ACADEMIC PERFORMANCE TRENDS AND GENDER GAPS IN THE PISA CYCLES (2018, 2022 AND 2025): A DESCRIPTIVE-COMPARATIVE ANALYSIS OF NORTH MACEDONIA, KOSOVO AND ALBANIA

Lulzim MURTEZANI[1]*, Endrita ISENI[1]

1 Department of Psychology, Faculty of Philosophy, University of Tetova
*Corresponding author e-mail: lulzim.murtezani@unite.edu.mk

Abstract

This study analyzes trends in academic performance and gender differences among 15-year-old students in North Macedonia, Kosovo and Albania, based on the results of three cycles of the Program for International Student Assessment (PISA) in 2018, 2022 and 2025. The analysis relies on secondary data published by the OECD and focuses on three indicators: mean scores in reading, mathematics and science compared with the average of OECD member countries; the distribution of students by proficiency level, particularly below Level 2 and at Levels 5–6; and gender differences in performance. The results show that all three countries remain below the OECD average in all assessment domains. The share of students who do not reach Level 2 remains high, especially in North Macedonia and Kosovo, where it ranges from 64.4% to 85.1%, while in Albania it ranges from 38.5% to 50.4%. At the same time, the share of students reaching Levels 5 and 6 is low and does not exceed 1.5% in any of the countries analyzed. As regards gender differences, girls outperform boys in reading in all three countries and in all cycles analyzed. In 2025, higher results for girls are also observed in science, while in mathematics the differences between girls and boys are small. The study's findings underline the need for continuous monitoring of basic competencies, support for high-achieving students, and tracking of gender differences in academic performance.

Keywords: PISA, academic performance, gender differences, proficiency levels, North Macedonia, Kosovo, Albania, OECD.

1. Introduction and problem statement

The Programme for International Student Assessment (PISA), organized by the Organisation for Economic Co-operation and Development (OECD), assesses every three years the competencies of 15-year-old students in reading, mathematics and science [1]. Unlike tests that rely mainly on curriculum content, PISA assesses students' ability to use the knowledge and skills they have acquired in various everyday life situations. For this reason, its results are considered an important indicator of the quality and effectiveness of education systems.
In North Macedonia, Kosovo and Albania, PISA results have repeatedly drawn attention in public and professional debates on the quality of education. However, studies that simultaneously examine the course of academic performance and gender differences over longer periods remain limited. Comparing the results of the PISA 2018, 2022 and 2025 cycles offers an opportunity to observe changes in performance and in gender differences across countries and over time.

1.1 Aim of the study

The aim of this study is to analyze, in a descriptive and comparative manner, the trends in academic performance and gender differences in North Macedonia, Kosovo and Albania across the PISA 2018, 2022 and 2025 cycles. The analysis focuses on mean scores in reading, mathematics and science, on the distribution of students by proficiency level, and on gender differences in performance, comparing these indicators with the average of OECD countries.

https://doi.org/10.62792/ut.icfra.y2026.i2.pp142

2. Methodology and indicators analyzed

This study is based on a secondary analysis of data published by the OECD [1–3] for the three main PISA assessment domains: reading, mathematics and science. The target population consists of 15-year-old students enrolled in formal education (ISCED 2 or higher levels). Comparisons between assessment cycles are based on different groups of students and do not represent following the same individuals over time.
Based on the available PISA data, three main aspects of student achievement were analyzed in this paper: the mean level of performance in reading, mathematics and science; the distribution of students by proficiency level; and differences in performance between girls and boys.

2.1 Mean scores and changes in performance

Students' results, expressed in PISA points, are analyzed relative to the OECD average. To assess changes between cycles, the average of the 23 OECD member countries with comparable data for the period 2018–2025 is used, while for the 2025 comparisons the overall OECD average is used. This approach allows a more reliable comparison of results across cycles and at the same time links the 2025 results to the current OECD reference.

2.2 Distribution of students by proficiency level

The analysis examines the percentage of students below Level 2, which the OECD considers the minimum proficiency threshold, as well as the percentage of students reaching Levels 5 and 6, which represent the highest performance levels.

2.3 Gender differences in performance

To examine gender differences in performance, the difference between the mean score of boys and that of girls was calculated:
Gender difference = mean score of boys − mean score of girls
Negative values indicate that girls achieved higher results, while positive values indicate higher results for boys. Since this study relies on descriptive analysis and does not include inferential analyses of statistical significance, small differences should be interpreted with caution.

3. Results

This section presents the results of the analysis for North Macedonia, Kosovo and Albania, based on PISA 2018, 2022 and 2025 data. Since PISA provides a wide range of data and indicators, in this paper we have attempted to select those we considered most important for supporting our analysis. For this reason, attention has focused on students' mean performance, the distribution by proficiency level, and gender differences.

3.1 Mean performance and comparison with the OECD (PISA 2025)

Table 1 presents the mean results of students in North Macedonia, Kosovo and Albania in reading, mathematics and science, as well as their difference from the OECD average in 2025.

Table 1. Difference from the OECD average in PISA 2025

Domain	OECD	North Macedonia	Kosovo	Albania*
Reading	461	−104	−121	−53
Mathematics	463	−83	−113	−30
Science	482	−104	−125	−47

Note. The difference is calculated as the country's mean score minus the OECD average in 2025. Negative values indicate results below the OECD average. Calculations are based on data published by the OECD [1].

The data presented in Table 1 inform us more clearly about the position of the countries analyzed relative to the OECD average and provide a fuller picture of the differences identified in the three assessment domains.

As shown in Table 1, North Macedonia's results are 104 points lower than the OECD average in reading and science and 83 points lower in mathematics. In Kosovo, the differences from the OECD average amount to 121 points in reading, 113 points in mathematics and 125 points in science. Albania shows smaller differences from the OECD average, namely 53 points in reading, 30 points in mathematics and 47 points in science.

The comparison between countries shows that Albania has the smallest deviations from the OECD average in all three assessment domains. By contrast, Kosovo shows the largest differences from the OECD average, while North Macedonia ranks between these two countries in reading, mathematics and science.

3.2 Academic performance trends (2018–2025)

Table 2 presents data that allow a comparison of students' academic performance across the PISA 2018, 2022 and 2025 cycles.

Table 2. Mean scores (M) and changes in performance across the PISA 2018–2025 cycles

Domain	Country	PISA 2018 M (SE)	PISA 2022 M (SE)	PISA 2025 M (SE)	Δ 2018–2022	Δ 2022–2025 (SE)	Δ 2018–2025 (SE)
Reading	Albania*	405 (1.9)	358 (1.9)	408 (2.6)	−47	+49 (3.4)	+2 (3.7)
	Kosovo	353 (1.1)	342 (1.1)	340 (1.3)	−11	−2 (2.0)	−13 (2.5)
	North Macedonia	393 (1.1)	359 (0.8)	357 (1.0)	−34	−1 (1.7)	−35 (2.4)
Mathematics	Albania*	437 (2.4)	368 (2.1)	433 (2.9)	−69	+65 (3.8)	−4 (4.6)
	Kosovo	366 (1.5)	355 (1.0)	350 (1.3)	−11	−5 (2.1)	−15 (3.2)
	North Macedonia	394 (1.6)	389 (0.9)	380 (1.0)	−6	−9 (1.8)	−15 (3.1)
Science	Albania*	417 (2.0)	376 (2.2)	435 (2.7)	−41	+59 (4.7)	+18 (4.9)

Domain	Country	PISA 2018 M (SE)	PISA 2022 M (SE)	PISA 2025 M (SE)	Δ 2018–2022	Δ 2022–2025 (SE)	Δ 2018–2025 (SE)
	Kosovo	365 (1.2)	357 (1.3)	357 (1.3)	−8	0 (3.6)	−8 (3.9)
	North Macedonia	413 (1.4)	380 (0.9)	378 (1.0)	−33	−1 (3.4)	−35 (3.9)

Note. M = mean; SE = standard error; Δ = change in points between cycles. Data adapted from [1, 3]. Albania's results in PISA 2025 should be interpreted with caution because of the methodological limitations reported by the OECD.

As shown in Table 2, in North Macedonia the results in reading and science are lower in 2022 than in 2018, by 34 and 33 points respectively, while in mathematics the difference is 6 points. Between 2022 and 2025 the movements are small, ranging from −1 to −9 points.
In general, in North Macedonia and Kosovo the 2025 results remain below the levels recorded in 2018 in all three assessment domains. In Albania, the 2025 results are close to those of 2018 in reading and mathematics, while higher values are reported in science. The interpretation of these differences remains conditional on the methodological limitations reported for Albania's 2025 data.

3.3 Achievement by proficiency level

To complete the picture of students' academic achievement, Table 3 presents data on their distribution by proficiency level, with particular emphasis on students below Level 2 and those reaching Levels 5 and 6.

Table 3. Percentage of students below Level 2 and at Levels 5–6 in PISA 2025

Domain	Country	Below Level 2 (%)	Δ (2018–2025), pp	Levels 5–6 (%)
Reading	North Macedonia	73.6	+18.5	0.0
	Kosovo	84.0	+5.3	0.0
	Albania*	50.4	−1.8	0.1
	OECD	31.0	—	5.5
Mathematics	North Macedonia	67.9	+6.9	0.8
	Kosovo	85.1	+8.5	0.0
	Albania*	44.7	+2.3	1.5
	OECD	34.8	—	7.8
Science	North Macedonia	64.4	+15.0	0.2
	Kosovo	78.5	+1.9	0.0
	Albania*	38.5	−8.4	0.5
	OECD	25.7	—	7.2

Note. pp = percentage points. Positive values in the Δ (2018–2025) column indicate an increase in the percentage of students below Level 2 between the PISA 2018 and 2025 cycles. A value of 0.0% does not indicate an absence of students at these levels, but a percentage smaller than the reporting threshold (0.05%). Adapted from [1–3].

As seen in Table 3, the percentage of students who do not reach Level 2 remains high in all three countries analyzed. In Kosovo, 84.0% of students in reading, 85.1% in mathematics and 78.5% in science were below this proficiency level in 2025. In North Macedonia, the corresponding percentages were 73.6% in reading, 67.9% in mathematics and 64.4% in science.
The comparison between 2018 and 2025 shows an increase in the percentage of students below Level 2 in most indicators for North Macedonia and Kosovo. In North Macedonia, the largest increase is observed in reading (+18.5 percentage points), while in Kosovo it is in mathematics (+8.5 percentage points). For Albania, the percentage of students below Level 2 decreased by 1.8 percentage points in reading and by 8.4 percentage points in science, while in mathematics it increased by 2.3 percentage points. These results should be interpreted with caution because of the methodological limitations reported by the OECD.

3.4 Gender differences in performance (Boys − Girls)

Table 4 presents the mean differences in performance between boys and girls in reading, mathematics and science in the PISA 2018, 2022 and 2025 cycles. The differences are calculated as the mean score of boys minus the mean score of girls. Negative values indicate higher results for girls, while positive values indicate higher results for boys.

Table 4. Mean differences by gender (Boys − Girls) in PISA 2018, 2022 and 2025

Domain / Country	2018 Difference (SE)	2022 Difference (SE)	2025 Difference (SE)	Change 2018–2025 (SE)	Change 2022–2025 (SE)
Reading					
North Macedonia	−52 (2.5)	−26 (1.8)	−31 (2.1)	+20 (3.1)	−5 (2.8)
Kosovo	−24 (2.0)	−25 (1.8)	−38 (2.0)	−14 (2.7)	−13 (2.6)
Albania	−38 (2.2)	−40 (2.5)	−32 (2.4)	+6 (3.4)	+8 (3.5)
Science					
North Macedonia	−15 (3.1)	−15 (3.3)	−20 (2.6)	−5 (4.1)	−5 (4.3)
Kosovo	+4 (2.2)	−5 (2.2)	−18 (2.0)	−23 (2.9)	−13 (2.9)
Albania	−16 (2.4)	−23 (2.3)	−20 (3.2)	−3 (4.0)	+3 (3.9)
Mathematics					
North Macedonia	−7 (2.2)	−6 (1.8)	−2 (1.8)	+5 (2.9)	+4 (2.5)
Kosovo	+4 (2.0)	0 (1.8)	−1 (2.0)	−5 (2.8)	−1 (2.6)
Albania	−5 (2.7)	−19 (2.0)	+1 (1.9)	+6 (3.3)	+20 (2.7)

Note. Values represent the difference in points between the mean scores of boys and girls (boys' score − girls' score). Negative values indicate higher results for girls, while positive values indicate higher results for boys. Adapted from [1].

As seen in Table 4, girls have higher results than boys in reading in all three countries and in all cycles analyzed. In 2025, the difference was −31 points in North Macedonia, −38 points in Kosovo and −32 points in Albania. Compared with 2018, the gender gap in reading has widened in Kosovo, while it has narrowed in North Macedonia and Albania.
In science, the 2025 results also show an advantage for girls in all three countries. The most notable change is observed in Kosovo, where the difference went from +4 points in 2018 to

−18 points in 2025. In North Macedonia and Albania, girls maintained their advantage throughout the period analyzed, albeit with small fluctuations between cycles.
In mathematics, gender differences are smaller compared with reading and science. In 2025, the difference was −2 points in North Macedonia, −1 point in Kosovo and +1 point in Albania. These values show that the results of girls and boys are very close in this domain.

4. Interpretation and discussion

The results of the study highlight two features common to the education systems of North Macedonia, Kosovo and Albania: a high percentage of students who remain below the minimum proficiency threshold, and a low percentage of those who reach the higher performance levels.
According to the OECD framework [3], Level 2 is considered the baseline level of proficiency, at which students are expected to be able to use the knowledge and skills they have acquired in various situations and to interpret information appropriately. The data of this study show that a considerable share of students in Kosovo and North Macedonia remains below this threshold. In 2025, more than four fifths of students in Kosovo did not reach Level 2 in reading and mathematics, while in North Macedonia the percentage of students below this level ranged from 64.4% to 73.6%, depending on the assessment domain.
In this regard, Willms [4] stresses that the distribution of students by performance level is an important indicator of educational equity. High percentages of students below Level 2 suggest that a large number of them do not possess the competencies that the OECD considers fundamental for effective participation in learning and in everyday life.
On the other hand, the percentage of students reaching Levels 5 and 6 remains very low in all three countries. In 2025, this percentage did not exceed 1.5% in any of the assessment domains, while the OECD average ranged between 5.5% and 7.8%. According to Hanushek and Woessmann [5], high levels of proficiency are particularly important for the development of human capital and the innovative potential of societies. Along the same lines, Schleicher [6] argues that advanced problem-solving skills are linked mainly to students who reach the highest performance levels.

4.1 Gender differences in performance

The analysis of results by gender shows differences in reading, science and mathematics, both in direction and in the size of the gap between girls and boys.
Reading performance. In all three countries and in all cycles analyzed, girls perform better than boys. In 2025, the difference ranged from −31 points in North Macedonia to −38 points in Kosovo. Compared with 2018, the gender gap in reading has widened in Kosovo, while it has narrowed in North Macedonia and Albania.
Science performance. In 2025, girls also score higher in science in all three countries. The most pronounced change is observed in Kosovo, where the difference went from +4 points in 2018 to −18 points in 2025. In North Macedonia and Albania, the advantage of girls remains present throughout the period analyzed.
Mathematics performance. Gender differences in mathematics are markedly smaller than in reading and science. In 2025, the difference was −2 points in North Macedonia, −1 point in Kosovo and +1 point in Albania, showing almost identical results between girls and boys.
The literature offers several possible explanations for these patterns. Some authors link gender differences to factors such as school engagement, motivation to learn, social and cultural norms, and academic self-perception [7, 8]. However, since this study relies on aggregate PISA data, the influence of these factors cannot be verified directly. For this reason, these

interpretations should be considered theoretical explanations and not empirical conclusions of the study.
The literature also shows that girls' higher performance in pre-university education does not necessarily translate into equal representation in the labor market or in STEM fields (science, technology, engineering and mathematics) in adulthood [8].

5. Findings and conclusions

The analysis of the PISA 2018, 2022 and 2025 results shows that North Macedonia, Kosovo and Albania continue to remain below the OECD average in reading, mathematics and science. Nevertheless, the data inform us that, despite the differences between the countries, some characteristics are common to all three education systems.
In addition to mean results lower than the OECD average, a considerable share of students, especially in Kosovo and North Macedonia, does not reach Level 2 of proficiency. These data show that the difficulties are related not only to the mean level of performance, but also to the proportion of students who do not attain basic competencies.
Likewise, the percentage of students reaching Levels 5 and 6 remains low in all three countries. This informs us that the representation of students with very high achievement continues to be limited in reading, mathematics and science.
In terms of gender, the results show a consistent advantage for girls in reading throughout the period analyzed. In 2025, girls also scored higher in science, while in mathematics the differences between girls and boys remained small. The results show that mathematics presents the smallest gender differences compared with reading and science.

6. Recommendations for education policies

Based on the results analyzed, several possible directions for education policies can be suggested. However, these recommendations should be viewed with caution, since students' academic performance is influenced by a range of educational, social, economic and cultural factors, which were not examined directly in this study.
First, it appears necessary to give increased attention to students who have difficulty achieving basic competencies in reading, mathematics and science. The data show that a considerable share of students in Kosovo and North Macedonia remains below Level 2 of proficiency, which may require additional supportive measures in the teaching and learning process.
Second, in addition to improving basic competencies, it is worth paying more attention to the development of students with high academic potential. In this regard, supplementary programs, activities and curricula that promote critical thinking, creative thinking, research work and problem solving may be considered.
Third, the results regarding gender differences point to the need for more balanced approaches to supporting students. On the one hand, forms of support for boys in reading may be considered, while on the other hand the promotion of girls' participation in STEM fields should continue.
Likewise, the digital era and the growing influence of social media are creating new circumstances that affect how students learn, communicate and build their interests. For this reason, education policies may include initiatives that strengthen digital skills, the critical use of information, and the safe management of online environments.
Finally, closer cooperation between schools, families, communities, the private sector and the labor market can create more favorable conditions for linking education with the real needs of society. In the context of rapid technological and economic change, such an approach might help better prepare students for the challenges of the future.

References

[1] OECD. 2026. PISA 2025 results (Volume I): Future-ready students. OECD Publishing. https://doi.org/10.1787/73451bc5-en
[2] OECD. 2019. PISA 2018 results (Volume I): What students know and can do. OECD Publishing. https://doi.org/10.1787/5f07c754-en
[3] OECD. 2023. PISA 2022 results (Volume I): The state of learning and equity in education. OECD Publishing. https://doi.org/10.1787/53f23881-en
[4] Willms J.D. 2018. Learning divides: Using data to inform educational policy. UNESCO Institute for Statistics.
[5] Hanushek E.A. and Woessmann L. 2015. The knowledge capital of nations: Innovation, human capital, and the economics of education. MIT Press.
[6] Schleicher A. 2018. World class: How to build a 21st-century school system. OECD Publishing. https://doi.org/10.1787/9789264300002-en
[7] Gollopeni B., Solivetti L., Kopsaj V. and Shahini Gollopeni K. 2024. PISA test: The impact of school characteristics and individual attitudes toward SES on students' academic achievement in Western Balkan countries: Case study Kosovo. Migration and Social Review, 12(2), 45–62.
[8] World Bank. 2024. Western Balkans country gender assessment: Education and labor market outcomes. World Bank Group.
[9] Gustafsson J.-E. 2021. Understanding longitudinal trends in PISA achievements: Educational policy and quality shifts. International Journal of Educational Research, 108, Article 101780. https://doi.org/10.1016/j.ijer.2021.101780
[10] OECD. 2026. Education GPS. https://gpseducation.oecd.org/
[11] OECD. 2026. PISA 2025 results: Albania. OECD Publishing.
[12] OECD. 2026. PISA 2025 results: Kosovo. OECD Publishing.
[13] OECD. 2026. PISA 2025 results: North Macedonia. OECD Publishing.