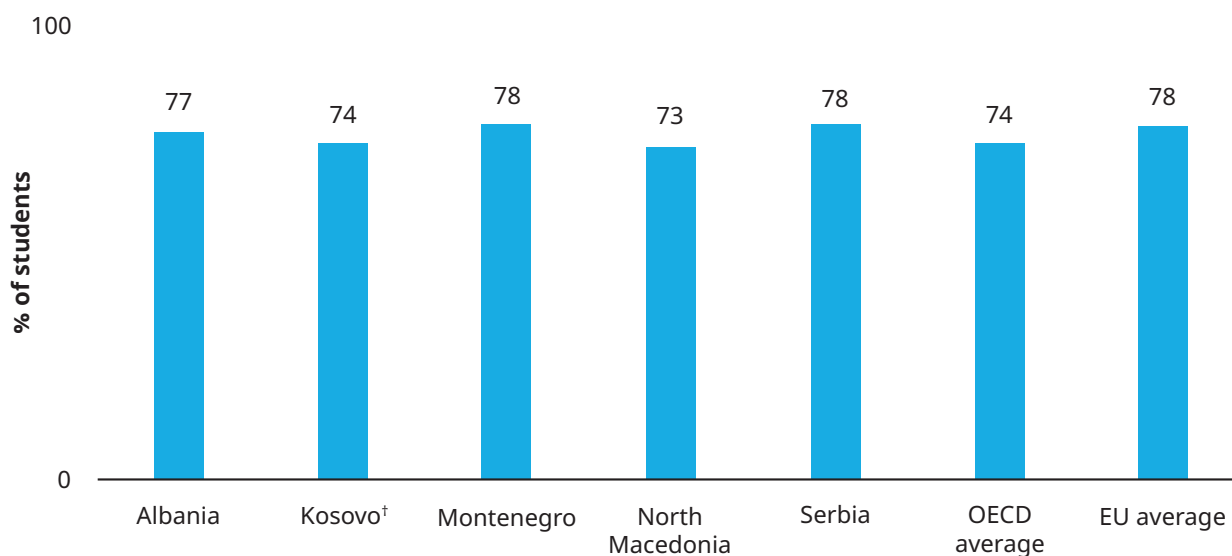
Source: OECD 2023a (Table II.B1.3.67).

Although family-school partnerships appeared relatively weak, home support tended to be generally positive in the Western Balkans. Students reported receiving family support in a variety of ways. On average across the region, about three in four students reported that their parents or someone in their family asks them

what they did in school that day at least once or twice a week (see Figure 4.16). Similar proportions of students also reported that their families eat the main meal with them, encourage them to get good marks and spend time just talking with them at least once or twice a week.

FIGURE 4.16 Percentage of students whose family regularly asks about school

Percentage of students who reported that at least once a week or twice a week their parents or someone in their family asks them what they did in school that day



Note: Statistically significant differences between PISA 2018 and PISA 2022 are shown in a darker tone. [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

Source: OECD 2023a (Table II.B1.3.69).

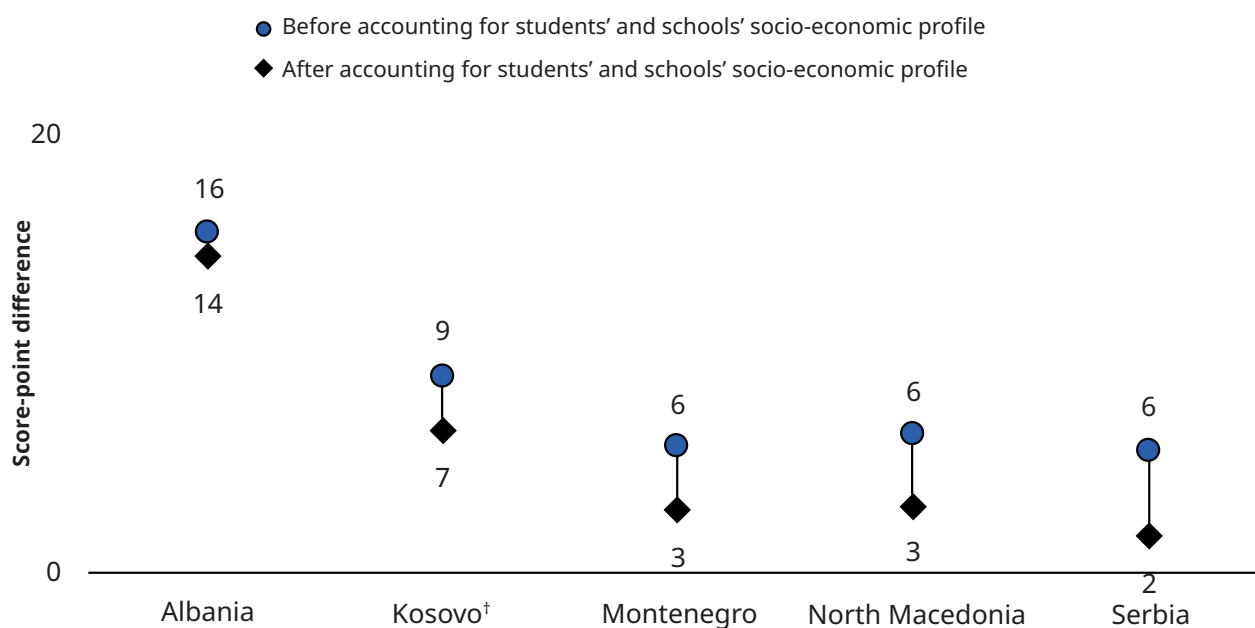
Students who reported receiving more support at home also tended to report more positive attitudes. For instance, across all Western Balkan countries with data, students with more supportive families reported a stronger sense of belonging at school, after accounting for students' and schools' socio-economic profiles. Family support also correlated with other measures of student well-being captured by PISA, including higher levels of life satisfaction, greater confidence in their capacity for self-directed learning and lower levels of mathematics anxiety.

A supportive home environment proves important not only for student well-being,

but also for student learning. In all education systems in the region, greater perceived family support was associated with an increase in mathematics performance (*see Figure 4.17*). In all Western Balkans systems except Serbia, this relationship remained significant even after accounting for students' and schools' socio-economic profiles. The strength of the relationship between family support and mathematics achievement proved particularly strong in Albania, where a one-unit increase in the index of family support was associated with an increase of 14 score points – equivalent to almost three-quarters of a year's worth of learning in OECD member states.

FIGURE 4.17 Family support and mathematics performance

Change in mathematics performance associated with a one-unit increase in the index of family support



Note: Statistically significant differences are shown in a darker tone. [†] Reference to Kosovo should be understood to be in the context of United Nations Security Council resolution 1244 (1999).



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5. STRATEGIC PRIORITIES FOR EDUCATIONAL IMPROVEMENT IN THE WESTERN BALKANS

The analysis of PISA 2022 results reveals both persistent challenges and emerging opportunities for education systems in the Western Balkans. This section synthesizes the key findings and identifies strategic priorities that could form the foundation for comprehensive educational improvement in the region. While some positive trends emerge, such as relatively strong student sense of belonging to school and increasing educational aspirations, Western Balkans education systems continue to face significant challenges. These include high proportions of students not achieving basic proficiency levels, substantial equity gaps in resource allocation and learning outcomes, and the need to strengthen teaching quality and digital learning capacities.

The findings point to five interconnected strategic priorities that policymakers should consider as part of education reform agendas.

- Priority #1: Address resource inequities and improve funding efficiency
- Priority #2: Ensure mastery of basic skills
- Priority #3: Revitalize teaching quality and teacher support
- Priority #4: Harness the potential of edtech to improve access to and quality of education
- Priority #5: Strengthen educational pathways and support high educational aspirations
- Priority #6: Strengthen student engagement and well-being

For each priority area, this section outlines evidence-based strategies drawn from both international experience and successful practices within the region. While these priorities prove relevant across all Western Balkan systems, their relative importance and specific implementation approaches vary by context. For instance, Kosovo faces particular urgency in addressing basic proficiency, with 85% of students performing below baseline levels in mathematics. Serbia's relatively stronger performance suggests potential lessons in curriculum design and implementation for regional peers. Montenegro's experience with digital learning during the pandemic offers insights for strengthening edtech capabilities across the region. Albania's strong correlation between family support and student performance highlights the importance of school-family partnerships.

Additionally, the analysis reveals how these priorities interact with and reinforce each other. Efforts to improve basic skills cannot succeed without addressing resource inequities and strengthening teaching quality. Digital learning transformation requires attention to both infrastructure and teacher capacity building. This interconnectedness suggests the need for comprehensive rather than piecemeal reform approaches.

Moving forward, education systems in the Western Balkans will need to carefully sequence and

prioritize reforms based on their specific contexts and capacities. While the challenges are significant, PISA results also reveal important strengths to build upon, including generally positive student attitudes toward learning and examples of effective practices within the region. Success will require sustained commitment, coordinated action across multiple stakeholders, and careful attention to both equity and quality throughout the reform process.

5.1 Address resource inequities and improve funding efficiency

Among Western Balkan countries with available data, government expenditure remains below the international benchmarks of allocating at least 4–6 per cent of GDP and/or at least 15–20 per cent of total public expenditure to education (UNESCO-UIS 2024). PISA 2022 data likewise show a need to increase the overall level of funding for education, with cumulative spending per student among Western Balkan countries much lower than on average across the OECD and the EU.

PISA results also suggest that the efficiency of spending must be improved: at similar or even lower levels of spending, other economies such as Mongolia and Baku (Azerbaijan) have achieved better student performance compared to Western Balkan countries. In the Western Balkans, education financing remains based on inputs (e.g., teaching hours, teaching staff availability) rather than on the number of students (OECD 2022).

PISA 2022 data also reveal significant disparities in resource allocation across Western Balkan education systems, with disadvantaged and rural schools particularly affected. The analysis shows that over half of students across the region attend schools where principals report shortages of educational materials hindering instruction – more than double the OECD average. These inequities extend beyond physical resources to digital infrastructure and human resources. The disparities are even more pronounced in rural areas, with PISA data showing that students in rural schools in Albania and North Macedonia face significantly greater resource constraints than their urban peers. This analysis shows that

resource challenges vary significantly by country context. In Albania, 21 per cent of students attend rural schools where resource shortages are most acute. Montenegro and Serbia report lower shares of rural students but face challenges in efficient resource allocation given demographic changes and declining student populations.

To address these systemic inequities, several evidence-based strategies emerge:

Reform funding mechanisms to better align resources with student and school needs. This includes implementing transparent per capita funding formulas that include equity adjustments for disadvantaged populations and developing targeted funding streams for schools serving disadvantaged populations. Albania's transport subsidies for rural teachers (Maghnouj et al. 2020a) demonstrate successful targeted support. This approach proves particularly relevant for Kosovo and North Macedonia, where socio-economic disparities in resource allocation showed the largest gaps.

This approach recognizes that instructional costs in disadvantaged contexts may be higher. Per capita financing formulae should consider various school characteristics: geographic location (urban/rural), school size, minority school status, presence of migrant students, and multiple languages of

instruction. Student-specific factors must include grade level, special needs status, and participation in adult, evening or distance learning programmes (Alonso and Sanchez 2011). Poland's successful model incorporates comprehensive equity criteria, accounting for proportions of students with disabilities, or immigrant backgrounds, schools in remote or high-cost locations, and schools with special subject offerings such as minority languages (OECD 2021b).

Countries need to **optimize resource allocation while ensuring equity**. This includes rationalizing school networks including through school consolidation and developing resource sharing mechanisms between schools, especially relevant for countries where geographic disparities are largest. In contexts with numerous schools serving relatively few students, rationalizing school networks and classrooms can help make education provision more efficient and effective (OECD 2022). This becomes increasingly important considering demographic changes in the region. However, consolidation efforts must carefully consider access implications and include support measures like transportation services or digital learning options for remote areas.

Countries should also **strengthen monitoring and accountability for resource use** including through implementing transparent tracking



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systems for educational spending, building on Serbia's experience with improved financial management systems and developing school-level reporting mechanisms that link resource allocation to student outcomes. This proves particularly important in Kosovo and Montenegro where resource efficiency challenges are most acute.

5.2 Ensure mastery of basic skills

The analysis reveals a profound challenge across Western Balkan education systems: large proportions of 15-year-old students are not mastering basic skills. Only about one third of students achieve basic proficiency in mathematics, significantly below OECD and EU averages. This challenge extends across subjects and appears particularly acute in reading, where performance gaps with international benchmarks are largest.

International assessment results reveal a concerning pattern of declining performance as students' progress through the education system. While PIRLS 2021 shows relatively stronger reading performance at Grade 4 (age 10) – with Albania achieving a score of 492 points and Montenegro scoring 474 points – 15 years of age, PISA 2022 results show a marked decline in student achievement. Similarly, TIMSS 2019 results for Grade 4 mathematics showed North Macedonia scoring 472 points and Montenegro achieving 453 points, yet by age 15, PISA 2022 mathematics results show significantly lower achievement levels relative to international benchmarks. This pattern suggests that while the foundation for learning is established in early primary grades, significant learning momentum is lost as students' progress through upper primary and lower secondary education.

To address this fundamental challenge, education systems could consider several evidence-based strategies:

First, strengthen learning progression across pre-primary, primary and lower secondary education. This comprehensive approach involves multiple interconnected strategies:

- Implementing systematic assessment frameworks across grade levels to track student progress and identify where

learning gaps begin to emerge. This will also help in identifying struggling students early in their educational journey. Regular diagnostic assessments across all grades should track student progress in foundational skills, coupled with clear intervention protocols for when students fall behind. These assessments should be designed to provide actionable information to teachers alongside appropriate support resources and intervention strategies.

- Providing targeted interventions through structured support programmes at key transition points, particularly at upper primary and lower secondary levels where achievement gaps often widen. These evidence-based interventions should include small-group instruction, additional learning time, and specialized learning materials. The approach should accommodate different learning needs while maintaining high expectations for all students. Programmes like Teaching at the Right Level, which has shown success in other contexts, could be adapted for Western Balkan systems.
- Ensuring curriculum coherence and effective teaching practices across all grades. This requires careful attention to learning progression alignment while preserving play-based and experiential learning approaches appropriate for young children. Curriculum frameworks should clearly articulate foundational skills development across levels and guide teachers in supporting this progression.

Second, enhancing instructional effectiveness across all grade levels through evidence-based teaching practices proves crucial given PISA data showing inconsistent relationships between teacher support and student outcomes across the region. This requires several coordinated approaches:

- Strengthening pedagogical preparation in initial teacher education, focusing on evidence-based practices for teaching foundational skills and strategies for upper and lower secondary grades. This should include extensive practical experience with diverse learners and specific

training in identifying and supporting struggling students. Teacher preparation programmes should align closely with school realities and current research on effective instruction.

- Providing structured guidance on effective teaching practices, particularly for core subjects, including detailed instructional guides, sample lesson plans, and assessment tools that teachers can adapt to their contexts. The guidance should be practical and classroom-focused while maintaining high standards. Regular opportunities for teachers' collaboration and sharing practices should be built into school schedules.
- Implementing classroom observation and feedback systems focused on improving instruction. These systems should support teacher growth rather than just evaluation, with clear rubrics aligned to professional teaching standards. Feedback should be specific, actionable, followed by professional development opportunities aligned to identified needs.

Third, developing comprehensive learning recovery programmes is essential given the widespread nature of learning gaps. This requires a systemic approach including:

- Implementing accelerated learning programmes focusing on essential skills while maintaining high expectations. These programmes should be carefully designed to help students catch up without sacrificing rigor, using focused instruction on key concepts, additional learning time and targeted support for struggling learners.
- Extending learning time through well-designed after-school or summer programmes that provide structured opportunities for additional learning. These programmes should be planned to avoid student fatigue and include engaging activities that reinforce core academic skills while maintaining student interest.



- Using formative assessment systematically to guide instruction and monitor student progress. Teachers should receive training in using assessment data to adjust teaching and provide targeted support. Assessment systems should provide timely, actionable information while avoiding excessive testing.

5.3 Revitalize teaching quality and teacher professional development

The analysis highlights significant challenges in teaching quality and effectiveness across the region. In Montenegro and Serbia, nearly 40 per cent of students report that students don't listen to teachers in most lessons. Teacher support shows inconsistent relationships with student performance – positively correlated in Albania but negatively in Montenegro – suggesting varying effectiveness in teaching practices. Country-specific challenges emerge: Albania shows declining teacher support since 2012, with a 15-percentage point drop in students reporting regular teacher help. Serbia faces an aging teaching workforce, while North Macedonia struggles with oversupply of teachers despite quality concerns.

The inconsistent relationship between teacher support and student performance, coupled with high rates of classroom disruption and declining parental engagement, suggests systemic issues in teaching effectiveness. These challenges begin with teacher preparation and extend throughout the teaching careers.

To address these challenges, countries should consider:

Strengthen teacher preparation through reforming initial teacher education (ITE).

In Albania, ITE programmes have no commonly agreed core, resulting in large variations between programmes offered in different universities. In Serbia, teachers specializing in particular subjects can come from university programmes that do not specialize in training teachers, which can result in teachers entering classrooms with limited knowledge or practical training (OECD 2022). Ensuring professional standards are fully and consistently linked to ITE programs can help boost the quality of teachers.

Strengthen and implement more rigorous selection criteria into ITE. The lack of selection criteria into ITE has resulted in a teacher oversupply, particularly in North Macedonia (OECD 2022). To improve the teacher caliber, entry standards into ITE should become more stringent and link to projected teacher workforce needs. Certification processes need review to ensure they are valid and reliable measures of teacher quality. Currently, certification programmes in the region tend to measure theoretical knowledge rather than practical pedagogy (Maghnouj et al. 2020a; Maghnouj et al. 2020b), potentially resulting in teachers unprepared for classroom practice.

Additionally, incentives can improve the prestige and attractiveness of the teaching profession. Such efforts are critical for all education systems, especially in the case of Serbia's ageing and shrinking teacher workforce. Merit-based scholarships and financial aid mechanisms can attract qualified individuals to enter pre-service teacher training institutions. Effective and efficient compensatory systems, improved working conditions in schools, and continuous and fair opportunities for career advancement can help raise the prestige and

attractiveness of the teaching profession.

Teachers must be given opportunities for continuous professional development, a critical need for the Western Balkans as highlighted by both PISA data and previous reviews of the region (OECD 2021a).

PISA results indicate relatively low levels of teacher support, frequent classroom disruptions and weak family-school partnerships, providing insight into target areas for teacher support. Equipping teachers with supportive practices – such as targeting teaching to students' learning levels, strengthening classroom management strategies and promoting family involvement – can help teachers build essential skills that can boost student performance.

Additionally, incentives can be provided to encourage participation in professional development, such as making professional development an integral and mandatory part of career advancement processes.

Financial constraints and dissatisfaction with available training (courses not aligned with teachers' needs) present primary obstacles to in-service teacher training participation. One way to encourage teachers to invest in their continuous professional development is by linking career progression and compensation to results from teacher appraisals. For instance, in Singapore offers an effective model: promotion decisions consider three years of annual performance appraisals and professional portfolios. Upon promotion, the Ministry of Education and the National Institute of Education provide teachers free courses and training relevant to their new positions (Maghnouj et al. 2020a).

5.4 Harness the potential of edtech to improve access to and quality of education

The analysis reveals a complex digital education landscape in Western Balkan schools. The region faces challenges in both access to and effective use of digital technologies. PISA data has highlighted that many students lacked access to adequate and high-quality digital resources (desktop or laptop computers, internet access, learning management systems) in schools, particularly in disadvantaged contexts. While



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moderate use of digital devices (up to one hour daily) shows neutral or positive associations with learning outcomes, over 25% of students report frequent digital distractions in class. Further evidence that builds on available findings and examines the impact of devices (as well as other factors) on teaching and learning is needed.

Western Balkan countries have made commendable efforts to develop digital education strategies, integrate digital learning into education sector policies, strategies and ongoing reforms (UNICEF 2023b). However, unlocking technology's potential requires a holistic approach to digital education and integration of technologies, going beyond simply providing devices and connectivity. Four interconnected elements should form the core of digital education: infrastructure and digital learning content, teachers' digital competencies, students' digital skills, and educational technology (edtech) governance. For the full approach to digital education, see UNICEF's Regional Digital Learning and Transformation of Education Strategy for Europe and Central Asia (UNICEF 2023a).

On infrastructure, countries need to **ensure equitable access to devices and reliable internet connectivity**, as well as quality digital learning platforms and content, particularly in disadvantaged and rural schools. Western Balkan

countries must upgrade digital infrastructure, which remains an obstacle for utilizing edtech in schools.

Teachers' digital competencies require significant strengthening. While the pandemic accelerated teacher training in digital tool use, PISA data shows that fewer Western Balkan students feel confident in using digital technology for learning compared to OECD averages. This suggests a need to deepen teacher professional development beyond basic digital skills to focus on the more advanced skills and effective pedagogical approaches for edtech integration. Digital competencies should therefore be built into national teacher competency standards, included as a key element in ITE, and integrated throughout the continuum of pre-service and in-service training.

Along with developing teachers' digital competencies, students must also develop adequate digital skills. One approach involves creating concrete frameworks for integrating digital skills and competencies into curricula. Montenegro demonstrates this through its Digital Competence Framework, aligned with the European Digital Competence Framework (OECD 2022). Schools should also establish policies and guidelines for integrating education technologies

– including devices, platforms and content – in the school environment, ensuring they are intentionally used, serve learning and children's best interests.

Countries also need **clear policies and guidelines for technology use in education**.

While evidence suggests a positive association between the intentional integration of technology in school education and student performance, the use of digital devices for leisure can also be a learning distraction (OECD 2024). The finding that over 25 per cent of students report frequent digital distractions during mathematics lessons, with associated negative impacts on performance, highlights the need for structured device use approaches. This should include establishing clear protocols for when and how devices support academic benefits through child-centred approaches.

5.5 Strengthen educational pathways and support high educational aspirations

The analysis reveals remarkably high educational aspirations among students in Western Balkan countries, with over three in four expecting to complete tertiary education – higher than OECD and EU averages. These aspirations grew significantly between 2018 and 2022 in Albania, Kosovo and North Macedonia, with increases

exceeding 10 percentage points. While high aspirations can positively influence student motivation and achievement, PISA data reveals concerning disconnects between these aspirations and current academic readiness, with large proportions of students performing below basic proficiency levels.

Significant equity gaps in educational expectations persist across the region.

In all Western Balkan countries, socio-economically advantaged students were more likely than disadvantaged students to expect to complete tertiary education. The socio-economic gap in educational expectations was at least 19 percentage points across the Western Balkans; in North Macedonia, this gap amounted to 29 percentage points. Gender gaps also emerged, with girls more likely to report expecting to complete tertiary education across all countries in the region.

The misalignment between aspirations and academic readiness poses challenges for education systems.

Only about one third of students on average across the region reached basic proficiency in mathematics, compared to about 70 per cent across OECD countries. This suggests many students may struggle with tertiary education's academic demands without significant additional support. Additionally, the virtual absence of high performers (only 0.2 per cent



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reaching levels 5–6) indicates systems are not yet effectively nurturing academic excellence needed for advanced study.

To address these challenges, Western Balkan countries should consider several evidence-based strategies:

First, strengthen academic preparation and support in secondary education. This requires implementing comprehensive approaches to boost student readiness for further education:

- Develop early warning systems to identify students at risk of not meeting academic requirements for their desired educational pathway
- Provide targeted academic support programs, particularly in core subjects
- Strengthen study skills development and academic counselling
- Create opportunities for advanced coursework for high-achieving students.

Second, diversify and strengthen educational pathways while maintaining high standards.

Currently, most Western Balkan countries have limited quality vocational or technical alternatives to traditional academic routes. Systems should:

- Improve the quality and relevance of vocational education programmes
- Create more flexible pathways between academic and vocational tracks
- Enhance the prestige of non-university pathways through quality improvements and better articulation with higher education
- Develop work-based learning opportunities in partnership with employers.

Third, implement comprehensive career guidance and counselling programs starting in lower secondary education. Students need support to make informed decisions about their educational futures:

- Integrate career guidance into the curriculum from early grades



- Provide accurate information about different educational pathways, including requirements and outcomes
- Train teachers and counsellors in career guidance
- Engage parents in educational planning discussions.

The relationship between aspirations and outcomes varies across the region, requiring tailored approaches. In Albania, for instance, where performance declined significantly while aspirations increased, there's a particular need to align support services with student ambitions.

Implementation of these strategies requires attention to several key factors: (i) building teacher and counsellor capacity to support students' educational planning, (ii) developing partnerships between secondary schools, higher education institutions, and employers, (iii) creating robust data systems to track student transitions and outcomes and, (iv) ensuring equity considerations are central to all initiatives. Experience from other countries suggests that successful implementation often begins with pilot programmes in selected schools before scaling up, allowing adaptation to local contexts and building evidence of effective practices. Regular monitoring of both implementation and outcomes proves essential to ensure initiatives effectively support students in achieving their educational aspirations while maintaining high standards.



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5.6 Strengthen student engagement and well-being

PISA 2022 reveals mixed patterns in student engagement and well-being across the region. While students generally report stronger sense of belonging than OECD averages, concerning trends emerge in attendance and classroom engagement. In Montenegro, student truancy decreased significantly (from 58 per cent to 23 per cent between 2018 and 2022), while it worsened in Albania and Kosovo.

The analysis shows varying challenges by country: Serbia reports high levels of classroom disruption, with 40 per cent of students indicating poor listening in most lessons. North Macedonia shows significant socio-economic disparities in student well-being measures. Parental involvement declined substantially between 2018 and 2022 in all countries except Kosovo, with particularly large drops in Montenegro (over 20 percentage points).

Countries need to **address both structural and social-emotional barriers to engagement**. The finding that about a quarter of students' long-term

absenteeism relates to factors such as boredom or family responsibilities highlights the need for more engaging instruction and stronger family-school partnerships. Education systems should consider developing early warning systems to identify disengaged students while simultaneously addressing root causes of disengagement.

Particular attention should be paid to **rebuilding school-family partnerships**, which deteriorated significantly between 2018 and 2022 in most Western Balkan countries. The strong positive relationship between family support and student performance – particularly pronounced in Albania where it is associated with a 14-point increase in mathematics scores – demonstrates the importance of systematic efforts to engage families in student learning.

Education systems should also **strengthen student support services**, given the mixed findings on mathematics anxiety and growth mindset across the region. This should include developing comprehensive guidance and counselling services, implementing social-emotional learning programmes, and providing targeted support for students experiencing academic anxiety or motivation challenges.

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