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JORDAN AND LEBANON PERFORMANCE IN INTERNATIONAL STUDENT ASSESSMENTS

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EXECUTIVE SUMMARY

Jordan and Lebanon Performance in International Student Assessments

Human capital is the key driver of a country's economic growth, and of all the different forms of long-term investment, education is quite possibly the most cost-effective, time-tested, and fundamental investment in a nation's human capital. But to assess any education system's ability to generate human capital effectively, it is essential that the education outcomes of students in that system be measured regularly and accurately, and that best-practice models be identified and implemented in its schools.

International large-scale assessments are an effective tool for countries to use in comparing their students' learning levels to those in other countries. National assessment systems measure how much students know compared to what they are supposed to know as defined in the national curriculum and national education strategy. Secondly, they measure how much students know compared to other students within the same country. But national systems cannot compare their students' knowledge to students from other countries, or gauge their achievements against the reference of international standards. For any country to know how well its education system is doing in attaining global standards of learning and skills development, participation in international large-scale student assessments (ILSAs) is essential.

Two of the best-known ILSAs are the Programme for International Student Assessment (PISA) and Trends in International Mathematics and Science Study (TIMSS). By assembling a substantial database of student outcomes from more than 100 national school systems over the last 20 years, PISA and TIMSS provide a reference standard against which a country can compare its student outcomes to those of other countries to know if changes are needed. PISA, for example, tests 15-year-old students from some 80 countries in problem solving and cognition every three years—the last "round" of testing and data collection was in 2018—then analyzes and publishes the results.

Large-scale international assessments, by enabling decision makers to compare results across countries and over time, also offer valuable insights into the characteristics of a nation's school system. ILSA has collected rich additional data that provide the evidence base for formulating targeted policies and practices to improve performance.

This report analyzes the results of various PISA and TIMSS assessment rounds conducted in Jordan and Lebanon to identify trends in achievement, provide insights into factors that contribute to better learning, and allow for cross-country comparisons. The performance of Jordanian and Lebanese students in reading, mathematics, and science is compared to student achievement in other countries. Comparisons of students' scores across a range of covariates – such as ability levels, gender, and socioeconomic background – are also presented. The PISA and TIMSS data are also analyzed to understand what factors promote or hamper student educational success in these two countries.

The report provides in-depth analysis beyond simple rankings, analyzing results for different academic subjects, grades, and years. By analyzing various factors associated with learning, especially in specific context of each country, it draws upon a broadened perspective to interpret the results in a real-world context of every day social life.

Using countries that participated in both PISA and TIMSS assessments, the results of the two evaluation systems can be presented on the same platform and scale to enable meaningful apples-to-apples comparisons. The report also addresses certain shortcomings of the assessments, particularly in sampling and coverage, and their implications for accurately measuring the learning levels of Lebanese and Jordanian students.

Student Achievement

Despite some improvements, student outcomes in Jordan and Lebanon continue to fall below expectations when viewed in an international context. The results of PISA 2018 show that Lebanese and Jordanian students' average outcomes were below the OECD average in all tested subjects.

There are, nevertheless, some differences in the performance of the two countries. **In reading**, for example, Jordanian 15-year-olds performed much better than Lebanese 15-year-olds. The gap to the OECD average was 134 points for Lebanon and "just" 68 points for Jordan – still sizeable, but about half that of Lebanon's. The good news is that both gaps have decreased since the PISA rounds of 2012 and 2015, indicating that certain improvements have occurred over time, especially in Jordan. Nonetheless, the reading gap remains considerable.

In mathematics, both countries fall below the OECD average, with Lebanon fairing slightly better but only in the TIMSS assessment. Students' performance in Jordan and Lebanon falls below the OECD average by about one standard deviation, equivalent to about 3–4 years of education. Lebanon's results are better than Jordan's on the TIMSS assessment, but the two scores are statistically similar in PISA.[i]

In science, students perform better in Jordan than in Lebanon, but the more glaring finding is that the gap to the OECD average remains substantial for both countries. In Jordan, the gap is 70–100 points, in Lebanon 110–125 points. This puts 15-year-old students in Jordan about 2–3 years of schooling behind the average OECD student in science knowledge. For Lebanon, the gap is four years or more. To put it more starkly, in science, Lebanese 15-year-olds are where 11-year-old OECD students on average are.

Given that education outcomes are a vital determinant of access to labor markets and future productivity, the PISA and TIMSS results hold vital information for estimating human capital development. The results from international assessments are incorporated into the World Bank's Human Capital Index (HCI) for both Jordan and Lebanon. Last updated in October 2020, the HCI is a composite measure that includes results from international assessments but also reflects other critical human capital indicators such as access to education and the quality of health services.

Jordan and Lebanon's low human capital outcomes are primarily attributable to their relatively low education outcomes. In practical terms, what the HCI scores tell us is that the future productivity of a child born today in Jordan is only 55 percent of what it most likely would have been if that child had optimal health and education. For Lebanon, the figure is lower still – only 52 percent.

The international assessments show that much needs to be done to improve the learning of Jordanian and Lebanese children in order to contribute to national human capital development and economic growth. The insights presented by the comparative international perspective of this report should help educationists and other decision-makers consider several critical issues that do not come into sharp focus when only student results internal to a country are examined.

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i The difference in outcomes between the PISA and TIMSS assessments may be related to better population coverage in TIMSS, which managed to include many underperforming Jordanian students who are not represented in PISA.

Inequality in Achievement and Socioeconomic Background

Students in Jordan and Lebanon on average have lower socioeconomic backgrounds than their peers in the OECD countries, and this can explain some – but not all, or even most – of the lower student achievement. In Jordan, assuming the same socioeconomic background as across the OECD on average, the reading achievement gap would decrease from about 70 points to about 55 points. In Lebanon, it would decrease from about 134 points to about 114 points. Thus, lower socioeconomic background explains only a small part of the achievement gap in both countries.

The lower-than-expected student performance in both Jordan and Lebanon even with socioeconomic status accounted for – both well-off and disadvantaged students score below expectations – is an indication of substantial systemic shortcomings across the education sector. In every country and in every subject, students from better-educated families, or with more resources at home, achieve better outcomes. The correlation between socioeconomic status and education outcomes is well proven. However, in Jordan and Lebanon, average performance on PISA and TIMSS is lower than expected compared to countries that have similar socioeconomic status, with a larger gap in Lebanon. Moreover, while disadvantaged students in Jordan perform close to the average of OECD students who have a similar background, privileged students in Jordan perform below expectations. In Lebanon, by contrast, both disadvantaged and privileged students score lower than would be expected based on their socioeconomic background.

Gender Gaps

Jordan has one of the largest education performance gender gaps of all countries, with girls outperforming boys in reading and science. In mathematics, both groups score similarly in PISA, but in TIMSS, girls outperform boys. The PISA 2018 results for reading show that girls in Jordan outperform boys by more than 50 points, which is half a standard deviation of the international students' performance distribution and equivalent to about two years of education. In science and TIMSS mathematics, the gender gaps are smaller but still significant.

In Lebanon, the gender differences in performance are much smaller and in line with OECD average score differences. In reading, girls score higher than boys by 28 points, similar to the average gender gap across the OECD countries (about 30 points). In mathematics and science, boys and girls score almost the same, which is also similar to the OECD average. In TIMSS, boys and girls score similarly in both mathematics and science.

In Jordan, the gender achievement gap in favor of girls is larger among lower-achieving students. Among the best students, the gender gaps in reading and science are almost halved when compared to low achievers. In mathematics, the gender gap disappears among the best students.

In Jordan, higher positive teaching and school indices for female teachers compared to male teachers may explain the higher results for Jordanian girls. Female teachers score higher on indices related to their school's emphasis on academic success. They also tend to work in better school conditions and report greater safety, order, and work satisfaction than male teachers. This result is closely correlated with the better performance of the Jordanian female students. There were no significant differences between male and female teachers' characteristics in Lebanon.

Student Motivation and Test Performance

Student motivation is higher in Jordan and lower in Lebanon when compared to the OECD average. However, these motivational differences can only explain a small part of the achievement gap to the OECD countries. The PISA test gauges students' motivation to perform well in school and on tests. In 2018 this motivation was reportedly much higher for Jordanian students than not only Lebanese students but also even the average across the OECD. On the other hand, students in Lebanon reported the lowest levels of test effort among all PISA 2018 participating countries. Data analysis indicates that if student test efforts in Lebanon were at the level of the OECD average, this would result in a 10-point performance rise, which explains only a small part of the achievement gap. For Jordan, analysis of the test data shows that the greater test effort of the Jordanian students did not translate into significantly better performance.

Discipline, Bullying, and Absenteeism

In both countries, bullying, a lack of discipline, and absenteeism are strongly and negatively correlated with assessment results across all subjects. Bullying is more prevalent in Lebanon, but it harms student achievement in both countries. Among boys, 26 percent in Lebanon and over 16 percent in Jordan experience bullying about weekly, compared to 14 percent and 5 percent of girls, respectively. In addition, absenteeism and lateness to school are associated with lower achievement in both countries which is more evident in underperforming schools. Also, in both countries, girls report feeling a higher sense of belonging and connectedness to their schools and to their peers, another factor that can positively correlate with learning outcomes or reflect a better school climate.

Grade Repetition

In Lebanon, students more often repeat grades, and this is negatively associated with their performance. The higher frequency of grade repetition in Lebanon explains part of the achievement gap to the OECD countries and the achievement difference with Jordan. Research shows that grade repetition is generally one of the least effective interventions to improve learning. It is very costly and typically does not improve student achievement but rather is detrimental to student motivation. Having the same level of grade repetition as in the OECD would increase scores in Lebanon by about 17 points, closing the achievement gap.

Private Schooling

In Lebanon, about 60 percent of students attend private schools, and although students in private schools outperform their public schools peers, overall, they still score well below the OECD average. The better performance of public schools in Jordan, and the generally higher outcomes of disadvantaged students there, could provide Lebanese decision-makers with some policy guidance and best practices.

Language of Instruction

Students who speak the same language at home as the language of instruction and the language of assessment achieve better results in PISA. However, in Lebanon, only about 2 percent of students use the language of instruction at home, compared to 94 percent in Jordan, where Arabic is for most students both the language of instruction and the native language used with friends and family. In addition, students in Lebanon speak Lebanese Arabic at home, which is slightly different from the standard Arabic which is used for instruction at school as well as for assessment. Inadequate language fluency also limits teachers' activity and parental support, especially among less-educated parents who speak no second language. Therefore, improving both students' and teachers' language skills should be a top priority in Lebanon.

Underperforming Schools

In both Jordan and Lebanon, low-performing students tend to be clustered in schools that have low-teaching quality. These schools are often found in rural areas and small villages. In Jordan, they are more often boys' schools. In Lebanon, these are more often public schools. These schools have performance levels much below basic international standards thus not equipping students with the most basic knowledge of mathematics, science, or reading.

Early Childhood Education

Early childhood education (ECE) and early childhood care is a crucial stage in children's development. Access to early education varies starkly between Jordan and Lebanon, with the rates this time favoring Lebanon. ECE spans ages 0–6 and encompasses educational and child-care services from infancy to preschool. In Jordan, access to ECE is low, especially for children from disadvantaged backgrounds. In contrast, Lebanon's gross enrollment rate in early education in 2016 was reported at 86 percent. Most preschools in Lebanon are privately owned and concentrated in the central region or urban areas, limiting the access of poorer and rural families. Many studies have shown that students who had exposure to good-quality ECE had better learning outcomes later in life, but while access to ECE in Lebanon is high, the quality is both lacking and highly variable, as there are no common national quality standards.

Online Teaching and resource constraints

In both Jordan and Lebanon, unequal access to remote learning during the COVID-19-related school closures, and resource constraints especially among poorer students, will likely exacerbate in equality Jordan and Lebanon. More than 1.3 million Lebanese and 2.3 million Jordanian students were affected by school closures. Remote learning requires greater effort from both teachers and students, together with access to technical facilities for efficient learning. Disadvantaged students usually lack the technical exposure to participate comfortably in online learning and have limited support from both parents and teachers.

In addition to proficiency in using remote teaching delivery methods, more emphasis needs to be on the pedagogy of remote learning to ensure students learn effectively remotely. The Jordanian and Lebanese principals surveyed were positive in their opinions about the adequate availability of resources for teachers to learn how to use digital resources. According to them, 55–75 percent of students study at schools where professional resources for teachers are

provided. However, according to research, while professional training tends to focus on the technical aspects of teaching online, the essential deficiency is proper pedagogy. As a result, many teachers in Jordan and Lebanon do not understand the teaching principles that underlie remote or online education, and how these differ from the pedagogical principles employed in conventional classroom instruction. Thus, although they master technical issues with time, their teaching effectiveness is usually much lower than in a traditional setting.

Although limited access to hardware resources constrains student learning, connectivity to the Internet plays an equally crucial role in distance education. According to the PISA data, about 29 percent of Jordanian and 22 percent of Lebanese students do not have a computer, and more than 3 out of 10 do not have access to an Internet-connected computer they could use for learning purposes. Additionally, 2 out of 10 students must share one computer with their entire family, limiting the time they can spend on it. Critically, in both Jordan and Lebanon, about 15 percent of 15-year-olds do not have an Internet connection. Another problem is the lack of a suitable study place: 20 percent of Lebanese students, and 16 percent of Jordanian students, reported not having a dedicated study space.

1. JORDAN AND LEBANON IN INTERNATIONAL STUDENT ASSESSMENTS

1.1. Large-Scale Assessments – Making Comparisons across Countries

As a social asset, education is one of the fundamental forms of human capital that not only influences the quality of people's lives—developing their critical thinking faculties, sharpening their ability to form opinions, and enriching their understanding of events and phenomena—but at its best, also dispenses broad social benefits. **It is all but impossible for a nation to achieve sustainable economic development without making substantial investments in human capital, especially educational capital**. Because of its far-reaching consequences, it is essential to measure, regularly, whether and how well the education system is enabling the nation's students to attain international standards of academic performance, and to search for and implement best-practice models in its school systems.

Over the past decade, Jordan and Lebanon have both made substantial efforts not only to improve the quality of their education but also to broaden access to it. Despite these efforts, student outcomes remain below expectations. Although the two countries admittedly have different histories and face different problems, comparing them in the area of student performance, and the various factors associated with it, may help to inform educational policies in both. This chapter reviews general educational outcomes in Jordan and Lebanon, covering recent international assessments results. It also serves as an introduction to the detailed analyses presented in subsequent chapters.

To assess students' educational achievement, most countries employ standardized national tests. These typically evaluate the nation's students against one another, but they do not enable international comparisons. Additionally, standardized national tests often do not collect data that can be used to explain differences in student achievements. National exams, which measure student competencies acquired at a given educational level, work well when used for admission purposes because they enable school systems to compare student results against local standards. But they fare poorly when it comes to comparing changes in students' results over time. In other words, national assessments do not provide information on education quality against international benchmarks, nor do they inform decision-makers about temporal trends occurring within their educational system.

International large-scale assessments (ILSAs) are designed to compare results across countries and over time. They also collect rich additional data that can be used to identify what policies and practices are associated with high performance. In many countries, the results of these assessments influence national debates on education policy and shape education reforms (Volante, 2017). Currently, nearly all developed and middle-income countries participate in the Organization for Economic Co-operation and Development (OECD)'s PISA (Programme for International Student Assessment), or the International Association for the Evaluation of Educational Achievement (IEA)'s TIMSS (Trends in International Mathematics and Science Study), or its PIRLS (Progress in International Reading Literacy Study). These three large-scale international assessment programs provide detailed comparisons of student performance in reading, mathematics, and science, from primary to secondary education levels. They also use information acquired from students, teachers, school principals, parents, and ministries to analyze how different student, family, school, and system characteristics are related to performance.

These data are rich and can provide policymakers and practitioners with useful insights. However, international reports focus only on key findings. ILSA data can be used more extensively to inform policy and practice in each of the participating countries, which is possible because detailed data from all of these studies are publicly available and well-documented.

Although the results of international comparisons are important for understanding how student outcomes are shaped in different systems, their interpretation requires special care and considerable expertise (Lechner et al., 2021; Rutkowski et al., 2010; Rutkowski and Rutkowski, 2016). Student performance depends on multiple factors, and education policy and practice are responsible for only a part of it. The family's economic situation, labor market prospects, and cultural factors are, to a large degree, all independent of education policy and yet are crucially important for student results.

Additionally, technical issues such as sampling and population coverage, measurement of knowledge and skills, and interpretation of cross-sectional studies to inform policy must also be considered in order to make sound general judgments about a country's performance in the education sector and the factors that affect it. Although ILSA organizers, and the various institutions that implement these studies in different countries, make a substantial effort to draw comparisons that are reliable and meaningful, it is also easy to misinterpret the results, especially if a proper understanding of the technical issues and their impact on comparisons is lacking.

For both Jordan and Lebanon, an important issue to consider is the population coverage. Studies that are carried out in primary schools (for example, TIMSS and PIRLS) cover nearly the whole population because most primary school students are in school and can easily be included in the sample. However, at the secondary school level, the situation can be quite different because some students may no longer be enrolled. Because ILSAs do not cover those who are outside the education system, such students may be excluded from the assessment, thereby skewing the results.

In PISA 2018, the coverage index is equal to 87 percent in Lebanon and 54 percent in Jordan,[1] which suggests that the majority of 15-year-old students are enrolled in secondary school. The low value of the PISA Coverage Index for Jordan can be attributed to a number of different factors. The main one is the large influx of refugees in the last several years (World Bank Group, 2016). A second factor is that although PISA assumes all 15-year-old students in a country as a basis for sampling, in practice, 15-year-olds who have not reached grade 7 – for example, those who have dropped out from the educational system or were held behind in primary school due to grade repetition – are excluded from assessment. This is a second factor that lowers the coverage index.

PISA is an international, large-scale assessment of the competencies of 15-year-old students. It has been conducted every 3 years since 2000. It currently covers some **3 million** students from **90+ countries** and economies.

TIMSS is an international, large-scale assessment of 4th and 8th graders in mathematics and science, conducted every 4 years.

A third factor that lowers the coverage index is that students educated outside the official educational system, for example, those in refugee camps, are also excluded from assessment. Fourth, the index is further lowered by exclusions, most of which are based on a student's inability to attend school or their inability to participate in the assessment, for example, because of a disability.

Finally, the coverage index can further be lowered by school-nonresponses or student-non responses, although these numbers tend to be very low in both Jordan and Lebanon (OECD, 2019, p. 173).

In this report, we discuss how differences in coverage index can affect comparisons between the two countries, as well as with international benchmarks. We can only hypothesize about students who were not covered in the PISA sample, but in the report, we check whether distributions of socioeconomic background, gender, and other demographic characteristics are similar across samples to see if these differences could affect the results. Moreover, in countries such as Jordan and Lebanon, differences between the spoken language and the language used in the assessments might affect comparisons. These issues are addressed and corrected for in the report before we draw conclusions about comparisons of student performance.

Despite certain shortcomings, **ILSAs are the best available tools to compare student learning outcomes across countries. Recent careful analysis of the usage of ILSAs for policy reforms suggests that countries should not focus solely on rankings, but rather use the richness of ILSA data to conduct in-depth analyses to ensure that their conclusions are not affected by technical shortcomings** (Singer and Braun, 2018). This report attempts to provide an exhaustive analysis of ILSA data, mostly PISA, TIMSS and, for early grades, Early Grade Reading Assessment (EGRA) results for Jordan and Lebanon, in order to inform policymakers and practitioners about results that are often overlooked when the focus is mainly on country rankings. ILSA data can provide invaluable insights into education policy and practice in areas such as curriculum and standards, gender-related policies, student behavior and school-related attitudes, or socioeconomic differences and their relation with learning outcomes. When interpreted with caution and an understanding of the technical details, ILSA data can provide useful information that can be employed to plan reforms in these areas and to predict their expected outcomes.

1.2. PISA and TIMSS Assessments in a Nutshell

Both Jordan and Lebanon participated in PISA 2018 and TIMSS 2019, the two most widely used international large-scale assessments. Both studies provide internationally comparable scores in mathematics and science, but there are important differences to consider when comparing performance across them.

The OECD's **PISA is an international assessment measuring the reading, mathematics, and science abilities of 15-year-old students in grade 7 and above**. The assessment has been organized every three years since 2000. In the most recent round in 2018, 79 countries (37 OECD countries and 42 partner countries and economies) participated, including Jordan and Lebanon. Jordan has been involved in the assessment since 2006, while Lebanon joined in 2015, allowing a comparison of these countries' results for the last two cycles – PISA 2015 and PISA 2018. The scores are scaled to a normal distribution, with a mean of 500 points and a standard deviation of 100 points for the average across the OECD countries (weighing all countries equally).

TIMSS, by contrast, is an assessment that has been administered by the IEA (International Association for the Evaluation of Educational Achievement) **every four years since 1995**. Like PISA, TIMSS gathers information about both student and school backgrounds as well as about mathematics and science achievements.

TIMSS 2015 included 57 countries, 7 benchmarking entities, and more than 580,000 students (including 270,000 8th graders). PISA 2018 tested students from 79 countries.

The first difference with PISA is that TIMSS does not include reading because this domain is covered by another IEA assessment called PIRLS (Progress in International Reading Literacy Study). In most countries, the **assessment covers students in the 4th and 8th grades**. The main difference between PISA and TIMSS is that PISA students are in different grades but are all about 15 years old, whereas in TIMSS the average student age varies from country to country. Countries that work with 4th grade cohorts can also monitor their performance four years later. Jordan participated in TIMSS from the second cycle (1999) and has once participated in the fourth-grade test, while Lebanon has been involved in the 8th grader tests since 2003. In this report, we cover data up to the 2015 TIMSS. An analysis of 2019 TIMSS data (from the 2018 assessment) will be presented in a subsequent report.

Both assessments are administered to nationally representative student samples, although there are differences in the target populations as explained above. In both studies, student outcomes are estimated using item response theory (IRT) models to provide internationally comparable scores.

The differences between PISA and TIMSS are also related to sampling and the level of analytic focus: In PISA, schools are sampled, whereas in TIMSS, classrooms are selected. The result is that PISA provides only approximate information about teaching approaches because student and teacher data cannot be correlated exactly with one another. By contrast, in TIMSS, the teacher data that are collected can be linked precisely to the students that these teachers taught. Finally, it is notable that both studies define international benchmarks or proficiency levels which describe "what students know and can do" at different performance levels.

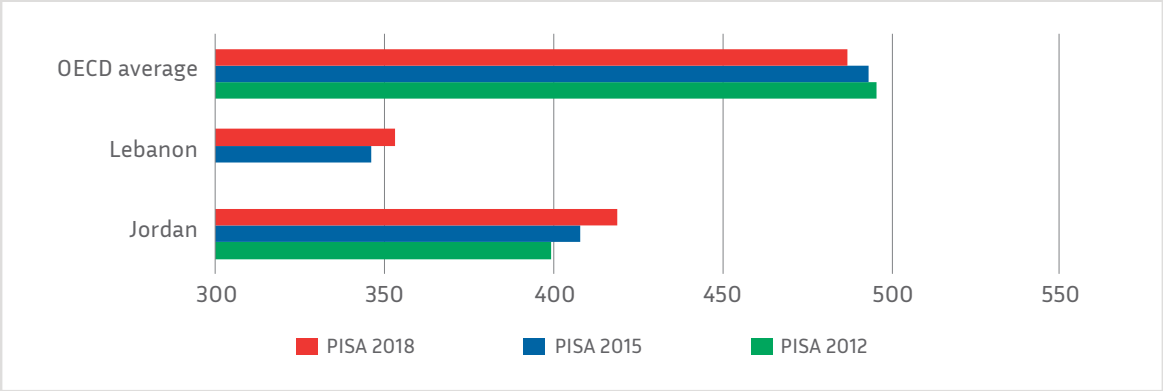
1.3. Jordan and Lebanon Student Performance in PISA and TIMSS

This chapter presents an overview of achievements in international large-scale assessments for both Jordan and Lebanon from an international perspective. In regards to **reading**, results will be presented using PISA data. For **mathematics and science**, in order to present composite scores from all available assessments (PISA and TIMSS), the authors' own calculations were used. These calculations are harmonized performance indices inspired by the methodology introduced by Angrist, Djankow, Goldberg and Patrinos (2019). Finally, to show an analysis of the overall level of human capital, the **HCI (Human Capital Index) for Jordan and Lebanon** will be presented.

Achievements in Reading

Figure 1.1 shows that, over the period of study, **the average results of both Lebanese and Jordanian students were below the OECD average** (in 2018 by 134 and 68 points, respectively).

FIGURE 1.1: STUDENTS' PERFORMANCE IN READING



Source: Author calculations based on OECD PISA

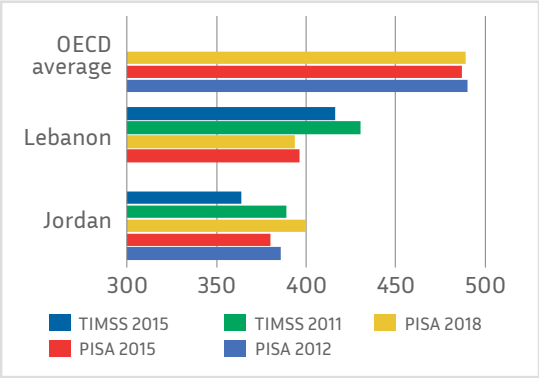
Achievements in Mathematics and Science

The mathematics and science of PISA and TIMSS cannot be compared directly because the two assessments use different measurement scales. Nevertheless, in an attempt to compare TIMSS and PISA mathematics and science outcomes, we present the results on a common scale (specifically, the TIMSS scores are scaled up to the PISA scale). For the translation of TIMSS scores into the PISA scale, we used the results of the countries participating in both assessments in a given round and academic subject, assuming that the participants' achievements in both assessments are equal in a certain year. In this report, the Angrist, Djankow, Goldberg and Patrinos (2019) methodology was followed with the simplifications described below. However, the robustness checks confirmed that the methodology presented by Jakubowski et al. (2019), arrives at similar conclusions.

In the analysis below, TIMSS, which was the anchored test,[2] was linked to the scale of PISA (reference test). In the first step, the overlapping countries that **participated in both assessments**[3] **in a given round and academic subject were selected and used to create a benchmark based on their results**: the mean scores for PISA and TIMSS tests were calculated for mathematics and science in a given testing round of the assessment. The ratio of the mean score in PISA to the mean score in TIMSS allowed us to calculate and present the learning outcomes of the Lebanese and Jordanian students in the TIMSS assessment on the PISA scale. For more details of how the tests were put on a common scale, see Angrist, Djankow, Goldberg and Patrinos (2019).

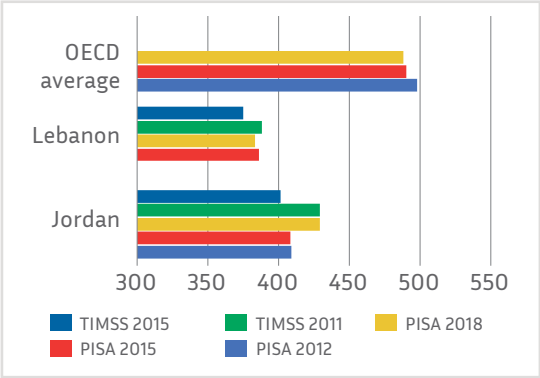
Figures 1.2 and 1.3 compare mathematics and science performance across Lebanon, Jordan, the benchmark used in scaling, and the PISA OECD average. **Regardless of the year and study, both countries performed worse than the OECD average. In the case of mathematics, student performance in Jordan in 2018 was 89 points below that of the OECD countries in the PISA assessment, a gap equivalent to about three years of academic instruction.**[4] **For Lebanon, this difference was larger still – 96 points – equivalent to more than three years of schooling**. Despite the initially better math results for Lebanon compared to Jordan, it should be noted that the distance between the Lebanese students' performance and the OECD average increased over time, while the Jordanians improved their position regarding this benchmark over time. Interestingly, the TIMSS 2015 results are higher than the PISA 2015 for Lebanon but lower for Jordan.

FIGURE 1.2: STUDENTS' PERFORMANCE IN MATHEMATICS



Source: Author calculations on the basis of Angrist, Djankow, Goldberg and Patrinos (2019) methodology

FIGURE 1.3: STUDENTS' PERFORMANCE IN SCIENCE



Source: Author calculations using PISA and TIMSS data

Figure 1.3 shows the students' performance in science: the PISA and TIMSS results in 2015 reveal similar trends. As in mathematics, in science both countries again trail the OECD average. In 2018, for the PISA assessment, Lebanon was 105 points below OECD countries, equivalent to more than three years of schooling, while Jordan was 60 points lower, equivalent to about two years of schooling.

The Human Capital Index (HCI)

The Human Capital Index (HCI) measures the expected human capital that a child born today can attain by age 18. It aims to indicate how the current situation related to health and education affects the lives of future generations and can be a basis for taking certain policy interventions. Created by the World Bank,[5] the HCI ranges from 0 to 1 (Kraay, 2018) and consists of three components:

TABLE 1.1: HCI COMPONENTS

	Jordan	Lebanon
Probability of Survival to Age 5	0.98	0.99
Expected Years of School	11.1	10.2
Harmonized Test Scores	430	390
Learning-Adjusted Years of School	7.7	6.3
Fraction of Children Under 5 Not Stunted	-	-
Adult Survival Rate	0.89	0.93

Source: World Bank, 2020

- Expected Learning-Adjusted Years of School, calculated by multiplying Expected Years of School (sum of enrolment rates at different levels of education) and the ratio of Harmonized Test Scores to advancement attainment on the TIMSS (score of 625);

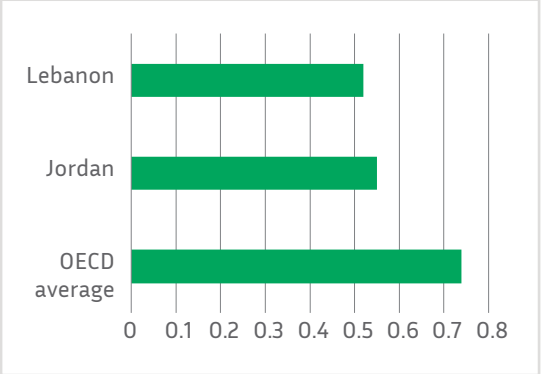
- The probability of surviving to age 5 (the UN Child Mortality Estimates are used);
- Health, measured primarily as the fraction of children under 5 who are not stunted, and the adult survival rate.

Generally speaking, HCI is a product of components that measure future productivity as captured by child mortality, the quality and quantity of education, and health status.

According to the 2020 World Bank database, **Lebanon's HCI is about 0.52, and Jordan 0.55. What this means is that the future productivity of a child born today is only 52 percent and 55 percent, respectively, of what it would be in the case of full healthcare and optimized education.** The average value of the indicator for the OECD countries is 0.74.

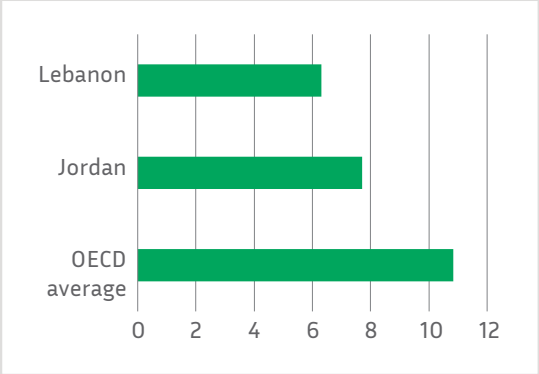
When it comes to health and survival, Jordan and Lebanon do not differ that much; the difference between them is greater for Learning Adjusted Years of Schooling (LAYS). In both countries, the education period lasts 12 years but LAYS is only 6.3 for Lebanon and 7.7 for Jordan. In comparison, LAYS for the OECD countries averages 10.8. **It should be noted that the relatively low level of HCI results in Jordan and Lebanon is primarily due to the insufficient levels of learning outcomes in both countries.**

FIGURE 1.4: HUMAN CAPITAL INDEX



Source: World Bank database, 2020

FIGURE 1.5: LEARNING-ADJUSTED YEARS OF SCHOOL



Source: World Bank database, 2020

The assessments permit certain exclusions among the target population (within some rate of limitations) from the target population:

- at the school level (geographic inaccessibility of the school, school size, specific structure or school curriculum, for example, for learners who have disabilities)
- at the student level (students who have functional or intellectual disabilities, non-native language speakers)

1.4. Factors to be considered in comparing student performance over time

Three related issues affecting PISA and TIMSS performance comparisons between Jordan, Lebanon, and other countries are considered below. First is sampling and population coverage, which varies across PISA and TIMSS, and between the two focus countries. Second, the motivation to solve the problems on the test was measured in PISA 2018 and revealed large differences, especially for Lebanon. Finally, we consider how students' socioeconomic background changed across studies and over time, and how it could affect results.

These three factors are less important when comparing, for example, PISA results across the majority of OECD countries, where population coverage, test effort, and socioeconomic background are relatively similar. However, for less developed OECD countries, and certainly for Jordan and Lebanon, these factors most likely do affect country results and should be taken into account when drawing policy conclusions that are based on international comparisons.

1.4.1. PISA and TIMSS sampling and its impact on performance

One of the purposes of the large-scale assessments is to **track changes in students' performance over time by comparing them across the study cycles**. However, for the results to be comparable, **it is also crucial to follow changes occurring in population composition and coverage because they may influence the outcomes** (for example, years of formal schooling before the assessment took place, student age, exclusions, and so on). Moreover, PISA[6] and TIMSS[7] differ in their sampling methodologies – another reason why they cannot be directly compared in most cases.

PISA SAMPLING

PISA is based on a two-stage sampling design. A large group of 15-year-old students (5,000 in OECD countries) are selected to represent all 15-year-old students in a country. At the first stage, schools are sampled. To meet national requirements, each country has to select at least 150 schools. An 85 percent participation rate (of the sampled schools) is required. The within-schools sampling is then carried out, in which students are sampled with equal probability. Here, a minimum student participation rate of 80 percent is necessary.

TIMSS SAMPLING

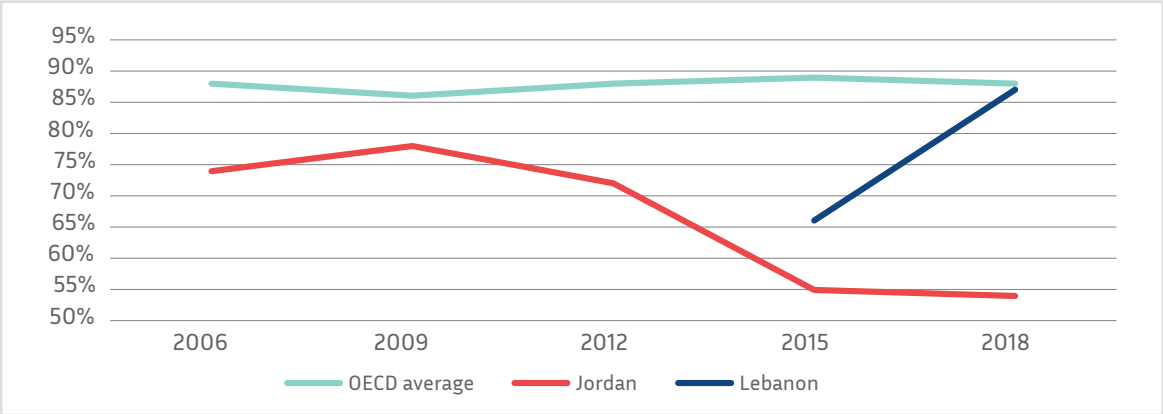
TIMSS similarly uses a two-stage random sample design. At the first stage, a sample of schools is drawn but at the second step, one or more classrooms are selected instead of individuals. Acceptable response rates in TIMSS are 85 percent for schools, 95 percent for classrooms, 85 percent for students, or 75 percent for combined school, classroom, and student participation.

Primary attention should be paid to the coverage. With TIMSS, the coverage for Jordan and Lebanon is, in both cases, close to 100 percent, and generally, there are no school-level exclusions. In PISA, coverage index 3j, reflecting the proportion of 15-year-olds represented by the PISA 2018 sample for Lebanon, was 87 percent. For Jordan, it was barely 54 percent. In comparison, the OECD average exceeded 88 percent.

Again, for comparison, in PISA 2015 the index was 66 percent, 55 percent, and 89 percent, respectively. The coverage rate for Jordan decreased over time, for the OECD countries it remained high and stable, and for Lebanon it increased between 2015 and 2018 by more than 20 percentage points and is now close to the OECD average.

The increase in the PISA coverage rate for Lebanon suggests that the study now has more informative value. The opposite is true for Jordan because the coverage dropped from nearly 80 percent in 2009 to less than 55 percent in 2015 and 2018. The low value of the index means that many 15-year-old students were not included in PISA because, for example, they had already left formal education or were not present at school at the time.

FIGURE 1.6: THE PISA COVERAGE INDEX



Data for Lebanon are available from 2015
Source: PISA 2018 Results (Volume I); annex A2 table I. A2.1

At the same time, we can also plausibly assume that these likely are not students who would excel in the PISA assessment. Thus, we can expect that the results would be lower if more students had been included, although this is merely a conjecture that cannot be checked with the data at hand. Nonetheless, the low coverage rate for Jordan should be considered when interpreting this country's results, and, even more, when interpreting trends in PISA performance.

The coverage index also depends on the exclusion rate, but the exclusion rates have to be below 5 percent of the population and were in fact relatively low in both countries. (Exclusions are mostly for students with disabilities and those with limited proficiency in the assessment language.) In PISA 2018, the overall exclusion rate amounted to 0.5 percent in Jordan, 2.2 percent in Lebanon, and 4.2 percent for the OECD average. This means that the exclusions have only a small effect on lowering the level of the coverage index.

1.4.2. Performance over time with demographic adjustments

The richness of the PISA data enables one to check whether changes in key demographic variables of the sampled students – such as indicators for an immigrant background, gender, and age – are related to changes in student performance across cycles. The unadjusted changes can be compared with an adjusted performance that assumes the same demographic distribution

as in the 2018 sample. We found that **demographic changes had little impact on comparisons of student performance across countries and across PISA cycles.** Moreover, these changes have more impact on student results among the OECD countries.

In Jordan, the adjusted changes in reading show slightly higher improvement than the non-adjusted ones, although the difference is only about 1–2 points. In Lebanon, where only two years can be considered, the opposite pattern emerges: the unadjusted score is higher, but here too, the difference is rather small. **Both countries show an improvement in 2018 compared to the previous assessment rounds, even when demographic changes are adjusted for, whereas the OECD average indicates a decline.**

In mathematics and science, the demographic changes have limited impact on performance estimates for Jordan and Lebanon. In all cases, the results suggest an improvement in student performance in Jordan and stable performance in Lebanon (bearing in mind, however, that the changes are small and statistically insignificant).

OECD analysis considers changes in demographic indicators but not changes in socioeconomic background. The latter is important for interpreting results for Jordan and Lebanon since both countries differ from the OECD average in the area of student socioeconomic backgrounds.

Adjusting for changes in the socioeconomic background of students across PISA cycles is also important for understanding how differences in the sample coverage of disadvantaged and privileged students changed over time, and how that might affect estimated results in reading, mathematics, and science.

Table 1.2, below, shows comparisons adjusted for changes in student socioeconomic background for Jordan across PISA 2012, 2015, and 2018, and for Lebanon between 2015 and 2018. Socioeconomic background is measured as the educational attainment and occupational status of parents, together with home resources including education-related, cultural, and consumer goods. In addition, immigrant background and gender are controlled for as before. The results presented in the table rely on the inverse-probability weighting method, which is used to balance distributions of the above-mentioned characteristics over time. In other words, this method ensures that socioeconomic background, gender, and immigrant status are the same across PISA cycles when estimating performance changes.

The results provide a fairly consistent picture of performance changes in Jordan between PISA 2009 and PISA 2018. Taking into account changes in student socioeconomic background and sample demographics, performance in all three domains improved by about 10 points between 2009 and 2018. Larger improvements than that are estimated for the 2012–2018 period, and for the two most recent PISA rounds, 2015 and 2018. However, it should be noted that these improvements are larger because of a decline in performance after PISA 2009.

TABLE 1.2: PISA PERFORMANCE CHANGES IN JORDAN, ADJUSTED FOR CHANGES IN SOCIOECONOMIC BACKGROUND AND DEMOGRAPHICS

Jordan	2009 to 2018			2012 to 2018			2015 to 2018		
	reading	mathe-matics	science	reading	mathe-matics	science	reading	mathe-matics	science
estimated change	**10.1**	**10.8**	**11.5**	**16.8**	**14.4**	**20.7**	5.5	**15.4**	**17.4**
socioeconomic background	4.2	4.8	4.3	3.3	4.1	3.2	3.7	4.0	3.1

Source: Own calculations based on PISA data. Statistically significant changes are bolded.

For Lebanon, we can compare results only between the last two PISA rounds. After controlling for changes in socioeconomic background and demographics, we found a positive change only in reading, with mathematics and science scores remaining similar between 2015 and 2018.

TABLE 1.3: PISA PERFORMANCE CHANGES IN LEBANON ADJUSTED FOR CHANGES IN SOCIOECONOMIC BACKGROUND AND DEMOGRAPHICS

	2015 to 2018		
	reading	mathematics	science
estimated change	**15.1**	2.9	1.3
socioeconomic background	4.7	4.8	4.3

Note: Statistically significant changes are bolded.

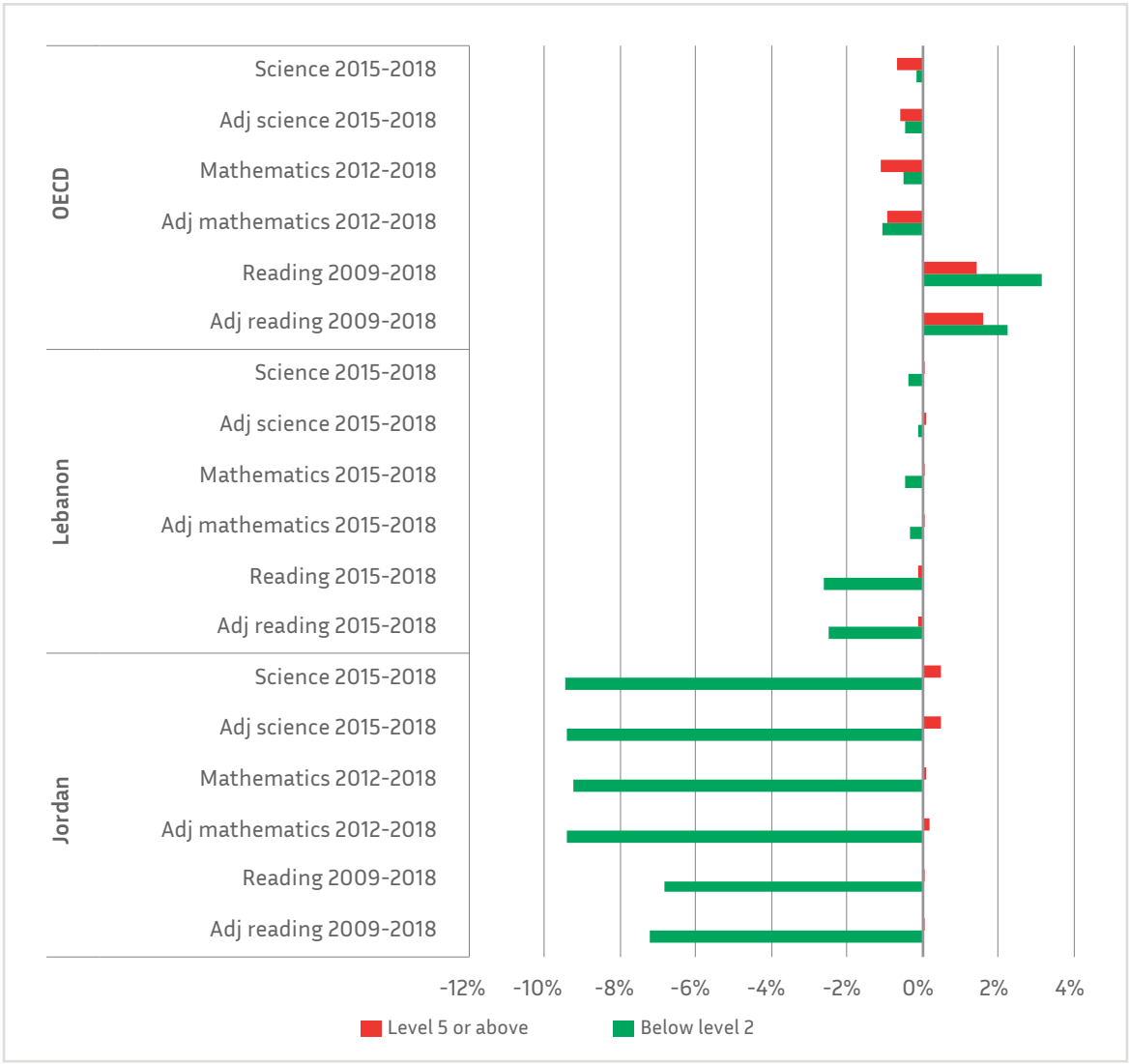
Source: Author calculations based on PISA data

In general, the **adjusted changes are different in Jordan and Lebanon,** but in both countries they show some improvement over a longer period. Adjustments for changes in student background assure us that this improvement is not driven by changes in student samples. In Lebanon, estimated changes are more positive after adjustments for socioeconomic background and suggest that there was indeed an improvement in reading performance, but performance in mathematics and science remained unchanged.

The above-described changes can be seen in the light of distribution changes in proficiency levels in Jordan and Lebanon. Proficiency levels allow for clear interpretation of what a particular score on the PISA scale means in terms of the abilities and knowledge that a student at a certain level possesses. In general, there are six proficiency levels. Level 2 is often considered the minimum level required to meet everyday life challenges. Children at this level possess the skills necessary to read and are able to use them for further learning. For example, they can identify a main idea in a moderately long text and can find explicitly stated information in it.

Students who score below this level typically cannot engage in more complex problems that are routinely faced by adults in modern societies. These students are considered low achievers. On the other end of the scale, students who score at or above level 5 are regarded as top-performing. Figure 1.7 shows the percentage of change in performance of low-achieving and high-performing students when demographic issues are controlled for (adjusted to 2018). **The increase in both high- and low- achievers indicates greater inequalities in education – this is the case for reading performance in the OECD countries, but for Jordan and Lebanon no such pattern is evident**. The proficiency levels all share changes that are usually stronger for the adjusted[8] results. Attention should be paid to **decreases in the group of low-achieving students in Jordan, with a slight increase in the share of high achievers.**

FIGURE 1.7: SCORES ADJUSTED FOR DEMOGRAPHIC CHANGES (OECD ANALYSIS) AND UNADJUSTED CHANGES IN THE PERCENTAGE OF LOW ACHIEVERS AND TOP PERFORMERS IN READING, MATHEMATICS AND SCIENCE, PISA



Source: PISA 2018 Results (volume I). Annex B1, table I.B1.7, table I.B1.37

1.4.3. Students' motivation and assessment results

The assessment results can also be analyzed from the perspective of students' motivation to do their best during the tests. Recent research literature suggests that low student motivation may be affecting international assessment results because some students believe that tests such as PISA or TIMSS are of little or no importance, so they invest little effort into it. Some research suggests that financial incentives often lead to a significant improvement in results, suggesting that the real level of student competencies might be different and could be downward-biased in countries where students have lower motivation to take these tests (Baumert and Demmrich, 2001).

To measure how motivation and effort relate to results in PISA 2018, students were asked to report on a 1–10 scale how much effort they put into the test, and how much they would have invested in it if the results counted toward school grades. (The responses, of course, were entirely subjective and should therefore be interpreted advisedly). On average, students

PISA Level 2 is defined as the baseline level of proficiency in each subject that is required to function properly in society. It is determined by a number of points specific for each subject. Achieving a certain level of proficiency requires a set of precisely defined skills.

PISA Level 5 and above represent students with high abilities. In addition to the skills required at the lower levels, Level 5 students are also able to deal with complex problems.

indicated that they would have made more effort if the test affected their grades. Boys reported expending less effort than girls, and this difference was statistically significant. When the difference between countries is examined, we find that **Jordanian students admitted making a higher effort than the OECD average, regardless of the test's influence on their grades. Students in Lebanon, by contrast, reported the lowest test effort among all PISA 2018 participants**. Also, boys in Jordan reported considerably lower test effort than girls, and this gap was larger than the OECD average or when compared to Lebanon.

TABLE 1.4: AMOUNT OF SELF-REPORTED EFFORT INVESTED IN PISA 2018

	The average effort invested in the PISA test Effort1	Effort1 Gender difference (girls – boys)	Average effort students would have invested if scores counted toward school grades (Effort2)	Effort2 Gender difference (girls – boys)
Jordan	8.37	**0.40**	9.25	**0.44**
Lebanon	6.86	**0.29**	7.82	**0.31**
OECD average	7.65	**0.29**	9.11	**0.29**

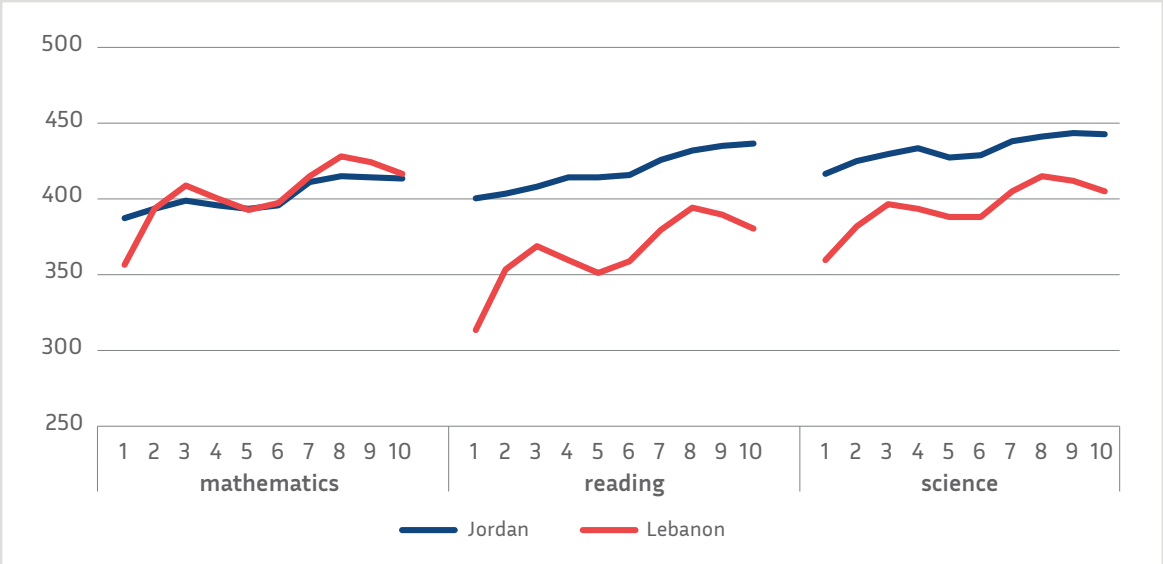
Note: Statistically significant differences are bolded.

Source: PISA 2018 Results (volume I). Annex A8, tables I.A8.1 and I.A8.2

The effort students made translated into performance: the lowest scores were achieved by those who said they invested the least effort. It is essential to emphasize that these results are based on students' own self-reports. This means that some learners may have misreported their level of effort because they perhaps did not want to admit their real level of engagement. It is also possible that some learners, perhaps prone to making emphatic statements or exaggerated claims, tended to use higher numbers to signal the same level of effort that some other students used more modest numbers to indicate. These personality differences could well be gender-correlated or culture-correlated, and hence will show up when comparisons are made across genders or countries.

The issue of effort invested in the assessment seems to be one of the greatest impacts on performance. We will analyze this problem of impact of effort on performance in more detail in subsequent chapters. For now, it is noted that students' opinions and perceptions of the significance or consequences of the assessment might be one of the important factors that explain differences in test scores between the top performers and the low achievers.

FIGURE 1.8: MEAN SCORES THAT DEPEND ON THE REPORTED EFFORT (MOVING AVERAGE FOR SMOOTHING)



Source: Author estimates based on PISA 2018

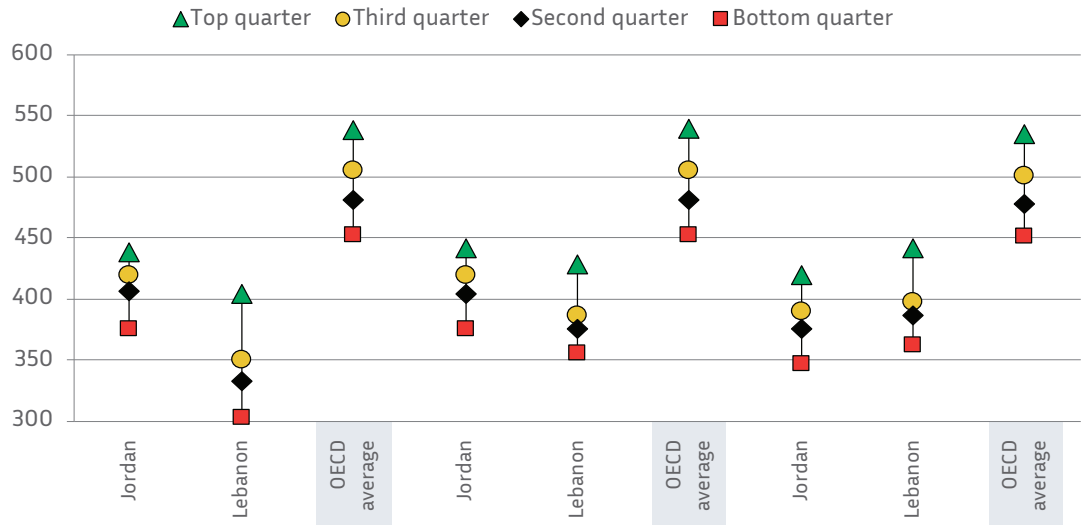
1.4.4. Students' socioeconomic status and educational results

This chapter examines the difference between Jordanian and Lebanese students' socioeconomic status and its impact on academic performance. It should be mentioned that the causal relationship between educational results and socioeconomic status is often two-way: low socioeconomic status can have a negative impact on educational outcomes, which in turn can negatively impact students' future socioeconomic status.

Students among the 25 percent of learners with the highest values in the ESCS index in their country are classified as socioeconomically advantaged, while those among the bottom 25 percent are categorized as socioeconomically disadvantaged.

In PISA, students' socioeconomic background is defined by the internationally comparable PISA index of economic, social, and cultural status (or ESCS), a composite measure derived from variables such as parents' education, parents' occupations, home resources, and so on. The ESCS scale is standardized to have a mean of zero and a standard deviation of one for OECD countries. Other country results are therefore interpreted in relation to the OECD average. **In PISA 2018, both Jordan and Lebanon had a lower median ESCS than the OECD average, which can partially explain the OECD performance advantage in PISA assessments**. In the following chapters, a number of in-depth interpretations regarding this issue will be made.

FIGURE 1.9: RANGE OF SOCIOECONOMIC STATUS IN LEBANON, JORDAN AND OECD



Mean score	408	347	493	409	386	493	380	396	490
Slope	**24**	**37**	**37**	**25**	**26**	**38**	**25**	**28**	**37**
R2 (%)	7	11.8	11.9	9.4	9.7	12.9	9	9.1	13

Source: Author calculations based on PISA 2018

The relation between achievement and socioeconomic background is positive, which confirms that advantaged learners perform better. Regardless of the domain, the magnitude of this association (the "slope" in the figure above) in Jordan and Lebanon is smaller than the respective magnitude in the OECD countries.

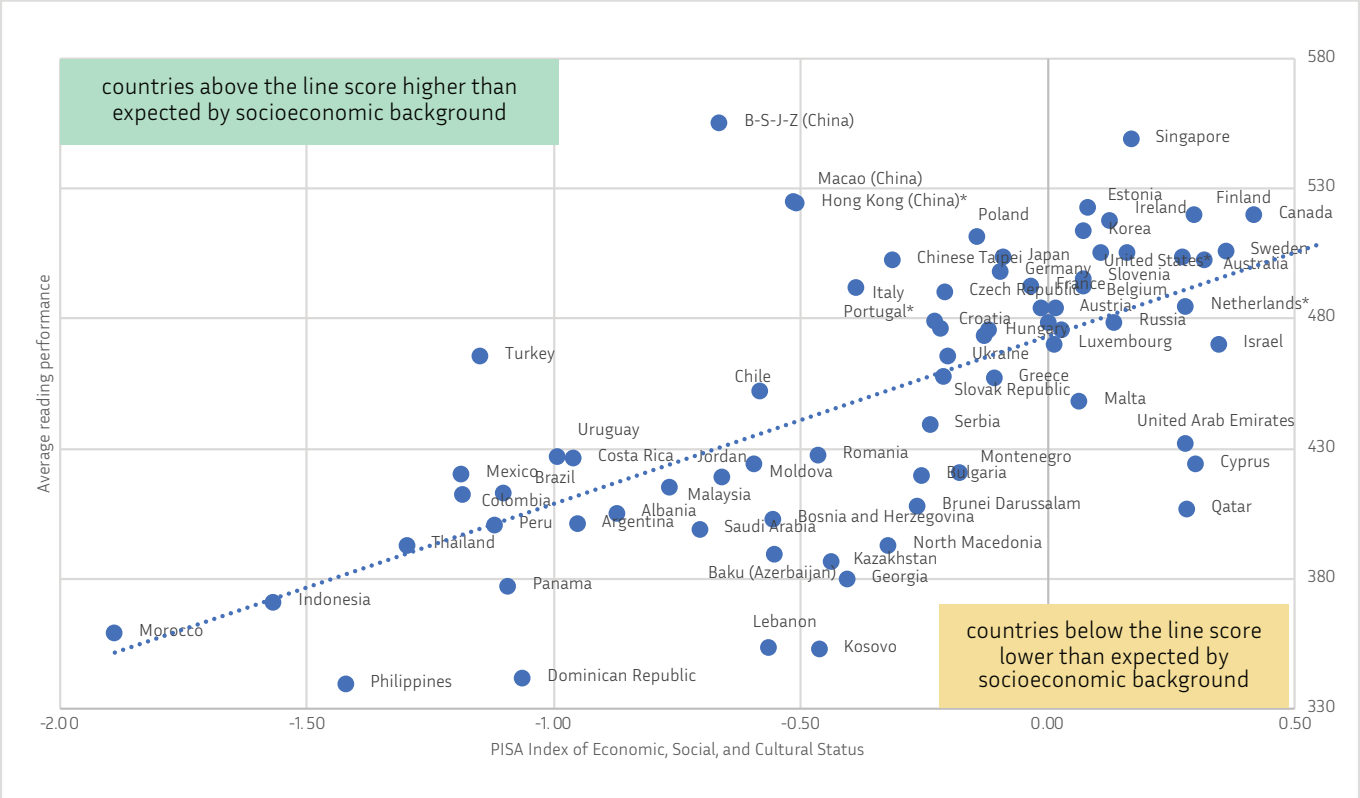
Figure 1.10 demonstrates a **strong relationship at the country level between an average student's socioeconomic background and average reading performance**. Countries with higher average student socioeconomic background perform better in the PISA reading test. More specifically, a one-standard deviation improvement in the average student's socioeconomic background in a given country is associated with an increase of about 70 points in the average student's reading performance. **Differences in this regard should be taken into account when comparing performance across countries.**

Figure 1.10 also shows that some countries perform above and some below the prediction line. For example, China (B-S-J-Z), Chinese Taipei, Poland, Portugal, and Turkey all show much better performance than other countries that have a similar level of student socioeconomic background. The education systems in these higher-performing countries might offer policy-makers some lessons about how to lessen the overall impact of socioeconomic background on student performance, in that these countries manage to compensate for their relatively

modest level of socioeconomic development in their respective educational systems. Despite their relatively modest levels of development, they have found ways to give their students a better education than expected. It appears that there is greater equality in those societies, in that educational resources that, in more unequal countries, are captured by the advantaged and the privileged, with diminishing returns, are distributed more evenly in these countries, and so there is more bang for the buck for those resources. The resources end up doing more "work," in much the same way that seven taxicabs owned by seven drivers will end up doing more work than seven taxicabs all owned by one rich driver who can only drive so many hours of the day.

the socioeconomic background of student families in China (B-S-J-Z) **is similar to that of Jordan and Lebanon, yet performance in the latter two is much lower. The other two countries with similar socioeconomic profiles to Jordan and Lebanon – Malaysia and Saudi Arabia – perform only a little lower than Jordan but quite a lot higher than Lebanon**. In reading, all four countries score below expectations, based on the socioeconomic background of their students.

FIGURE 1.10: READING PERFORMANCE AND STUDENT SOCIOECONOMIC BACKGROUND (ESCS INDEX)



Source: Author calculations using PISA 2018 data

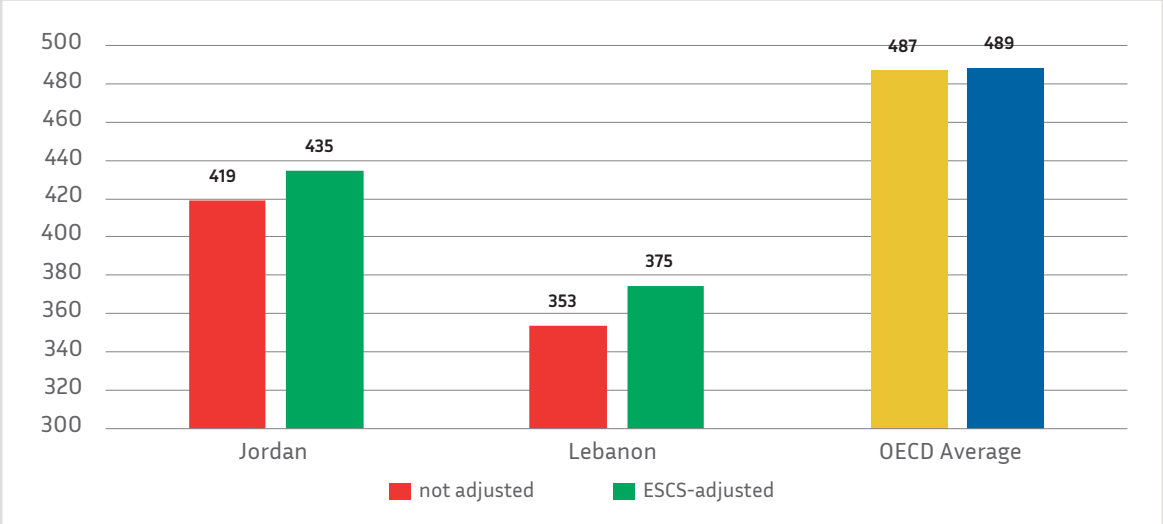
While China performs much higher, Chile is an example of a country with a similar socioeconomic background but also performing higher while still at the prediction line. Similarly, for the United Arab Emirates, Kazakhstan, and the Philippines, reading performance would be expected to be higher based on student socioeconomic background. Kazakhstan has a slightly higher socioeconomic background than Jordan and Lebanon, but when it comes to reading performance, it ranks almost exactly at the midpoint between Jordan and Lebanon. Students in the United Arab Emirates have some of the highest average socioeconomic backgrounds yet they score similarly to Jordan, a country with a substantially lower average socioeconomic background, and score much lower than countries such as, for example, Australia, which has a similar background of students.

To summarize, **performance in both Jordan and Lebanon is lower than would have been expected judging from the socioeconomic status of the student families.**

Since socioeconomic background strongly correlates with student performance, one could argue that countries and regions participating in PISA should be compared only after controlling for the effect of socioeconomic background, in order to make comparisons fairer and to better reflect teaching quality and policy effects. Figure 1.11 presents such adjusted comparisons for Jordan and Lebanon. Lighter bars on the left show average student performance before any adjustments; these are the results reported in the OECD reports. Darker bars on the right show ESCS-adjusted results to allow for more meaningful comparisons with student socioeconomic background taken into account. Note that the results for both Jordan and Lebanon are affected by this correction, but the OECD average is nearly the same.

The results adjusted for socioeconomic background show that part of the achievement gap between our two focus countries and the OECD countries can be explained by the less advantageous socioeconomic background of students in the two countries. **The average performance of Jordan increases from 419 to 435 points when adjusted. In effect, when adjusted, the gap to the OECD average decreases from about 70 points to about 55 points. The same occurs in Lebanon, where average performance increases by almost 22 points, somewhat narrowing the gap with the OECD average from about 134 points to less than 114 points**. It should be pointed out that even though Jordan and Lebanon have similar socioeconomic backgrounds, their average performance differs markedly. The gap between them is almost the same as the one between Jordan and the OECD average. The achievement gap in both countries does get smaller when the background of students is considered, but it still remains substantial. In short, differences in socioeconomic background are just one among a larger set of explanations.

FIGURE 1.11: READING PERFORMANCE IN JORDAN AND LEBANON, ADJUSTED FOR STUDENT SOCIOECONOMIC BACKGROUND



Source: Table A3.7, and author estimations from the PISA database

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To summarize, when analyzing large-scale assessments, a number of issues need to be kept in mind before any valid comparisons can be done. It often happens that direct cross-country comparisons, even when the entities being compared are culturally similar, may not be accurate because of other factors.

- In the PISA 2018 assessment, the coverage trend for Jordan is decreasing; for the OECD countries it is quite constant; and in Lebanon, one can observe an increase in population coverage between two cycles. The decreasing coverage in Jordan can be substantiated with the heavily declining enrollment in secondary schools observed from 2008 to 2017. From 2017 on, some slight increases of a few percentage points began, which also translated into the lower coverage drop between PISA 2018 and 2015. When it comes to TIMSS, the coverage is generally 100 percent, regardless of the cycle.
- While analyzing changes in results over time, demographic shifts should be considered, although these had a rather small impact on mean performance (1–3 points) and were generally significant only for Jordan.
- The reliability of the assessment results may depend on the level of involvement and effort that students invested in the test. Jordanian students reported higher levels of effort than Lebanese students, but students in both countries reported making lower effort than those in the OECD countries.
- Both Jordan and Lebanon had a lower median ESCS than the OECD average, which can partially explain the OECD advantage in PISA assessments.
- Both in Jordan and Lebanon, students from higher socioeconomic backgrounds outperformed those from lower backgrounds. However, the correlation between socioeconomic status and student performance is stronger in Lebanon. In addition, in both countries, socioeconomic status is much more related to reading performance than to mathematics or science performance. (The reverse is true for the OECD countries.)

2. REGRESSION AND DECOMPOSITION ANALYSIS OF THE PERFORMANCE DIFFERENCES BETWEEN JORDAN, LEBANON, AND THE OECD COUNTRIES

This chapter discusses the relationship between student-, family-, teacher-, and school-related characteristics and the reading skills of 15-year-olds. The selected indices show not only different "endowments" in Jordan and Lebanon when compared to the OECD – for example, varying levels of resources, attitudes, or practices – but also the fact that they are differently related to student achievement.

In this chapter, we explore these differences to explain the gap in reading performance between the OECD countries and Jordan, versus Lebanon. We first discuss PISA indicators that show different patterns for Jordan and Lebanon, and then run regression analyses to see how these indicators relate to student reading performance in PISA 2018. Finally, we use selected indicators to decompose the achievement gap with the OECD countries to see which factors are associated with this gap.

The regression approach can show us how different are the associations between the selected indices and student performance in the two countries and across the OECD. The decomposition approach can show us how the level of these indicators ("endowments") can explain achievement gaps, together with differences in associations between these indices and performance.

2.1. Selection of indicators for the regression and decomposition model

Below, we provide a short description of the selected indicators and how to interpret their values.

Student family background

Two indices were selected to reflect home resources and family environment, respectively. Both indices were standardized to have a mean equal to zero and a standard deviation equal to 1 in the OECD countries (weighting each country equally). The first index is the PISA index of economic, social and cultural status (ESCS), which is a composite measure of student family background – parents' highest level of education and occupational status, and home possessions. Positive values on this index represent students with higher socioeconomic status when compared to the OECD average. In Jordan and Lebanon, the average values of this index are negative, indicating the lower socioeconomic status of student families relative to the OECD average. In all countries participating in PISA and in all domains tested, ESCS is positively related to student performance, although this association is relatively weak in Jordan, whereas in Lebanon the association is lower than the OECD average.

The second index is the index of parents' emotional support (EMOSUPS), which has positive values for students who perceive greater emotional support from their parents. Students in Jordan and Lebanon have similar values on this index as the OECD average, but compared to the OECD countries, its association with performance is stronger in Jordan, and much stronger in Lebanon.

Student attitudes and perceptions

Six indicators were selected to reflect student attitudes related to learning and their schools. All six indices were standardized to have a mean equal to zero and a standard deviation of 1 in the OECD countries (weighting each country equally).

The first indicator is the index of fear of failure (**gfofail**), which has positive values for students who express a greater fear of failure than the average student in OECD countries. This index has lower values in Jordan and Lebanon when compared to the OECD countries. The second is the index of motivation to master tasks (**workmast**), for which positive values indicate greater motivation. This index takes a higher average value in Jordan and, in both countries is strongly related to achievement.

The third analyzed indicator is the index of self-efficacy (**resilience**), with positive values for students reporting higher self-efficacy. Students in Jordan show higher value on this index and, in both countries, this index is positively associated with achievement. The fourth variable is the index of the value of school (**attlnact**); again, positive values indicate a higher value of schooling for a student. Students in Jordan have a higher average when compared to the OECD, whereas students in Lebanon have a lower average when compared to the OECD. In both countries, higher values on this index are associated with better achievement.

The fifth and the sixth indicators measure attitudes toward competition (**compete**) and students' perception of competitiveness of their peers (**percomp**), where positive values reflect more positive views on competition and stronger perceived competition between students, respectively. For both indices, average values are higher in Jordan and Lebanon when compared to the OECD average, and both are positively associated with student achievement.

System-level solutions

Two dummy-variable indicators measure important organizational characteristics of school systems. The first is an indicator for students who repeated a grade. (It takes the value of 1 for those who repeated a grade once or more, and zero for others.) At the individual level, it shows whether repeating a grade is associated with lower or improved outcomes. PISA data are cross-sectional, so the coefficient for this variable is usually negative since students who repeat a grade also tend to be students who struggle with learning. By contrast, at the aggregate level, the prevalence of students repeating a grade shows the effects of a policy of forcing students to spend more time with the same material, which is popular in some countries but rarely used in others.

The second indicator encodes students who are in private schools. (It takes the value of 1 for these students, and zero for those in public schools.) Thus, it reflects the effect of privately managed schools on student outcomes, but in the PISA data it is impossible to distinguish between, on the one hand, a causal impact of private schooling on achievement and, on the other, the causal effect of better-resourced or more motivated families enrolling their children in private schools. The PISA data only show how performance between private and public schools differ. However, at the aggregate level, the data do show whether systems in which there are a larger number of private schools perform differently from predominantly public school systems.

School-level factors

Two indices were selected to reflect school-level factors associated with teachers. These indicators are based on school principal responses, so they reflect their subjective opinion about teacher-related factors. Also, note that the effective sample size for this indicator is equal to the number of schools sampled, so it is much smaller than for student-reported information. In practice, it means that it is more difficult to detect any significant differences for these indicators using PISA data.

The first is the index of school principals' perceptions of potential factors hindering instruction, especially staff shortages (**staffshort**). It takes positive values when in principal's opinion is that the human resources in their school are inadequate. This index has a higher average in Jordan and a stronger negative relationship with achievement in Lebanon. The second is the index of teacher behavior hindering learning (**teachbeha**), for which positive values reflect principals' perceptions that teacher-related behaviors hinder learning in their school. This index has more positive values and a stronger (negative) association with reading performance in Jordan than in Lebanon. Therefore, teacher-related behavior directly impacts student performance in reading.

Background variables

Several student background variables are included in regression and decomposition models, partly to exclude performance variance associated with factors that are beyond the control of education policy and school practice, and partly to control for important characteristics that could vary between countries. An indicator for female students (1 for girls and 0 for boys) is included. It reflects that boys and girls differ in their achievement, especially in reading, but in the case of Jordan, it also reflects separation of schools by gender, which is not commonly found in OECD countries nor Lebanon.

Second, indicators for students with an immigrant background are included: one for first-generation immigrants, and one for students with immigrant parents. Third, two dummy variables denoting students in a grade either below or above the modal grade are included. Finally, a variable measuring self-reported test effort is included. Lower values of self-reported test effort reflect low student motivation to do well on the PISA assessment. So an additional control for this variable allows country results to be compared, considering that the scores of some students do not fully reflect their achievement level. Students in Lebanon report on average lower test effort, so it might be especially important to control for it when comparing Lebanon with other countries.

2.2. Regression analysis

We start with regression analysis, using all the above-mentioned indicators in one model that explains reading achievement in PISA 2018. Regressions are estimated separately for Jordan and Lebanon and compared to the average results for the OECD. The latter results are based on a pooled sample of all the OECD countries, with survey weights standardized so that each country contributes equally to the final results. This is similar to how the OECD calculates the so-called OECD Average, which is an arithmetic mean of the country estimates for all OECD countries. In our case, however, we use PISA microdata weighting, meaning that each country contributes to the overall variance in proportion to its population size (Jerrim et al., 2017).

Table A1 in the annex provides full results for three regression models estimated with the same set of predictors separately for Jordan, Lebanon, and the OECD countries. In each case, a model with and without the background variables is estimated. Differences in the coefficients across the models and countries are discussed below, providing possible explanations from the perspective of differences in education policy and practice.

Family background

The PISA index of economic, social, and cultural status (ESCS) is positively related to reading performance in all countries, and the regressions confirm this association, showing that, in all countries, students with more privileged backgrounds indeed tend to score higher in cognitive tests. However, the association is much stronger in the OECD countries than in the focus

countries. In the former, the average regression slope is about 30 points in both models (with and without the control of sociodemographic factors), whereas **in Jordan, the association between ESCS and reading performance is only about 12 points, and in Lebanon it amounts to about 17–18 points** (reading score change associated with one standard deviation change in socioeconomic background).

That is quite unexpected, given the large socioeconomic disparities in these two countries. The solution to this conundrum lies most probably in the sample coverage: while in most OECD countries the whole population of 15-year-olds is covered by PISA – which enables the estimates to represent the relationship in nearly the full population – this is less true for Jordan and Lebanon, where a large number of 15-year-olds are not covered by the assessment (according to PISA 2018 data – 13.3 percent in Lebanon and 46 percent in Jordan). These students are probably from less privileged backgrounds, and one can expect that they would score lower in the PISA test. In that case, the overall association with socioeconomic background would probably be stronger.

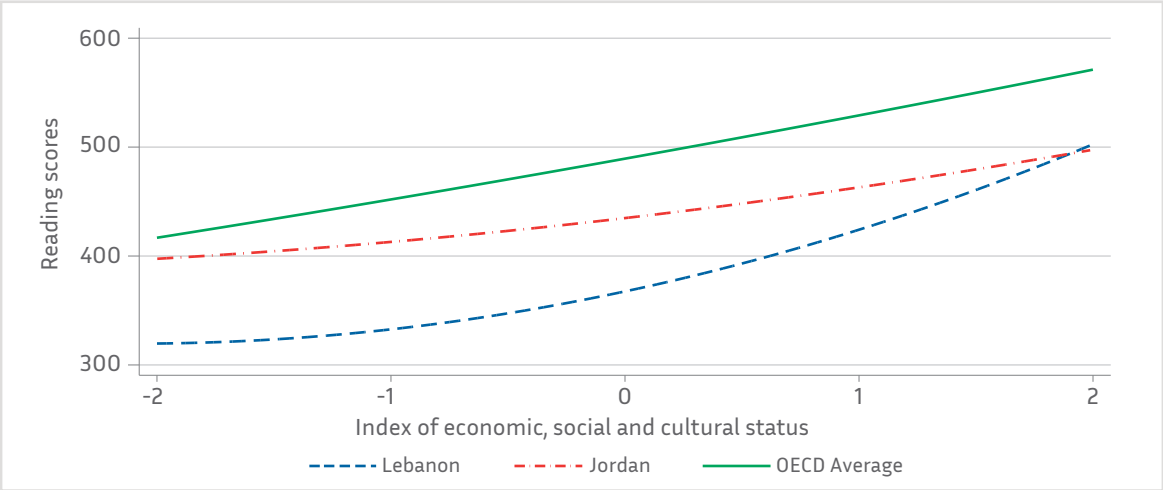
Additional comparison of nonlinearities in this relationship can shed more light on how the effect of socioeconomic background varies among Jordan, Lebanon, and the OECD countries. Figure 2.1 shows this relationship graphically for students within a reasonable range of the ESCS index (minus 2 and plus 2 standard deviations around the OECD average). We can see that the effect is strong and linear in the OECD countries. In Jordan, the relationship is also close to linear but weaker than in the OECD. In Lebanon, the relationship is highly nonlinear: very weak for students with low socioeconomic background (on the left) and much stronger for those from more privileged backgrounds (on the right). Interestingly, students from low socioeconomic backgrounds score similarly in Jordan and across the OECD and much lower in Lebanon. However, students with privileged backgrounds score almost identically in Jordan and Lebanon, but the scores for privileged OECD students are much higher. When we look at students from average socioeconomic backgrounds, the performance of the OECD students is higher than that of the Jordanian students, and much higher than that of the students in Lebanon.

This analysis suggests that students from disadvantaged backgrounds are relatively well-supported in Jordan, but those in Lebanon struggle to learn basic reading skills. By contrast, privileged students have similar performance in both of our focus countries, although well below the OECD average.

Overall, what this shows is that the weak relationship between socioeconomic background and performance in Jordan and Lebanon is driven by the relatively low performance of the more privileged students. On the other hand, the stronger effect of socioeconomic background in Lebanon, when compared to Jordan, is driven by the relatively low scores of disadvantaged students.

One could summarize this analysis this way: **Whereas disadvantaged students in Jordan perform as expected and close to the average for disadvantaged OECD students, privileged students in Jordan perform well below expectations and below the OECD average for privileged students. When it comes to Lebanon, both disadvantaged and privileged students score lower than expected, given their socioeconomic background.**

FIGURE 2.1: THE RELATIONSHIP BETWEEN SOCIOECONOMIC BACKGROUND AND READING PERFORMANCE IN LEBANON, JORDAN, AND THE OECD COUNTRIES



Source: Author analysis of PISA 2018 microdata

The index of parents' emotional support is positively related to student performance in Jordan and Lebanon, initially more strongly in the latter, but after controlling for background variables, the association is similar in both countries. The results suggest that **emotional support from parents is more important for student achievement in Jordan and Lebanon than in the OECD countries** and thus can be seen as a more important asset in these two countries, but especially in Lebanon.

Motivation and attitude indices

Two indices, measuring student perception of competitiveness (**percomp**) and their attitude toward it (**compete**), are only weakly related to reading performance. Higher perceived competition is negatively associated with performance in all the analyzed countries. There is a positive association between attitudes toward competition and reading scores in Jordan, whereas for Lebanon and the OECD countries this relationship is insignificant.

In general, these results suggest that competitiveness does not play a large role in explaining differences in student reading achievements. Similarly, the index of fear of failure (**gfofail**) is negatively associated with performance in Jordan, meaning that students in this country who express a greater fear of failure perform lower, but the effect is rather small – about 7 points. Also, the index of the value of school (**attlnact**) is related to higher scores in students who value schooling to a greater extent, but the associations are quite weak and do not vary much across the analyzed countries.

A much stronger relationship is observed for the index of motivation to master tasks (**workmast**), especially in Jordan. Students who score better also report greater motivation to master tasks, but in Jordan the difference is 2-3 times higher than the OECD average, and in Lebanon nearly twice higher. This suggests that in these two countries, **student motivation to perform well and achieve mastery is a more important prerequisite for learning than in the OECD countries**.

The index measuring student self-efficacy (**resilience**) is positively associated with larger increases in reading scores only in Lebanon. One standard deviation increase in self-reported resilience or self-efficacy is associated with an 11–12 point increase in reading performance for Lebanese students. Thus, **resilience might be a factor associated with the performance differences in Jordan and Lebanon.**

School-related indices

The two indicators reflecting the organization of the school system are strongly associated with performance in all countries, but the relationships vary. Results for students who repeated a grade (**repeat**) are especially interesting for Lebanon, where grade repetition is a much more common practice than in Jordan or across the OECD (34 percent of students in Lebanon repeat a grade, compared to about 11 percent in Jordan and in the OECD). Repeating a grade is negatively associated with reading scores in all countries, but the effect is much stronger in Lebanon. This is to be expected because students repeating grades are usually those who struggle with learning. However, students in Lebanon who repeated a grade are much more numerous and they have even lower results than in other countries. This suggests that **repeating a grade is a common but highly ineffective practice in Lebanon. It is also a very costly policy** because it fails to improve student results and deepens differences among students, while the costs of keeping students longer in the same grade are also substantial unless they leave the education system early. The rate of grade repetition in Jordan is similar to the OECD average, so although the policy may be costly and ineffective in these countries as well, its overall impact on student achievement and the cost of education is lower than in Lebanon.

According to PISA 2018, private schools are much more popular in Lebanon (52 percent of 15-year-old students attend private schools) than in Jordan (21 percent), but in both countries these numbers are higher when compared to the OECD average (18 percent, including government-funded schools). The national statistics indicate that the share of private schools differs from the PISA data, and in the case of Lebanon, they are even higher. The difference in reading performance between students in public and private schools is positive in Jordan, Lebanon, and for the OECD average alike, even after taking into account student socioeconomic background and other indicators in our model. Interestingly, this performance advantage is largest in Lebanon where the larger share of students attend private schools. In Lebanon, even after taking into account multiple factors, **the advantage of students in private schools amounts to about 30–40 points, which is equivalent to at least one year of formal education**. In Jordan, where fewer students go to private schools, the difference is about 15 points, which is still much more than in the OECD countries, where the advantage of private schools is below 10 points.

The final two indicators are based on school principal reports about staff shortages (**staffshort**) and teacher behaviors that hinder student learning (**teachbeha**). Interestingly, staff shortages are not related to reading performance in either Jordan or Lebanon. Regarding teacher behavior, the index is negatively associated with performance in Jordan, but the associated difference in reading scores is only about 5 points. In Lebanon, there is no correlation with performance, and across the OECD countries the effect is negative but very small (less than 2 points).

As a robustness check, a regression model was estimated for the selected variables that have the strongest association with reading performance and which vary across the two countries and the OECD average.[9] This additional model reassures us that our regression analysis is not biased by correlations among indicators. The results are presented in annex table A2 and are highly similar, providing the same qualitative interpretation of differences across the two countries and the OECD. For the sake of brevity, we will also use this simpler model for the decomposition analysis.

2.3. Decomposition results

The Oaxaca-Blinder decomposition method enables comparisons between the **effects** of resources and the **effects** on achievement simultaneously to explain performance differences between two countries. From the previous analysis where we compared the average values

of the variables and their associations with achievement, we could see that both differences – in average values and regression coefficients – vary across countries. The decomposition model considers both effects to explain achievement gaps. We first decompose the reading performance difference with the OECD average separately for Jordan and Lebanon. Then, we compare performance distribution in Jordan to that in Lebanon.

The method uses a set of linear regression models to decompose associations between indicators and the reading achievement distribution into a. the part related to differences in the levels of variables ("endowment") and b. the effects of variables ("coefficients"). In other words, **the "endowment" effect explains the performance difference by looking at different levels of certain characteristics across Jordan, Lebanon, and the OECD Average**. For example, if socioeconomic background is lower in one country, that will partly explain the gap because socioeconomic background is related to reading achievement.

The "coefficient" effect explains the performance difference by looking at the different regression slopes of these variables. For example, if socioeconomic background is more strongly associated with performance in the OECD, then it will explain part of the performance differences. If the regression slopes are similar across countries, or if the coefficients in all countries are close to zero, then the contribution of these variables to explaining the achievement difference will also be negligible. In the Oaxaca-Blinder decomposition, the third component is called the "interaction" effect and reflects how the level of variable and regression slope interact with each other. In other words, it reflects whether a difference in the effect for higher or lower values of the variable affects the achievement difference.

Table A3 in the annex shows the decomposition results for the comparison between Jordan and the OECD average, and then for the comparison between Lebanon and the OECD average. The estimates in the table show how indicators can explain the achievement advantage of the OECD countries. A positive sign in the endowment section suggests that this indicator contributes to this advantage through the level of this indicator which is favorable for the OECD countries. For example, since socioeconomic background is higher on average in the OECD countries, the endowment effect for the ESCS index is positive, showing that this difference in favor of the OECD countries contributes to their overall achievement advantage.

The estimated endowment effect for ESCS is about 7 points for the comparison between Jordan and the OECD Average. This can be interpreted as showing that **with the same socioeconomic background as in the OECD countries, the reading performance in Jordan would increase by 7 points,** or that the gap to the OECD countries would shrink by 7 points. **Considering that the overall gap is about 65 points, we can conclude that the difference in socioeconomic background contributes to about 10 percent of the overall gap.**

Estimates in the section of coefficients show how differences in the regression slopes between the two countries and the OECD average contribute to the achievement gap. A positive sign in the section of coefficients suggests that having a slope similar to that of the OECD countries would increase the achievement gap. In the case of **the coefficient estimate for ESCS in Jordan, we see a negative sign. This suggests that having a similar regression slope as in the OECD would decrease the achievement in Jordan by 11 points**. So, having a stronger association between ESCS and performance, similar to that of the OECD countries, would further increase the gap between the OECD and Jordan.

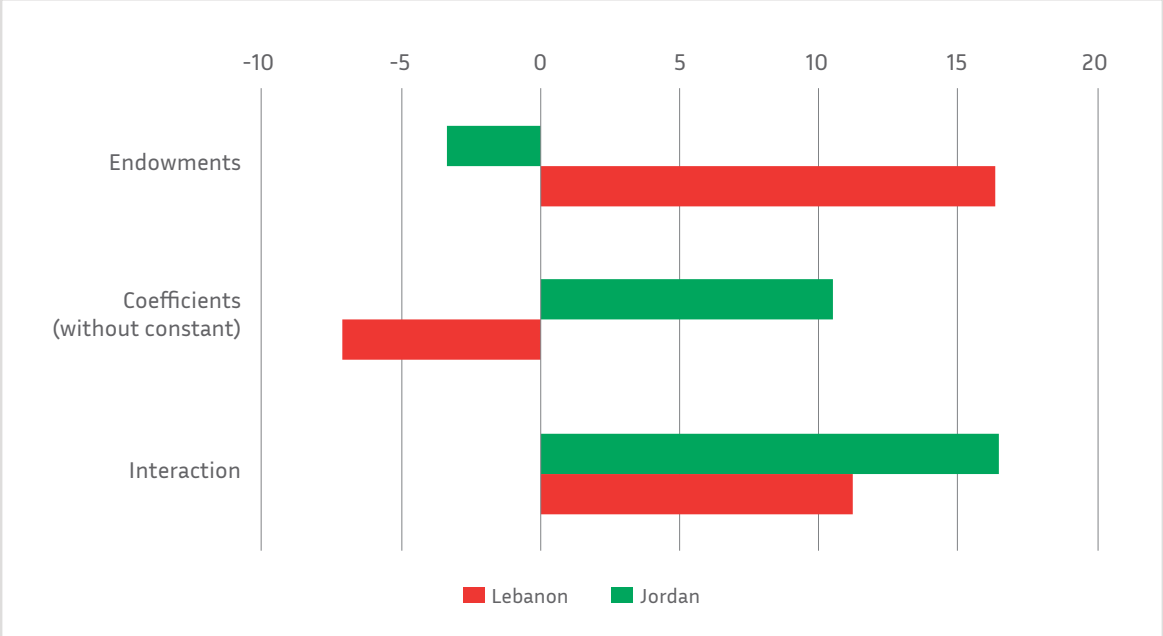
Finally, there is a section with interaction terms that show a joint effect of differences in the levels of characteristics and differences in the returns to these characteristics. In the case of Jordan versus the OECD Average comparison, **the interaction effect for socioeconomic background is positive. This means that the achievement of Jordanian students would be about 11 points higher if they had both a higher level of ESCS and a steeper socioeconomic background regression slope**.

The full results are available in table A3, but the following four figures summarize the main findings. First, figure 2.2 shows the decomposition of the achievement gap between the OECD Average and Jordan and Lebanon into three parts. Endowments measure the overall contribution that differences in the levels of the variables make to the achievement gap. For Jordan, the effect is very small, so we can conclude that overall differences in family characteristics, attitudes, and system organization do not account for much of the achievement gap. We will see, however, that individual effects vary and go in different directions. For Lebanon, the overall endowment effect is positive, meaning that with similar levels of variables as across the OECD, Lebanese students should perform about 16 points higher.

Figure 2.2 also compares the total effect of coefficients (differences in regression slopes) and interaction between endowments and coefficients. In both cases, there is a **positive total contribution to the performance in Jordan of having the same coefficients as in the OECD countries** (a possible increase of about 10 points) and having both the same endowments and coefficients (an increase of 16 points). **For Lebanon, having the same effects of variables as across the OECD would widen the gap by potentially lowering the performance of Lebanese students.**

These results are hard to interpret without analyzing individual variables because their effect might vary in terms of endowments, coefficients, and interactions. But additionally, the difference to the OECD average varies, as we saw at the beginning of the chapter when comparing means of the variable.

FIGURE 2.2: THE CONTRIBUTION OF DIFFERENCES IN ENDOWMENTS, COEFFICIENTS, AND THE INTERACTION BETWEEN THEM TO THE READING ACHIEVEMENT GAP BETWEEN JORDAN, LEBANON, AND THE OECD AVERAGE



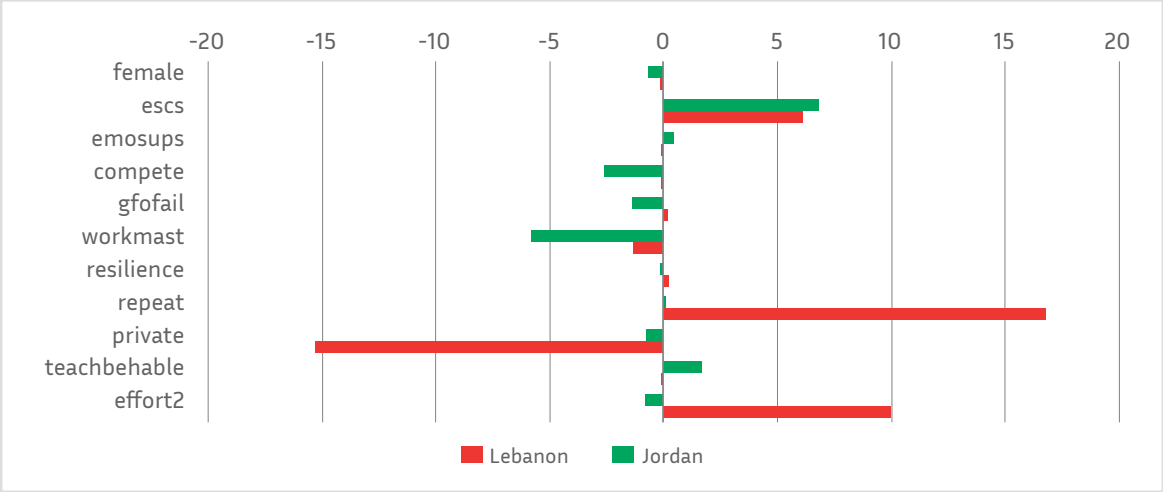
Source: Author calculations using PISA 2018 microdata

Endowment Effects

Figure 2.3 shows a detailed comparison of endowment effects for each variable, and provides a separate comparison of the OECD average with Jordan and Lebanon. Positive effects suggest in this case that changing the level of a variable to the level found on average across the OECD

would result in higher reading performance in Jordan or Lebanon. As discussed, the results show that if students from Jordan and Lebanon had the same socioeconomic background as the OECD Average (the ESCS index), their scores would be higher by about 6–7 points. This is a relatively small change, considering the large gap in socioeconomic background and an even larger achievement gap. In Jordan, several attitudinal indices show a negative effect, meaning that if students had a similar attitude toward competition (**compete**), or the same fear of failure (**gfofail**), or the same level of work mastery attitude as across the OECD, they would score lower. However, the combined effect for these three indicators is less than 10 points, so it is an effect of a rather modest size.

FIGURE 2.3: ENDOWMENT EFFECTS



Source: Author calculations using PISA 2018 microdata

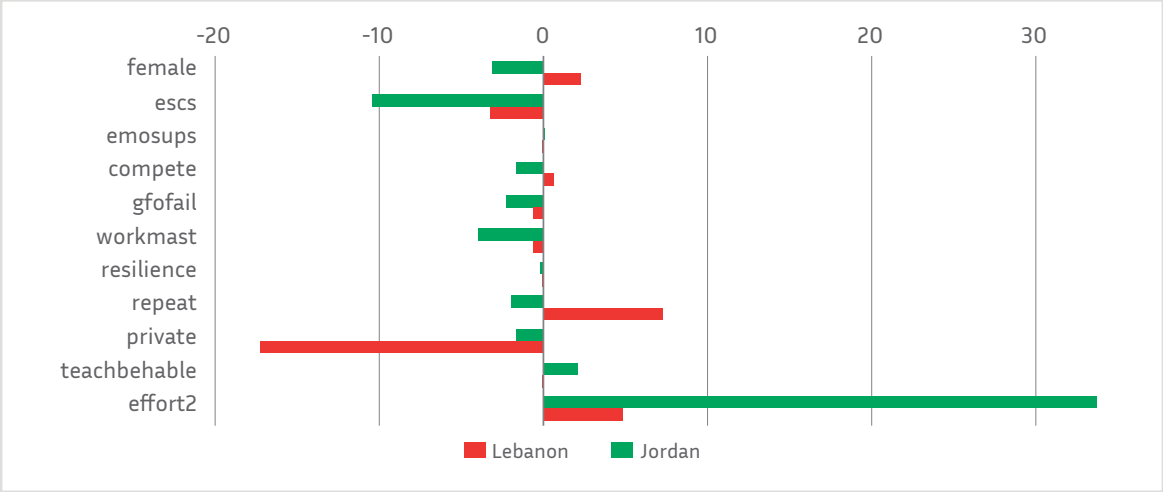
Much larger – but only in the case of Lebanon – are the effects of three key factors: grade repetition, private schooling, and test effort. **Having the same level of grade repetition as across the OECD would increase scores in Lebanon by about 17 points**, which is a substantial change. However, the repetition rate in Lebanon is much higher than the OECD average, so limiting it to the OECD level, as challenging as it may be, could bring positive reading results. The effect of higher attendance at private schools in Lebanon is quite the opposite: **lowering the share of students in private schools in Lebanon to the average level of the OECD countries would result in a decrease in reading performance of about 15 points.** It shows the positive impact of private schools on achievement; but on the other hand, it also shows the relatively lower quality of public schools in Lebanon. This effect can be fully interpreted only when the effects of coefficients and interactions are also considered, which is presented below.

The difference in test effort also contributes to the achievement gap between the OECD and Lebanon (but not Jordan). **Increasing student test effort in Lebanon to the level of the average across the OECD would raise performance by about 10 points**. In this case, "coefficient and interaction effects are not significant, so the lower level of effort on the PISA test in Lebanon is what would make the entire difference here. It may show the lower value that Lebanese students attach to the PISA assessment, in which case that would be a result relevant only to this assessment**.** However, it may also be a sign of generally lower motivation among some students in Lebanon, which would be an issue to be addressed with education policy. This effect could also represent phenomena such as a general assessment attitude or even test anxiety. These issues too can be addressed by appropriate educational policies.

Coefficient effects

Figure 2.4 compares the effects of differences in coefficients (regression slopes) between the OECD average and Jordan and Lebanon. The effects for gender are surprisingly low, despite the fact that the **gender gap in reading in Jordan is one of the largest among the countries participating in PISA 2018**. It appears that **the advantage of girls in reading is strongly associated with other variables in our model that its own direct effect is quite small.**

FIGURE 2.4: COEFFICIENT EFFECTS



Source: Author calculations using PISA 2018 microdata

More significant is the effect of differences in regression slopes for socioeconomic background (the ESCS index), but this is true only for Jordan. **Having the same relationship between ESCS and reading achievement as the OECD average would result in lower reading performance in Jordan**. Because the regression slope in Jordan is smaller than in the OECD countries, stronger segregation based on socioeconomic background would result in lower performance. Again, this effect needs to be interpreted together with the interaction effect, which is discussed below. For Lebanon, the effect of socioeconomic background is close to zero.

Differences in regression slopes of the attitudinal indices are related to the achievement gap for Jordan only, and there too, the effects are small. Taken together, the three indices (**compete, gfofail,** and **workmast**) are associated with a change smaller than 10 points. With the same effects of attitudes on achievement as exist in the OECD countries, students in Jordan would score 10 points lower. Regarding the index of resilience (self-efficacy measure), the coefficient effects, similarly to endowment effects, are negligible in both of our focus countries.

The effect of the difference in the regression slope for repeating a grade has a positive sign for Lebanon and is close to zero for Jordan. **That means that the more negative association between repeating a grade and reading performance in Lebanon further contributes to the wider achievement gap between Lebanon and the OECD countries**. In other words, having a smaller disadvantage associated with grade repetition would improve performance in Lebanon by about 7 points.

The performance difference between students in private and public schools is much larger in Lebanon than in the OECD. The decomposition analysis suggests that a smaller public-private difference would decrease reading performance in Lebanon. There is no such effect for Jordan. These results demonstrate a current challenge faced by the education system in Lebanon because more students will probably shift to the public sector owing to decreasing family

income. While the decomposition results show only an association between public and private school ownership and performance, it suggests that **taking in more students in public schools may result in lower student performance in Lebanon. Thus, improving teaching quality in public schools is an urgent issue to address.**

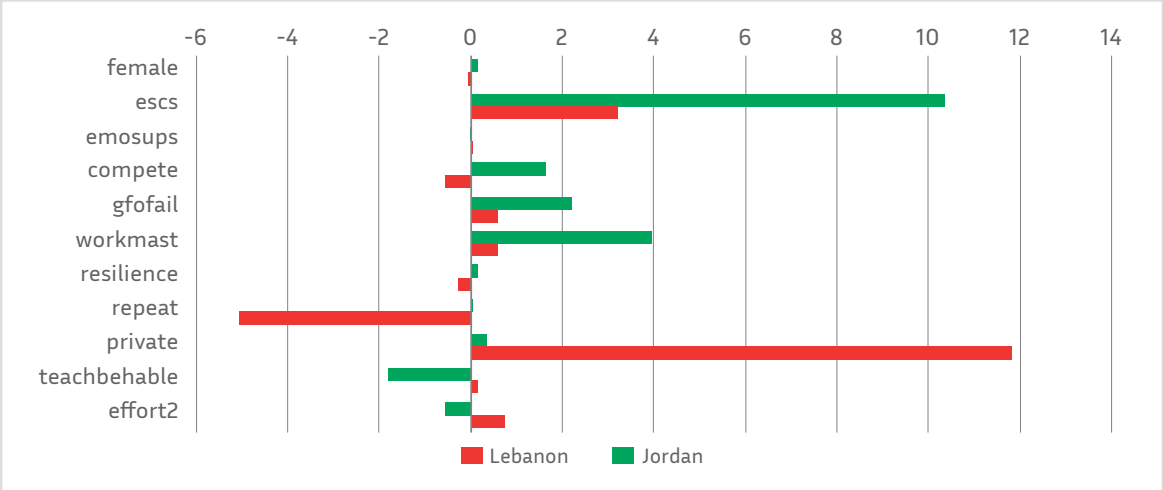
Finally, the strongest effect of differences in the regression slope for Jordan is associated with the test effort measure. **If Jordan had the same effect of test effort as exists in the OECD, it would raise performance in Jordan by more than 30 points**, which is a very strong effect. In other words, if better motivation among Jordanian students to solve the PISA test yielded the same high result in test performance in Jordan as among the OECD countries, then reading performance in Jordan would improve. Do note, however, that for Lebanon, it was the lower level of test effort that resulted in lower reading performance. For Jordan, it is not the difference in the effort ***per se*** (amount of effort paid to the PISA tests), but that even if students in Jordan are highly motivated to perform well, they achieve better scores less often than across the OECD.

Interactions effects

Finally, Figure 2.5 compares interaction effects. These effects reflect the possible change in performance in Jordan or Lebanon that might result if both endowments and coefficients were changed to the OECD level. **Reading performance in Jordan would improve by about 10 points if Jordan had the same level of socioeconomic background (higher) and a steeper regression slope as in the OECD countries**.

The corresponding effect for Lebanon is much smaller, about 3 points. This can be explained by looking at the relationship (presented in figure 2.1) between socioeconomic status and performance in Jordan. For disadvantaged students, the outcomes are similar to those across the OECD. But for privileged students, the outcomes fall below those by similar OECD students. So, the positive interaction effect states that if there were as many Jordanian students from higher socioeconomic backgrounds getting as high results as found in the OECD, the achievement gap would close up by about 10 points.

FIGURE 2.5: INTERACTION EFFECTS



Source: Author calculations using PISA 2018 microdata

The interaction effects for attitudinal indices and grade repetition are both small, with differences below 5 points in both Jordan and Lebanon. The only other substantial interaction effect occurs when both the level of private schooling and the size of the public-private achievement gap in Lebanon are the same as across the OECD, which would mean a lower

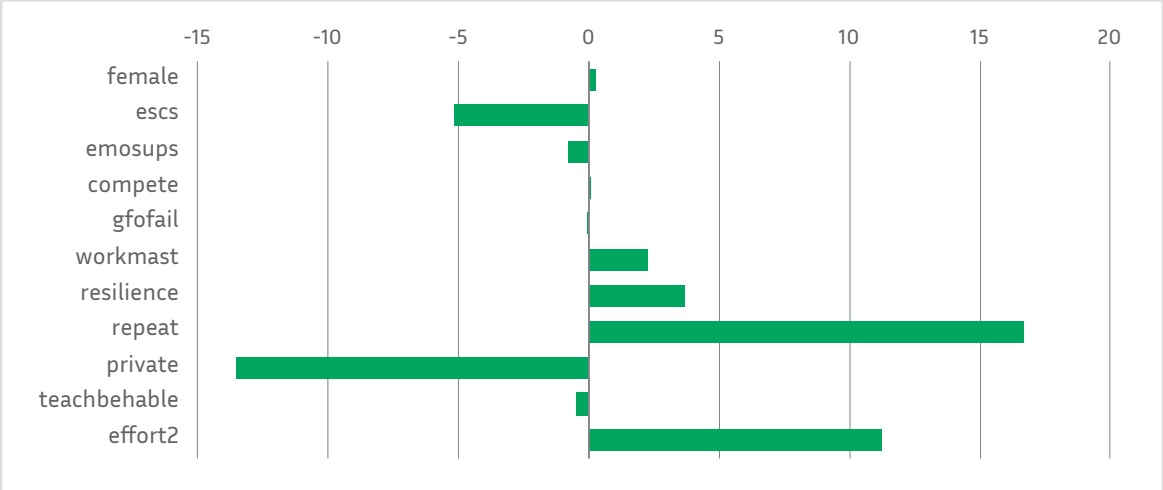
share of students in private schools and a smaller performance advantage of private over public schools. In this case, reading performance would potentially increase by about 12 points in Lebanon. Thus, **the decreasing enrollment in private schools might be detrimental to student performance in Lebanon only if the public-private achievement gap remains high. Lowering the gap to the levels found across the OECD countries could result in an overall improvement in student performance.**

Overall, the **decomposition model is able to explain a large part of the reading achievement gap between the OECD countries and Jordan and Lebanon**. Note that in the decomposition analysis, indices of emotional support from parents (emosups), resilience (self-efficacy), and teacher behavior (teachbeha) play no role in explaining the reading achievement gap between the OECD countries and Lebanon/Jordan. Also, other attitudinal indices do not show a significant association with the achievement gap. **Student socioeconomic background, grade repetition, private schooling, and differences in test effort (for Lebanon) and its impact on test results (in Jordan) are the factors associated with the reading achievement gap between Jordan/ Lebanon and the OECD countries**. These factors alone can explain most of this achievement gap.

2.4. Analysis of the reading achievement gap between Jordan and Lebanon

While the OECD countries provide a useful benchmark against which Jordan and Lebanon can be compared, it is also interesting to directly compare the two neighboring countries. Table A4 in the annex and figures below compare Jordan with Lebanon using a similar decomposition approach as for the comparison with the OECD average. **The estimated reading achievement gap between the two countries is about 43 points, with Jordan students performing higher**. The results have a similar interpretation to those presented above, but in this case the gap is between Jordan (the higher-performing country) and Lebanon. Thus, a positive effect means a performance improvement for Lebanon and a decrease of the gap size, while the opposite effect means a performance deterioration for Lebanon and an increase in the gap size. Two models were estimated, one with and the other one without test effort as the control variable. The figures present the results with test effort included, while table A4 displays results for both models.

FIGURE 2.6: ENDOWMENTS EFFECTS OF THE DECOMPOSITION OF THE READING PERFORMANCE GAP BETWEEN JORDAN AND LEBANON



Source: Author calculations using PISA 2018 microdata

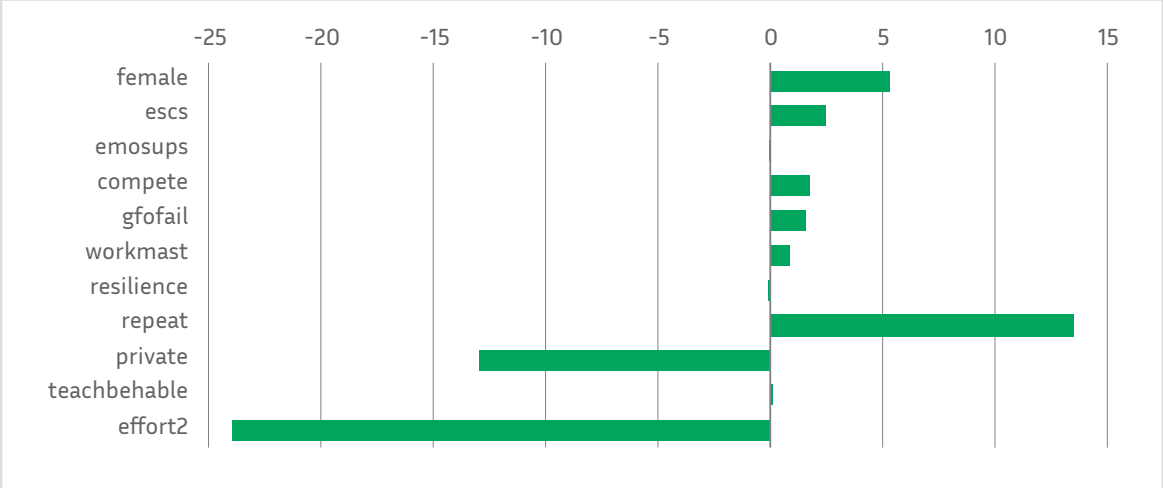
Figure 2.6 shows endowment effects – how differences in the levels of variables are associated with the performance gap. The higher average socioeconomic background in Lebanon means that lowering it to the level of Jordan would further increase the gap by about 5 points. It shows that the higher performance of Jordan despite the lower socioeconomic background of its students, and the improving family resources in Jordan, would result in even better performance. Attitudes (work mastery and resilience) make a small contribution to the achievement gap between Jordan and Lebanon, and in this case having a level of both more similar to Jordan would improve performance in Lebanon by about 6 points. The effects of emotional support (emosups), fear of failure (gfofail) and teacher behavior (teachbeha) are close to zero. There is no difference in the share of female students between these two countries, so the effect of the female variable is close to zero.

Key differences associated with the performance gap between Jordan and Lebanon are related to differences in grade repetition, number of students in private schools, and test effort. **Having a smaller share of students repeating a grade in Lebanon, as it is in Jordan, would increase student reading performance by about 17 points, which itself would close the gap by one-third. On the other hand, having a smaller share of students in private schools, as in Jordan, would decrease reading performance in Lebanon by 14 points. Finally, having a similar level of test effort as in Jordan would improve reading performance in Lebanon by 11 points.**

The next figure shows how differences in coefficients (regression slopes) are associated with the reading performance gap. Here, the effect for females is about 5 points, suggesting that further improving the advantage of girls over boys to the levels found in Jordan would increase performance in Lebanon. The differences in the coefficients for socioeconomic background, attitudes, and teacher behavior are not related to the reading achievement gap between the two countries.

There is, however, a large impact on the reading achievement gap of differences in coefficients for grade repetition, private schooling, and test effort. Having a less negative effect of repeating a grade, as in Jordan, would improve reading performance in Lebanon by 13-14 points. **Grade repetition in Lebanon is not only more widely accepted but also associated with much lower student performance than in Jordan, so both its endowment and coefficient effects are strongly associated with the reading performance gap to Jordan.**

FIGURE 2.7: COEFFICIENT EFFECTS FOR THE DECOMPOSITION OF THE READING PERFORMANCE GAP BETWEEN JORDAN AND LEBANON



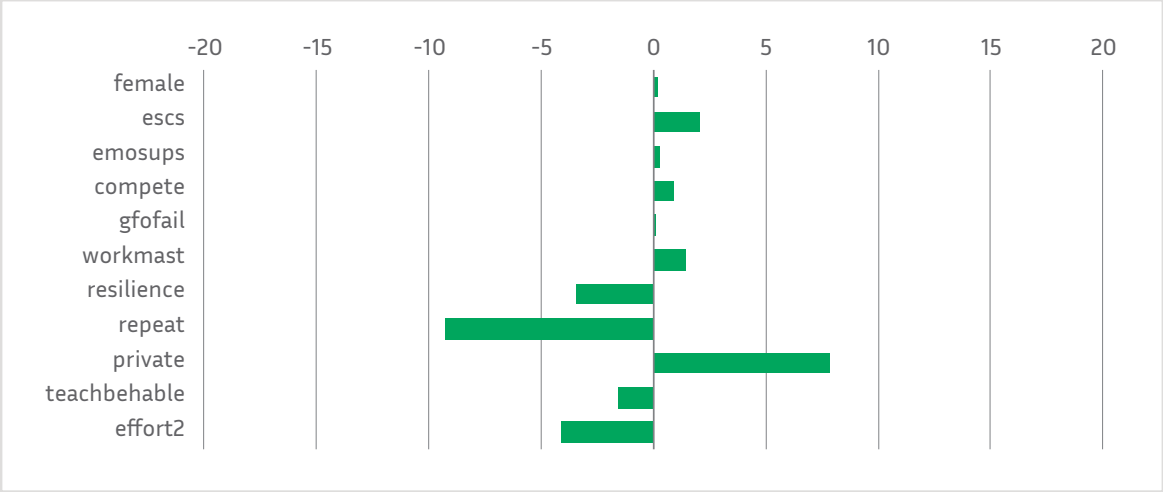
Source: Author calculations using PISA 2018 microdata

Having the same coefficient for private schooling as in Jordan would decrease the performance of students in Lebanon by about 13 points. This is because private schools not only are more popular in Lebanon but also show a performance advantage over public schools that is larger than in Jordan.

Finally, having the same coefficient for test effort as in Jordan would decrease performance in Lebanon by 24 points. This is because of a weaker association between test effort and performance in Jordan, which, as we already saw, is one of the factors that also explains a large part of the performance gap between Jordan and the OECD countries.

The figure below shows interaction effects from the decomposition model, which show what would happen to the reading performance in Lebanon if both endowments and coefficients are the same as in Jordan. In most cases, these effects are below 5 points, so they have little impact on the achievement difference. For grade repetition, the interaction effect is about 10 points, but when compared to the endowment effect and the coefficient effect, it is much smaller.

FIGURE 2.8: INTERACTION EFFECTS OF DECOMPOSING THE READING PERFORMANCE GAP BETWEEN JORDAN AND LEBANON



Source: Author calculations using PISA 2018 microdata

In any case, the effect of additional simultaneous change in both endowments and coefficients for grade repetition would have a negative effect on reading performance in Lebanon, but only after having an already large improvement from lowering grade repetition and lowering its detrimental effect on performance, and both to the levels of these effects in Jordan. Similarly, the additional effect of having both a lower share of students in private schools and a lower advantage of these students over public schools, as in Jordan, would improve student results in Lebanon. However, that needs to take into account the large effects of endowments and coefficients, which demonstrate that overall, the larger share of students in private schools in Lebanon contributes positively to its performance when compared to Jordan.

Finally, the interaction term for test effort is negative, which suggests that the effect of the simultaneous increase in test effort, with its smaller impact on test performance, would result in widening the gap between the two focus countries by slightly less than 5 points.

• • •

Summing up, this analysis points to four factors that can in large part explain the achievement differences between Jordan, Lebanon, and the OECD countries in the PISA 2018 reading assessment:

1. Students in Lebanon would highly benefit if the grade repetition policy were to be[10] to levels similar to Jordan, or to the average across the OECD countries. Grade repetition is very costly to the economy and it is also detrimental to student progress. In Lebanon the share of students repeating one or more grades is much larger than across the OECD countries or in Jordan. Also, the performance of these students is much lower than that of Jordanian or OECD students repeating a grade. The decomposition model suggests that limiting grade repetition or its detrimental effects would improve reading performance in Lebanon by a large margin, halving the gap between Jordan and Lebanon. Instead of simply repeating the grade, struggling students should be offered other, more fine-grained supportive measures aimed at early problem identification and pin-point remedial intervention. Screening tests in early primary school years are an example of such measures; individual or small-group remedial classes are another. Further improvement of low-achieving students' skills could be accomplished by improving enrollment in preschool, including its accessibility to the most underserved in society.

2. The achievement gaps can be only partly explained by lower socioeconomic background of student families. The analysis conducted shows that, in Jordan, students from a disadvantaged background perform quite well, but it is the relative performance of privileged students that is below the standard set by the OECD countries, where students of similar background perform much higher. In Lebanon, the performance of disadvantaged students is very low, much below levels found in Jordan or across the OECD for students with similar background. This is associated with the inferior results of public schools, which are attended primarily by students of lower socioeconomic status. On the other hand, the performance of privileged students in Jordan and Lebanon is similar, but still below the OECD average. Again, Lebanese educational scores would benefit from aid aimed at improving the performance of schools and students struggling with unfavorable socioeconomic conditions. It looks as if Jordan is wrestling with a slightly different problem – how to increase the educational attainments of socioeconomically privileged students. Measures enhancing their ambition and interest should be applied. Such effects can be achieved through appropriate teaching techniques, for example, reversed classroom, project-based teaching, portfolios, peer-tutoring, real-world projects, and other such methods (Little, 2018; Maker and Schiever, 2005; Park and Oliver, 2009).

3. The popularity of private schools and their significantly higher performance contribute positively not only to performance in Lebanon when compared with Jordan, but also to closing the gap with the OECD countries. On the

other hand, this analysis reveals the low quality of public schools in Lebanon. Also, negative selection of students consisting in large part of newly arrived Syrian refugees and students of poor socioeconomic status contributes to deepening the differences between public and private schools. For education policy, a sound goal would be to improve the quality of education in public schools and for students with disadvantaged backgrounds alike, especially in the light of current socioeconomic changes in the country and the expectation of a rise in the transition of students to the public sector. The performance of public schools in Jordan, and the generally higher outcomes for disadvantaged students could provide some guidance for policy and practice in this respect.

4. An improved level of test effort would increase performance in Lebanon, while in Jordan it is the relatively weak relationship between the reported test effort and performance that is widening the gap between the country and the OECD benchmark. Data analyzed reveal that low test awareness and effort might be one of the sources of low achievement in Lebanon. This topic needs further investigation. Perhaps communizing written assessments in Lebanon would serve to improve Lebanese students' level of test-wiseness and lower their level of test anxiety. The Jordanian system of national large-scale assessments, for example, the National Test for Quality Control of Education (National Test) and the National Assessment for the Knowledge Economy (NAfKE), are two examples of good practices here.

5. Reflecting on these results, it is important to notice that although both Jordan and Lebanon invest heavily in education—one of their top public-spending priorities—the two countries lie in an unstable region of the world, which puts them in in a rather unfavorable light, especially in comparison to most OECD countries. However, this situation cannot explain why such a large gap should exist between Jordan and Lebanon, on the one hand, and the OECD countries, on the other, even if one also factors in the lower socioeconomic backgrounds of their respective populations. Hence, more pin-point, in-class research is needed to fully understand the reasons for such a large gap. It is important to note that both countries lie in an unstable region and that both countries invest a lot in education.

3. THE GENDER GAP AND LOW-PERFORMING SCHOOLS IN JORDAN AND LEBANON

The discrepancy in educational achievement between male and female students is a common problem faced by many countries, on which a lot of research has been devoted. A massive body of literature indicates that **males do perform higher in mathematics and science** (Hyde, 2014; Tao and Michalopoulos, 2018; Contini, Di Tommaso and Mendolia, 2017; Williams, White, and MacDonald, 2016; Sun, Bradley, and Akers, 2012). However, it is often reported that the **gap for these subjects is closing** (Lindberg et al., 2010; Robinson and Lubienski, 2010; Wang and Degol, 2017; Hyde et al., 2008). Much larger are the gender-based differences **in reading in favor of females** (Lynn and Mikk, 2009; Moss and Washbrook, 2016; Logan and Jonson, 2010; Mullis et al., 2007).

Despite the great interest in these discrepancies and the many attempts to close down the gaps, it is still not clear what might be the reasons for the performance differences, and when they emerge. Some suggest that these differences **arise in early childhood or kindergarten** (Penner and Paret, 2008) or **during middle school** (Levine et al., 2005). However, their appearance is most often reported to intensify as students progress through high school (Leahey and Guo, 2001; Lindberg, et al., 2010).

The stage at which gender disparities arise varies across countries and contexts (Adamuti-Trache et al., 2013). The earlier the learning problems appear, the more likely it is that, owing to the cumulative nature of the curriculum, the gap will persist in the future or even widen. Therefore, it is vital to identify the problem at the earliest possible stage.

While both Jordan and Lebanon struggle with the problem of gender gaps, their problems are rather different and require different approaches. The Lebanese gap is much smaller but comes with lower scores in international assessments (in reading, mathematics, and science) among both girls and boys.

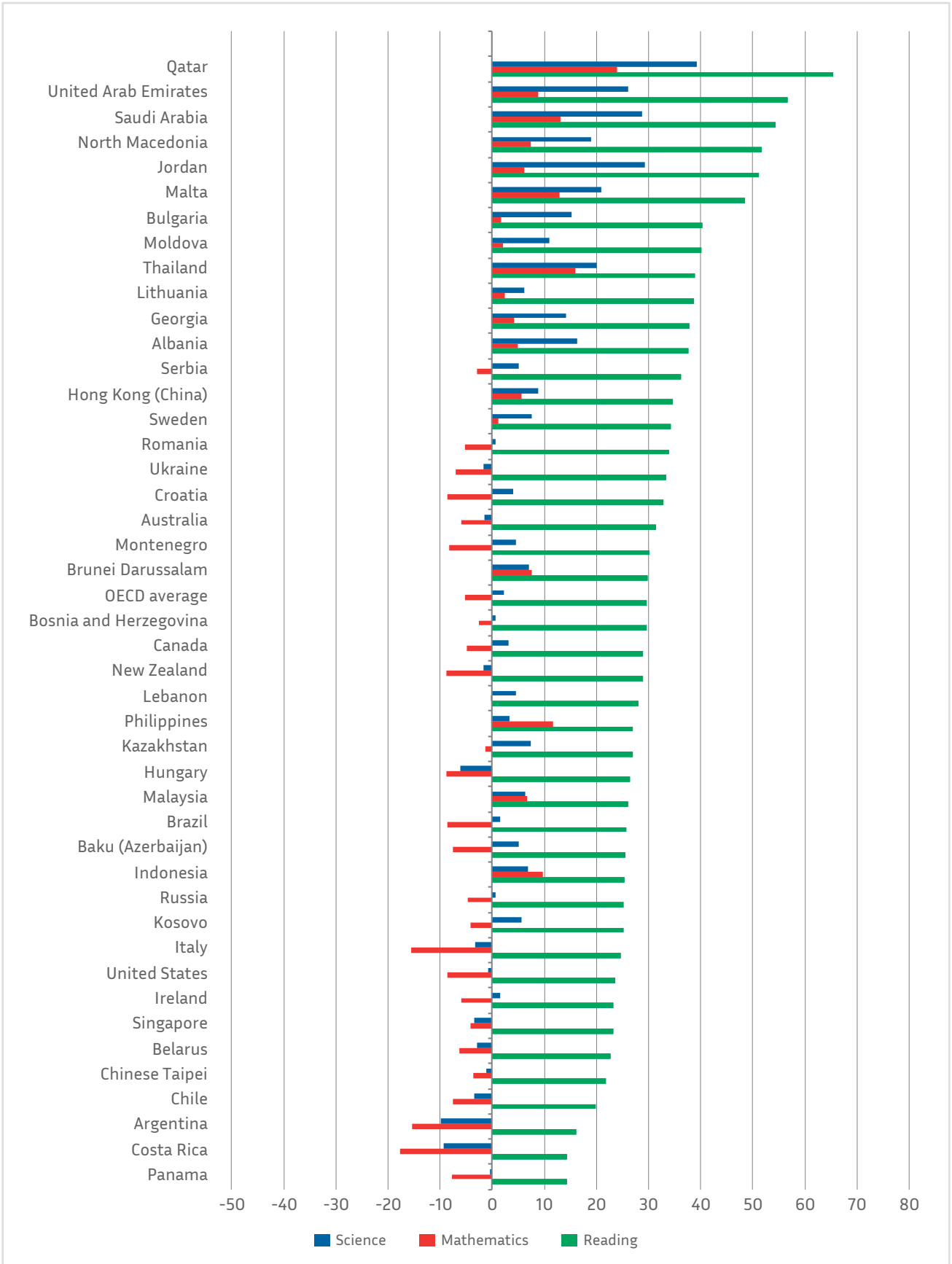
3.1. Performance of boys and girls in Jordan and Lebanon

3.1.1. Gender achievement gap PISA 2018 and international comparison

In almost all countries and in all international student assessments, **girls surpass boys in reading, and the gender gap is, in some cases, even three times greater than the gap in other domains**. Also, the largest gaps tend to be observed in the MENA countries, compared to other world regions. In mathematics, the higher performance of boys is more often observed, which is in line with prevailing stereotypes, although the differences are usually small.

PISA 2018 results show that, in Jordan, females outperform males in reading by over 50 points. It is half of the standard deviation of the international students' performance distribution and an equivalent of about two years of instruction. That is one of the most massive gender disparities in reading among all the countries assessed in PISA. In addition, females also have an advantage in other subjects. The difference is 6 points in mathematics (not statistically significant), and 29 points for science (an equivalence of more than one year of learning).

FIGURE 3.1: GENDER ACHIEVEMENT GAP IN FAVOUR OF GIRLS – PISA 2018



Source: PISA 2018, table II. B1.7.1, table II. B1.7.3, table II. B1.7.5

In Lebanon, gender differences in performance are much smaller. Girls outperform boys by 28 points in reading (equivalent of about one year of education) and 5 points in science (difference statistically not significant). There is no difference in results for mathematics. **The absolute levels of achievement for both genders are significantly lower in Lebanon than in Jordan**.

TABLE 3.1: GENDER ACHIEVEMENT GAP IN FAVOR OF FEMALES, PISA 2018

	reading	mathematics	science
Jordan	51	6	29
Lebanon	28	0	5
OECD	30	-5	2

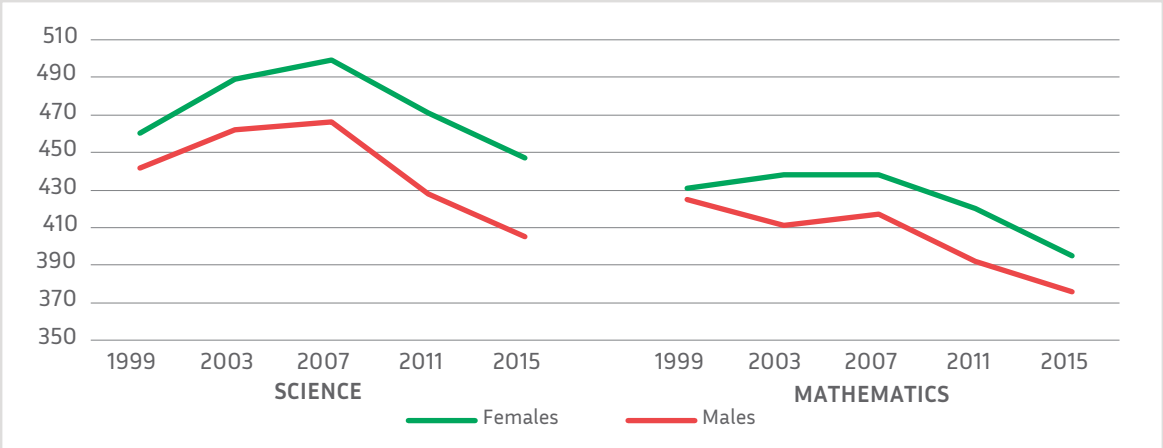
Note: Statistically significant differences are bolded.

Source: PISA 2018, tables II.B1.7.1, II.B1.7.3 and II.B1.7.5

3.1.2. Gender achievement gaps over time

The gender gap varies over time and international assessments. **In TIMSS**, the differences between genders for both mathematics and science were more significant for Jordan in each round. Both **males and females performed better in science than mathematics, but in the latter, the gap has increased over the years.** Although both genders have deteriorated since 2007, the deterioration among boys is slightly larger (figure 3.2).

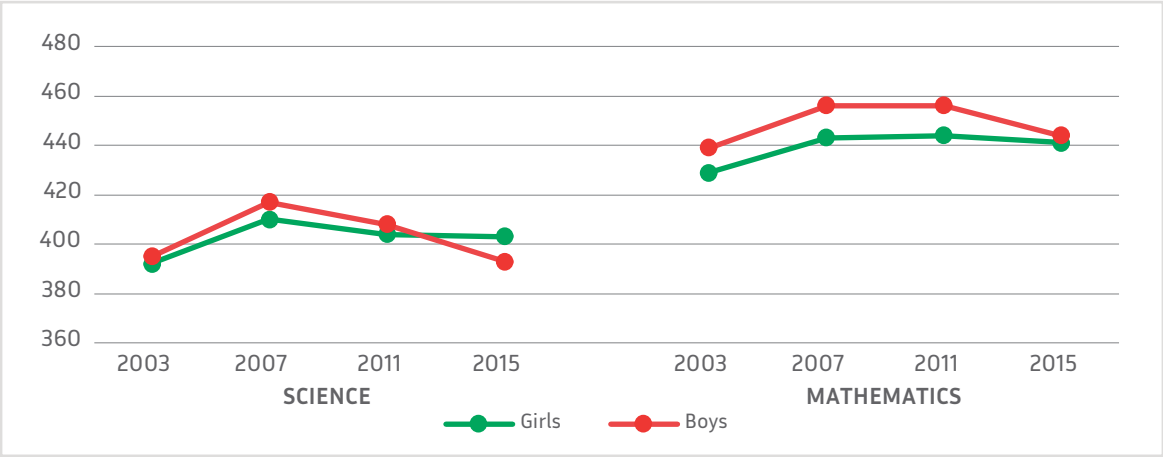
FIGURE 3.2: TIMSS PERFORMANCE TRENDS AMONG BOYS AND GIRLS IN JORDAN



Source: TIMSS 2015 Exhibit 1.13 Trends in Mathematics Achievement by Gender; Exhibit 1.13 Trends in Science Achievement by Gender

When it comes to mathematics, the downward trend in scores is evident for both males and females. In Lebanon, unlike in Jordan, students obtained slightly higher scores in mathematics over time. Over the years, the advantage of boys has diminished in both subjects: in mathematics the gap has almost closed, mainly due to weaker male student results; and in science the gap has reversed (figure 3.3).

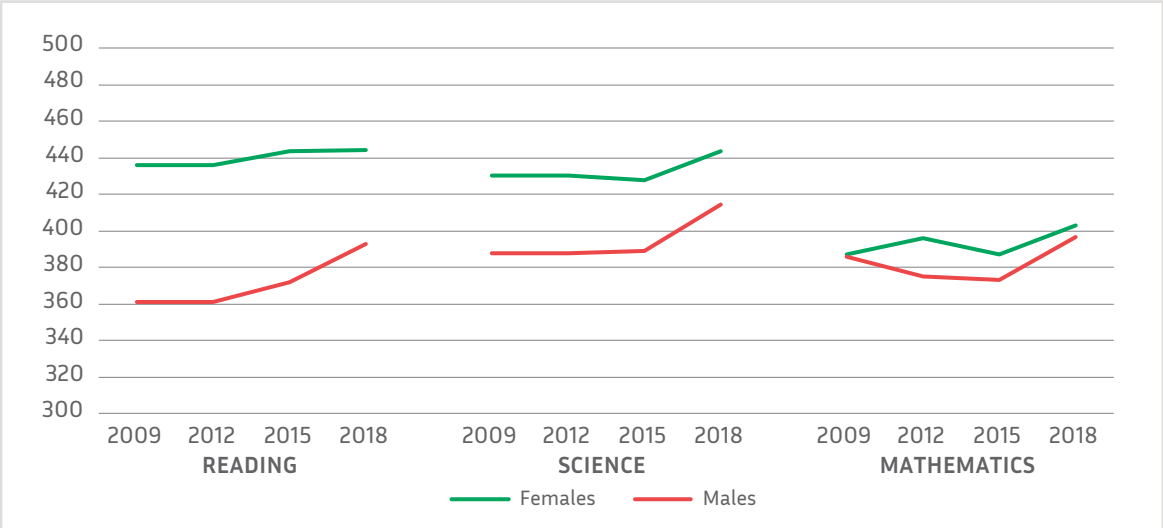
FIGURE 3.3: TIMSS PERFORMANCE TRENDS AMONG BOYS AND GIRLS IN LEBANON



Source: TIMSS 2015 exhibit 1.13 Trends in Mathematics Achievement by Gender; exhibit 1.13 Trends in Science Achievement by Gender

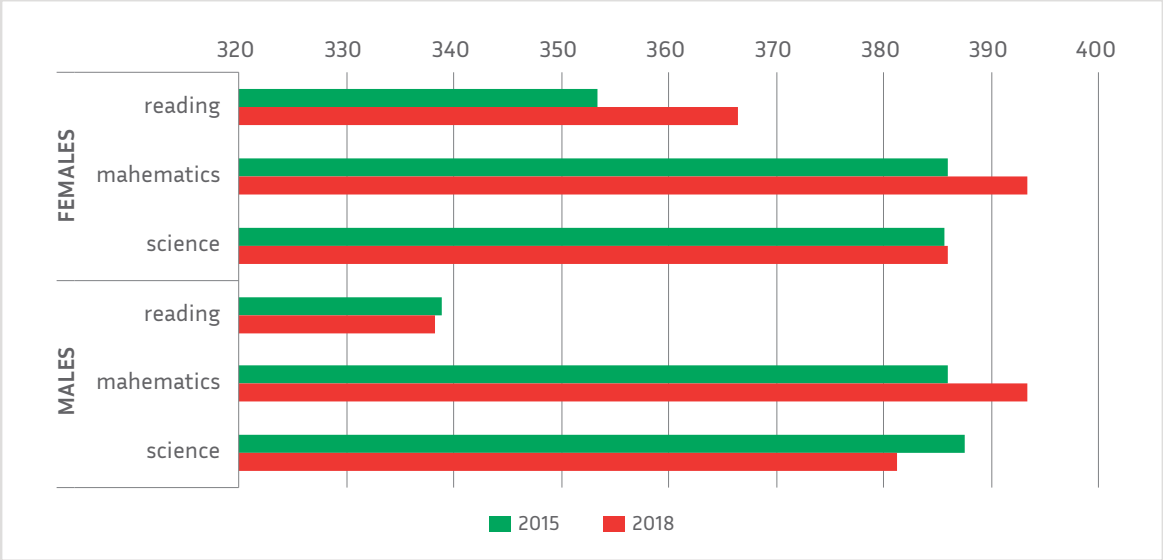
Another large-scale assessment – PISA – provides information about learning outcomes since 2009 for Jordan, and since 2015 for Lebanon. The PISA data point to slightly different trends than TIMSS: this is evident especially for Jordan, where gender gaps have decreased for each domain. The narrowing of the gender gap in reading may result from the relatively stable performance of girls and the significant improvement among boys, especially in 2015–2018. In math and science, although both genders improved, the improvement among boys was greater. In Lebanon the results have improved in all domains between 2015 and 2018, which is in line with the moderate growth visible in TIMSS. Although all female results improved, male students deteriorated in science. The difference is 7 points in reading, and only 1 point in science.

FIGURE 3.4: PISA PERFORMANCE TRENDS AMONG BOYS AND GIRLS IN JORDAN



Source: PISA 2018 table II.B1.7.1, table II.B1.7.3, table II.B1.7.5, table II.B1.7.27, table II.B1.7.28, table II.B1.7.31, table II.B1.7.32, table II.B1.7.33, table II.B1.7.37, table II.B1.7.38, table II.B1.7.39; PISA 2012 table I.5.3a, table I.4.3a

FIGURE 3.5: PISA PERFORMANCE TRENDS AMONG BOYS AND GIRLS IN LEBANON



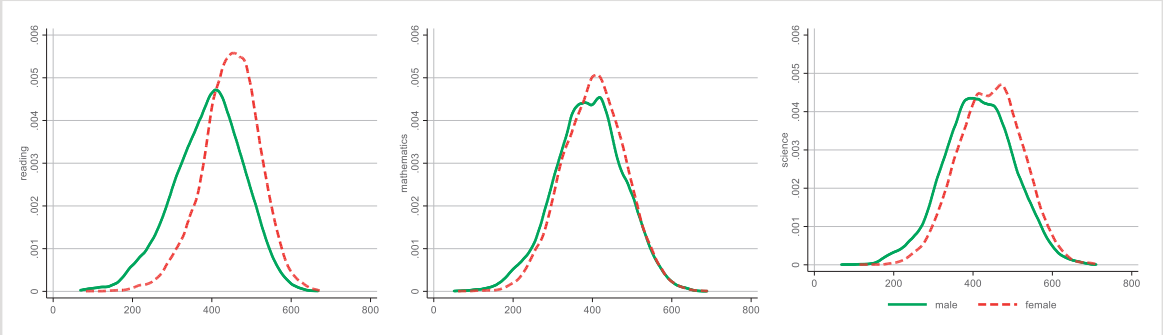
Source: PISA 2018 Table II.B1.7.1, Table II.B1.7.3, Table II.B1.7.5, Table II.B1.7.27, Table II.B1.7.28, Table II B1.7.31, Table II.B1.7.32, Table II.B1.7.33, Table II.B1.7.37, Table II.B1.7.38, Table II.B1.7.39

3.1.3. Gender-related performance distributions

To identify the scale of, and reasons for, the gender-related performance gaps, it may be helpful to identify among which students the differences in results are the greatest.

Figure 3.6 presents the estimates of the **performance distributions of male and female students in reading, mathematics, and science in Jordan in PISA 2018. In the case of reading, there are more high-performing females and more underperforming male students. The variation in males' reading abilities is also larger.** When it comes to mathematics and science, there are slightly more underperforming boys than girls. In mathematics, the advantage of females is evident. However, it is not as significant as in reading. It is also worth noting that the right-hand-side tails of the distributions overlap.

FIGURE 3.6: PISA 2018 READING, MATHEMATICS, AND SCIENCE SCORES DISTRIBUTIONS FOR MALE AND FEMALE STUDENTS IN JORDAN

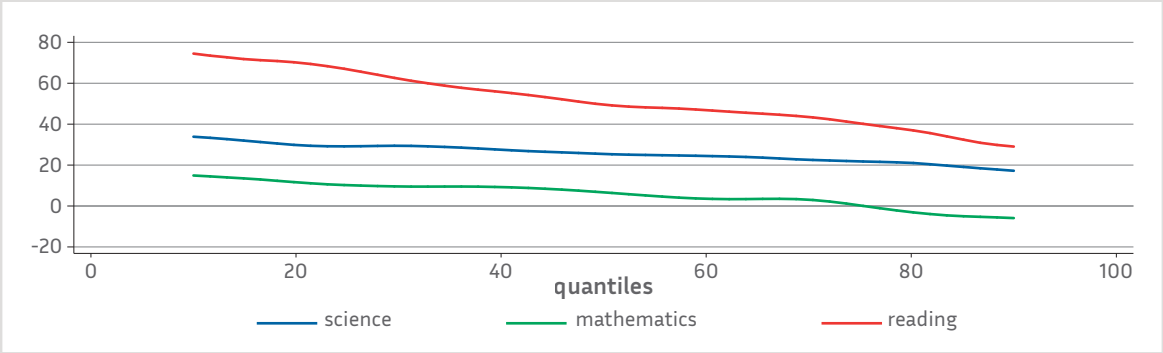


Source: Author calculations using PISA 2018 microdata

In science, the average performance is quite similar for male and female students, but there are more top-performing girls.

The quantile regression allowing us to trace the female advantage over boys depending on the level of performance indicates that **the gap is gradually diminishing for better-performing learners. The most considerable difference in educational outcomes in Jordan between low and high achievers appears in reading**. The gender gap for the weakest students was over 70 points for reading, which is 70 percent of the standard deviation of the international performance distribution, about 30 points in science, and almost 20 in mathematics. When it comes to the highest-achieving students, the gap is still the largest in the reading domain, while in mathematics, the females' advantage almost disappears.

FIGURE 3.7: THE FEMALES' ADVANTAGE IN SCIENCE, MATHEMATICS AND READING BY PERFORMANCE QUANTILE IN PISA 2018 IN JORDAN

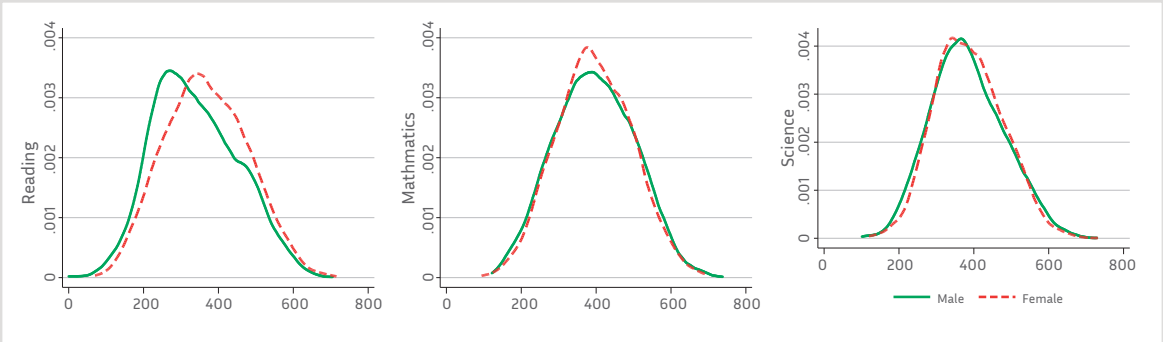


Source: Author calculations using PISA 2018 microdata

The analysis of distributions for reading, science, and mathematics results for males and females separately in PISA 2012, 2015, and 2018 shows **that boys improved their abilities, mainly in reading and science. The shifts for the whole distributions were noted, which means that both low- and high-performing male learners improved**. For females, there were only slight improvements in science and mathematics, while the distributions in reading are overlapping, meaning that the results across the analyzed time points are very similar to each other.

Analysis done for **Lebanon shows more underperforming male learners and more female high achievers in reading.** Both mathematics and science performance distributions are almost overlapping.

FIGURE 3.8. PISA 2018 READING, MATHEMATICS, AND SCIENCE SCORES DISTRIBUTIONS FOR MALE AND FEMALE STUDENTS IN LEBANON

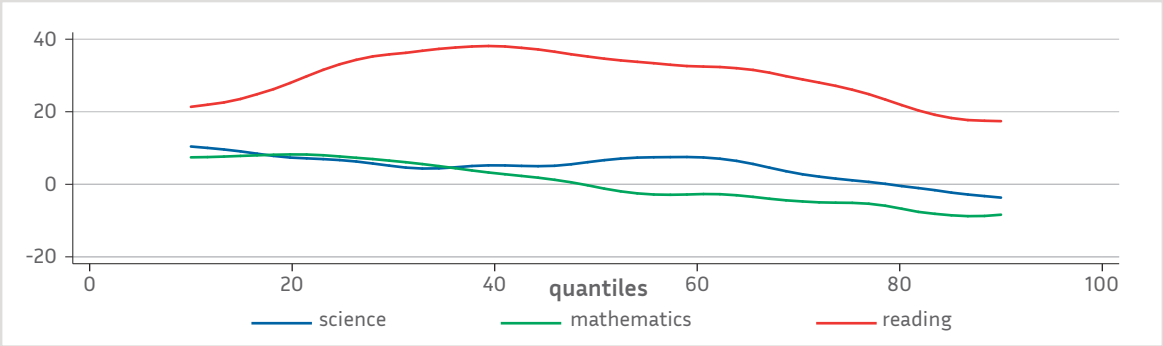


Source: Author calculations on PISA data

The quantile regression analysis points to different phenomena than in Jordan, where with the increasing performance levels, the difference between males and females has gradually been disappearing (see figure 3.7 above). **In Lebanon, the greatest breach between the genders is also in reading. However, it is not among the low achievers but the mid achievers, where it reaches its maximum of 30–40 points.**

For science and mathematics, there is a decreasing tendency (as it was in Jordan): the better students perform, the smaller the gender gap becomes. The gap between low achievers is about 10 points in science and 8 points in mathematics. The gap between mid achievers is lower – it disappears in mathematics and it is about 8 points in science. For the top-achieving students, the reversed gap is evident – boys outperform their female counterparts by about 4 points in science and 8 in mathematics.

FIGURE 3.9: THE FEMALE ADVANTAGE IN SCIENCE, MATHEMATICS AND READING BY PERFORMANCE QUANTILE IN LEBANON, PISA 2018



Source: Author calculations using PISA 2018 microdata

When it comes to the changes occurring in subsequent PISA assessments among Lebanon students, the distributions for **2015 and 2018 PISA results generally overlapped, which suggests that there were no changes or only slight changes.**

Summarizing, the analysis of PISA result distributions indicates smaller differences between boys and girls in Lebanon than in Jordan. Also, the changes in the outcomes that take place over time are smaller when compared to Jordan.

3.1.4. Educational achievement and school type

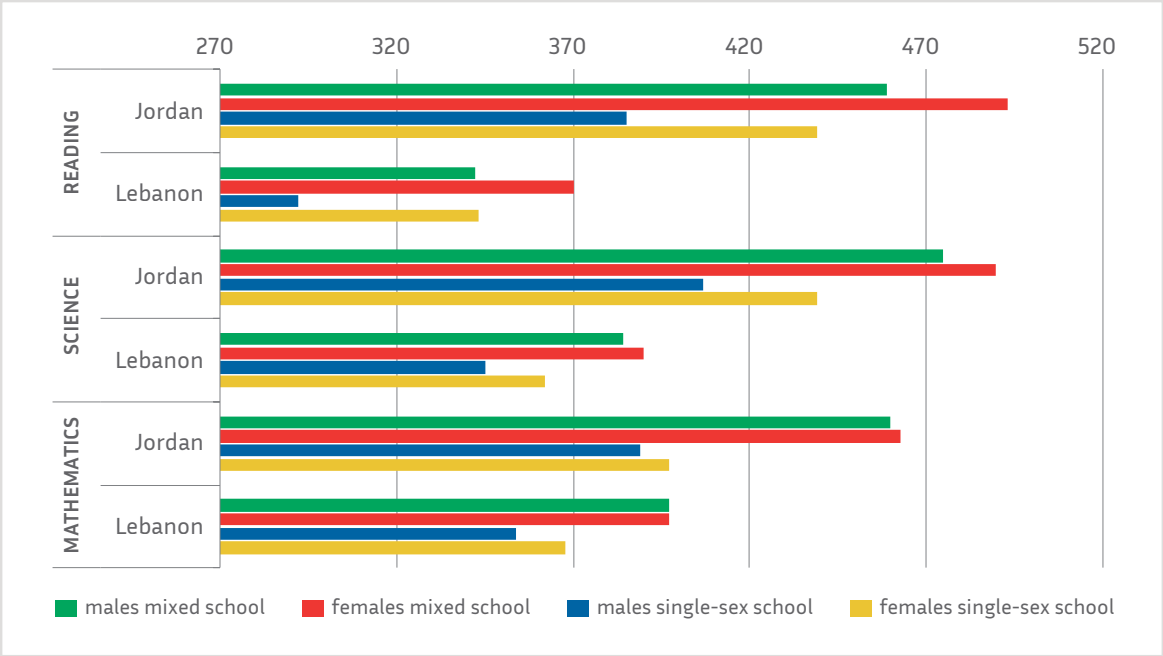
School organization differs between Jordan and Lebanon. In the former, mixed schools dominate: more than 92 percent of males and 86 percent of females attend coeducational schools. In Jordan, just the opposite is true. Over 89 percent of boys and almost 91 percent of girls study in single-gender schools. It is difficult to draw any credible conclusions based on such small samples of students studying in mixed schools in the case of Lebanon and same-gender schools in the case of Jordan.

In both Jordan and Lebanon, mix-school learners achieve higher results than their counterparts in single-gender schools, regardless of gender or subject. In coeducational schools, although boys still fall behind girls, the gender gap is smaller. This may result from the similar educational opportunities that girls and boys have in such schools.

In Jordan, **no matter what the school gender type is (single vs. mixed), boys fall behind in reading more often than girls do.** Overall, in **mixed-gender schools, there are fewer low achievers and more top-performing learners.** This might be a result of both peer and teacher

gender influence, not *per se,* but because of other characteristics correlated with gender. (For example, in single-sex schools, the teacher's gender is typically the same as the students,' while in mixed schools the teachers are usually female.) In Lebanon, in reading, there were more top-performing girls, regardless of school type. In mathematics and science, however, there were more boys among low achievers when single-sex schools are compared.

FIGURE 3.10: PISA 2018 PERFORMANCE IN JORDAN AND LEBANON, BY STUDENT GENDER AND SCHOOL GENDER TYPE



Source: Author calculations using PISA data

3.2. Explaining gender educational gaps

The differences in **gender gaps between Jordan and Lebanon may result from cultural conditions, prevailing stereotypes, or school organization**. For example, girls may become discouraged and anxious because they have a self-perception that math will prove to be difficult (internalized stereotype). Additionally, teachers or parents may put less effort into the teaching of girls. It should be noted that mixed schools dominate in Lebanon, so, generally, boys and girls have similar learning conditions and receive the same instruction. In contrast, in Jordan, gender-based inequalities may result in differing school standards between boys' and girls' schools, and hence to differences in performance.

There are also country-level factors that could determine the size of the gender gap. It is crucial to underline that economic, social, and cultural factors can also cause differences in performance. These country-level factors can be first identified at the school selection level because in both Jordan and Lebanon, public and private schools are within the assessment sample. An analysis of the ESCS (Economic, social and cultural status) index confirms an existing division between the private schools for richer students, and the public schools for poorer. The differences between schools were significant. The ESCS also significantly differs due to the gender of the school. Both in Jordan and Lebanon, students attending mixed schools report the highest index, which indicates their better economic, social, and cultural status, while in boys' schools, the index has the lowest values.

TABLE 3.2: THE AVERAGE ESCS INDEX FOR STUDENTS, BASED ON SCHOOL TYPE

School type	Lebanon		Jordan	
	Average ESCS	*S.E.*	*Average ESCS*	*S.E.*
Public	-0.99	0.04	-0.82	0.03
Private	-0.15	0.05	-0.06	0.06
Mixed	-0.52	0.03	0.33	0.10
Male	-1.02	0.21	-0.77	0.05
Female	-0.97	0.11	-0.77	0.04

Source: Author calculation based on PISA 2018

Note: The ESCS index is standardized so that the mean of the index for OECD students is zero and the standard deviation is one. A negative value implies that the ESCS is below the OECD average. Likewise, a positive value indicates that the ESCS is above the OECD average.

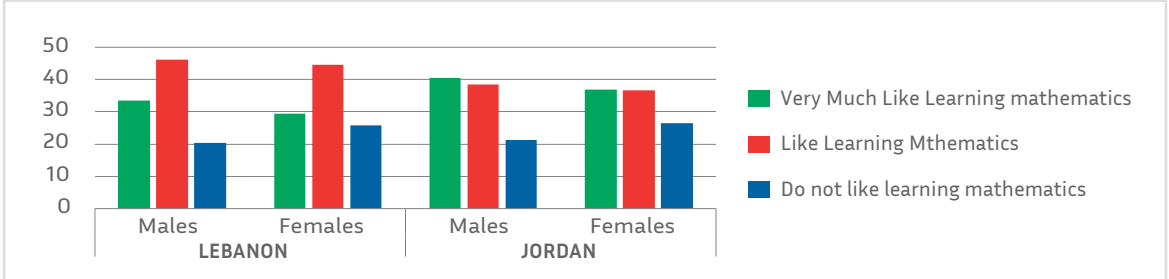
In Lebanon, the average ESCS was the highest among students attending private mixed schools. Similarly, in Jordan, students attending mixed-private and mixed-public schools presented better economic and social status. To conclude, **in both countries, people from a higher socioeconomic background enroll their children in private and mixed schools**, which leads to visible disparities in socioeconomic background: relatively more students from poorer households are in public schools, and relatively more students from richer households are in private and mixed schools.

There are, additionally, other gender differences that affect the performance of boys and girls to varying degrees – for example, certain **internal and external factors that can differ between students and countries.** The internal ones include **student self-perception and attitudes toward particular academic subjects that can cause long-term detriment to a child's education** (Jackman, Morrain-Webb and Fuller, 2019; Yetisir, 2014; Jansen, Schroeders and Ludtke, 2014; Villavicencio and Bernardo, 2016; Pekrun et al. 2009).

3.2.1. Differences in student-level indices

The TIMSS data collect information on students' home educational resources, attitudes to subjects, teaching practices, and social issues including sense of school belonging and exposure to bullying. The following section presents to what extent they affect boys and girls. In the next chapter, these variables will be used to explain the performance of boys and girls in mathematics and science. It should be noted that the data are based on students' subjective judgments and may lead to over- or under-estimation of some problems. The cultural factor may impact learners' answers; thus, one should be careful when comparing results between countries.

FIGURE 3.11: ATTITUDES TOWARD MATHEMATICS AMONG MALES AND FEMALES, TIMSS 2015



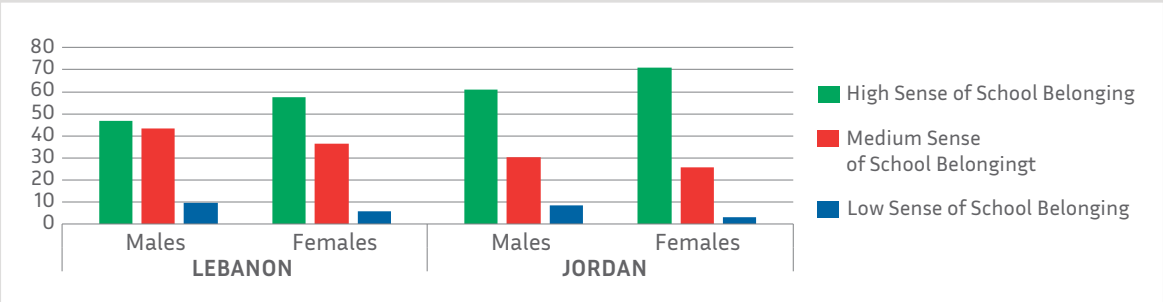
Source: Author calculations using TIMSS data

There are significant differences between males and females in their approach to mathematics. **About 26 percent of females both in Jordan and Lebanon expressed negative opinions related to mathematics, compared to 21 percent and 20 percent of males, respectively**. In Jordan, a higher percentage of students reported their positive attitude toward learning math.

The attitudes of the students toward school and learning may depend on their predispositions and abilities. Still, they may also be shaped by emotional experiences acquired at school, including a sense of school belonging and bullying.

The index of school belonging refers to whether students like their classmates and the schools they attend. It is summarized in three categories (high, medium, and low sense of school belonging). According to TIMSS 2015, **females feel more connected with their schools: 58 percent in Lebanon and 79 percent in Jordan reported a high sense of belonging, compared to 47 percent and 61 percent of males.**

FIGURE 3.12. SENSE OF SCHOOL BELONGING OF MALE AND FEMALE STUDENTS, TIMSS 2015

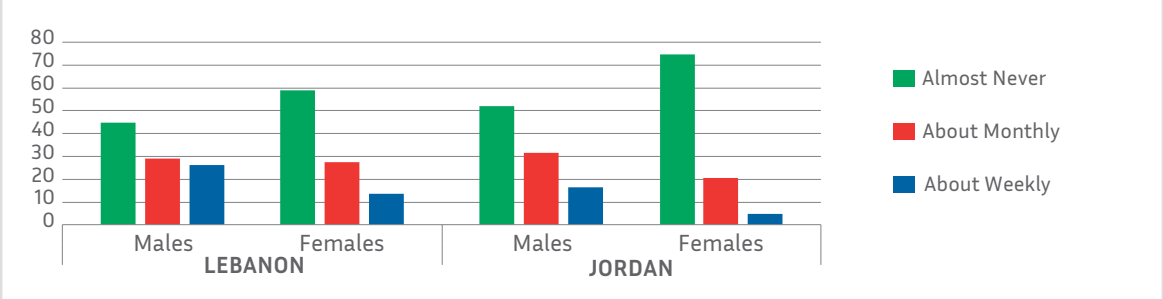


Source: Author calculations on TIMSS data

Regarding individual questions students were asked according to this particular index, girls wholeheartedly agreed with all statements, such as feeling safe at school, being proud to attend it, or perceiving their teachers as fair. When Jordanian and Lebanese students are compared, the former more often indicated a higher level of belonging, regardless of their gender.

When it comes to bullying, **boys experience it more than girls do:** 26 percent of boys in Lebanon and over 16 percent in Jordan experience it about weekly, compared to 14 percent and 5 percent of females, respectively. It should also be noted that for both genders it affects Lebanese students more often. In Lebanon, females and males reported the occurrence of bullying at least once a month almost equally often (29 percent of males and 27 percent of females), which suggests that this issue is also common among females. The responses that create the bullying index show that girls experience all types of bullying less frequently than their male peers.

FIGURE 3.13. OCCURRENCE OF BULLYING AMONG BOYS AND GIRLS, TIMSS 2015



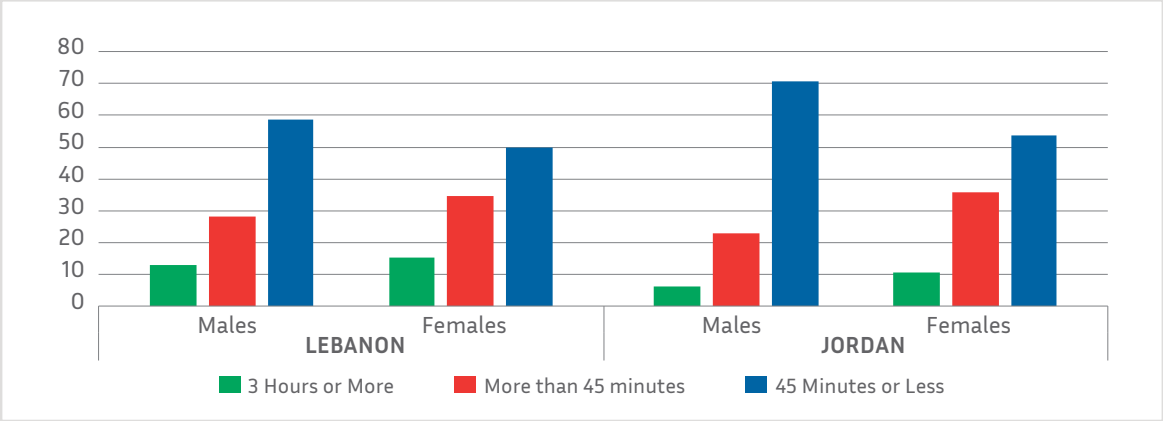
Source: Author calculations on TIMSS data

3.2.2. Time spent on homework and absenteeism

The literature suggests that student engagement, which can be measured by time spent learning or attending school, can also influence school results.

According to the TIMSS 2015 data, **both in Jordan and Lebanon, a small group of learners – 13 percent of males and 15 percent of males in Lebanon and 6 percent of males and 11 percent of females in Jordan – reported devoting more than 3 hours a day to homework. T**hose students who reported spending so much time on homework did not achieve the highest outcomes in the TIMSS test.

FIGURE 3.14: REPORTED TIME SPENT ON HOMEWORK PER WEEK FOR BOYS AND GIRLS TIMSS 2015



Source: Author calculations on TIMSS data

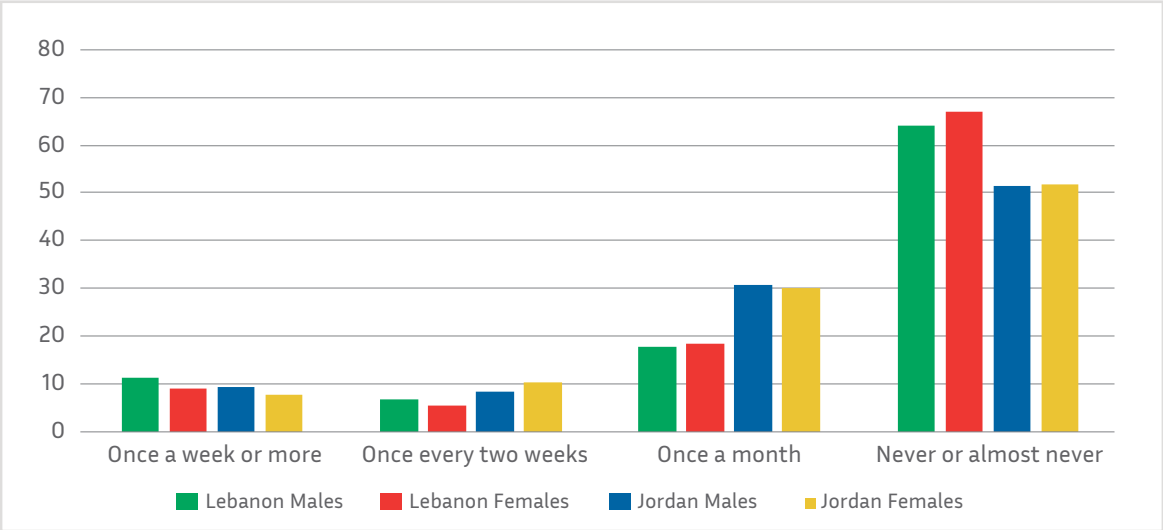
In the case of school absence, the percentages of students absent from school once a week or more, or once every two weeks, do not differ broadly between the countries. Attention should be paid to the fact that more Lebanese students, regardless of gender, reported that they never or seldom skipped classes. Jordanian students skip lessons more often than students do on average, and 11 percent of them say they do so regularly. On the other hand, absenteeism is a lesser problem in Lebanon, where students skip classes less often than in the whole international sample. **When the effect of absenteeism is considered, those who are absent from school more often perform worse. Furthermore, the negative effect of absenteeism is equally strong for both male and female students. These data are displayed in the table below:**

TABLE 3.3: SCORES IN RELEVANCE TO ABSENTEEISM FREQUENCY ACROSS SUBJECTS

Domain	Country	Absenteeism frequency				
		Never	Once every two months	Once a month	Once every two weeks	Once a week
Math	Jordan	438	428	411	398	379
	Lebanon	438	436	422	413	384
Science	Jordan	476	458	442	439	389
	Lebanon	389	385	365	361	317

Source: TIMSS 2019 data

FIGURE 3.15: STUDENT REPORTS REGARDING HOW OFTEN THEY WERE ABSENT FROM SCHOOL, BY GENDER, TIMSS 2015



Source: Author calculations on TIMSS data

3.2.3. Teachers

When it comes to teachers' characteristics, they concern, among others, years of teaching experience, level of formal education completed, indices associated with job satisfaction, school conditions, safety, challenges facing teachers, and so on. **There were no significant differences between male and female teachers' characteristics in Lebanon. In contrast, in Jordan, female teachers reported greater emphasis on academic success in their school, better school conditions, a greater sense of safety and order, and higher job satisfaction, than Jordanian male teachers. This effect also could contribute significantly toward explaining the higher assessment scores of Jordanian female students, in comparison to their male peers.**

These differences result most probably from the gender segregation in schools. Furthermore, table 3.4 presents differences in teachers' education due to gender. In both mathematics and science, most Lebanese teachers reported having a master's, bachelor's or equivalent degree, while in Jordan, the bachelor degree was the most common qualification level. Since mixed-gender schools dominate in Lebanon, gender-based differences in teachers' education level should not influence the gender gap in students' attainment.

In Jordan, which has mostly single-sex schools, it is more probable that the differences between male and female teachers may be reflected in students' outcomes. In mathematics, more than 88 percent of female teachers have a bachelor's degree or equivalent, which is also common among male teachers (71 percent), who also more often hold master degrees (17 percent). In science, the differences in education across gender are generally not significant for Jordanian teachers.

It can be summed up that, in general, male and female teachers do not differ much in the highest educational level completed. This conclusion applies to both Lebanon as Jordan. What is somewhat worrisome is the relatively large proportion of teachers with below-tertiary qualifications, especially in Lebanon. Increasing teachers' competencies could be one of the ways to boost students' performance in key domains.

TABLE 3.4: DISTRIBUTION OF TEACHERS BY EDUCATION AND GENDER (%)

	Mathematics Teachers				Science Teachers			
	Lebanon		Jordan		Lebanon		Jordan	
	Female	Male	Female	Male	Female	Male	Female	Male
Did not complete upper secondary	10.8	5.2	0.6	0.0	4.1	3.4	0.0	0.0
Upper secondary	13.4	12.4	3.5	5.1	14.7	6.4	8.9	7.7
Post-secondary, non-tertiary	0.0	0.0	1.0	0.0	0.0	0.0	0.5	0.0
Short-cycle tertiary	2.4	0.0	3.5	5.8	17.9	23.0	2.1	1.4
Bachelor's or equivalent	29.6	43.8	88.4	70.9	26.3	23.2	84.4	80.6
Master's or equivalent	41.9	38.1	2.1	17.0	36.6	38.4	4.2	8.5
Doctorate or equivalent	2.0	0.6	1.1	1.2	0.4	5.5	0.0	1.8

Source: Author calculations based on TIMSS data

3.2.4. Regression analysis of the gender gaps in mathematics and science achievement (TIMSS 2015 data)

Before implementing any measures to improve student learning outcomes, it is important to understand how each variable is related to learning achievement. TIMSS data collect student-level characteristics that, according to the literature, can differ by gender and affect educational outcomes to a varying degree, leading to a gender gap in school achievement. We focused on indices related to socioeconomic background, students' sense of belonging, experiencing bullying, absenteeism, and students' attitudes and teaching process.

In distinction to the previous chapters, here we will operate on a modified version of indices to explain their impact on student learning outcomes. The results will be presented separately for Jordan and Lebanon for each subject, and will be broken down by gender.

Several indicators were recomputed from the original TIMSS data to ease interpretation. Student absenteeism was coded as 1 for students who reported missing classes weekly or daily, and 0 for those who missed class no more than once a month or never. Having breakfast in the morning was coded 0 for those who had breakfast every day or missed it occasionally, and 1 for others. Doing homework was coded as 1 for students who spent 45 minutes or less on homework and 0 for all others who spent more, thus creating a "not homework" index.

For science, only separate data for physics, biology, and chemistry are available for Lebanon, while for Jordan responses are related to teaching general science. Thus, information about biology, physics, and chemistry teaching and learning was combined in Lebanon to allow for more direct comparisons with Jordan. So in Lebanon, for homework, information was coded

as 1 for students who spend less than 45 minutes weekly on homework in all three subjects. Similarly, in Lebanon, students' attitudes toward science subjects – for example, those who reported that the teaching they were receiving in science subjects was "engaging" and reported having confidence in science subjects – were provided separately for physics, chemistry, and biology. The average of these responses was taken as one index of whether students like science, find classes engaging, or are confident in science.

Lebanon

At the outset, it is worth noting that, in Lebanon, gender itself is not a significant factor for mathematics or science performance. Generally, boys and girls do not differ much in terms of selected indices; they attach similar values to learning subjects, present similar socioeconomic backgrounds, and have similar educational resources at home. The exception is the sense of school belonging and exposure to bullying, where the differences were significant both among students participating in math and those participating in science assessment. In both cases, the indices are higher among girls, meaning that female students feel more school-affiliated and are, at the same time, less likely to experience bullying.

The aforementioned indices were used to explain students' results in mathematics and science assessment. The regression equations were calculated separately for male and female students, and the detailed results are presented in annex tables A5 and A6 for mathematics and science, respectively. Below the main findings from these regression models are discussed.

For boys, two variables reveal their especially strong relation to mathematics outcomes. The first is computer access – students with access to it scored on average 33 points more than those who did not have access. The second variable is absenteeism – the difference between those who skip classes weekly or daily, and those who reported doing so no more than once a month or never, is about 33 points. Other relevant factors are home educational resources, exposure to bullying, and being confident in math.

In the case of girls, home educational resources, confidence in mathematics, and absenteeism all are significantly related to their math results. The regression analysis indicates that absenteeism is particularly harmful and has a higher absolute value for females than their male counterparts – missing classes weekly or daily is related to scores lower by an average of 34 points. Moreover, in the case of girls, time spent on homework turns out to have a significant negative impact: those who devoted only 45 minutes or less obtained 8 points less than those who spent more time.

When it comes to science outcomes, the most significant factor both for boys and girls was absenteeism – missing classes often (daily or weekly) was linked with a decrease in results on average by 52 and 43 points, respectively. However, there were other important factors as well: students who reported being confident in science achieved approximately 21 (males) and 18 (females) points more. Among the significant features for both genders are also home educational resources and bullying. Both have positive signs, which indicates that the better a student's economic situation and the less bullying they received, the higher their science outcomes were.

Jordan

The same analysis was carried out for Jordan. Here, as in Lebanon, gender turned out to have an insignificant influence on mathematic results, but in science the difference was significant: females obtained 31 points more than males.

Tables A7 and A8 in the annex present regression results explaining mathematics and science outcomes. In mathematics, as in Lebanon, the noteworthy factors were absenteeism and access to a computer, both of which showed a strong relation to mathematics performance. Male students who skipped classes more often scored about 39 points less, while for females it was 33 points. Being able to use a computer had a positive impact on mathematics – boys achieved 23 points more, and girls 24 points.

The results also indicate the significant impact of home educational resources, sense of school belonging, and self-confidence in mathematics both for male and female student achievement. For boys, a further significant predictor of achievement was exposure to bullying: those who experienced it less often performed better. Valuing mathematics was also positively related to higher achievement in the subject in the case of girls: a positive attitude toward learning mathematics was positively and significantly related with the assessment results.

Table A8 reports a similar analysis of science results. Here also, absenteeism (which reduced girls' results by 41 points and boys' results by 43 points), access to a computer (which increased the results by 23 points for boys and 30 points for girls), home educational resources, sense of school belonging, and self-confidence all seem to be reliable predictors of science achievement, both for male and female students. In addition, students, regardless of gender, who experiences bullying less often achieved higher academic results. Among boys, there was also a significant association between performance and attitudes toward science and toward engaging teaching. This relation does not seem to exist among girls (the effects are insignificant). It should also be emphasized that although girls more often experienced missing breakfast than boys, this negatively impacted only the boys' results.

To sum up, in both countries, there are differences between male and female students in sense of school belonging and bullying in favor of girls, for whom these indices reach higher values, meaning that they on average were more school-affiliated and less likely to experience bullying. In Jordan, doing homework and missing breakfast were also among the differentiating factors.

In both countries, gender was not a factor that significantly influences math achievement. In contrast, in Jordan, it strongly differentiated the science results. As for the impact of other factors on educational outcomes, generally, the results were in line with intuition and the extant literature: students who were in a better socioeconomic situation, had access to educational resources at home, skipped classes less often, and felt confident in the subject, scored higher. This was true regardless of gender or analyzed subject.

When it came to bullying, boys experienced it more often than girls in both countries; however, its significant negative impact was also observed among girls particularly in science. Other factors that significantly influenced the educational outcomes of both genders in Jordan were a sense of school belonging and having access to a computer. In Lebanon, only the latter variable was strongly related to mathematics performance, and only among boys.

The relationship between attitude toward learning a subject and performance, which was visible in Jordan, should also be emphasized. For science, this relation was significant for boys and positively influenced their results, while in mathematics the relation was negative and significant only for females. This indicates that willingness and attitude do not always have a reflection in results. A factor that was important only for male students in Lebanon, and only for math results, was time spent on homework: those who devoted less than 45 minutes on average performed worse.

The obtained results are in congruence with recent research. Certain aspects, such as experiencing bullying or a sense of belonging or socioeconomic background, may play a massive role in shaping students' educational achievements – both males and females.

TABLE 3.5: COMPARISON OF THE REGRESSION RESULTS FOR BOYS AND GIRLS

	Mathematics	Science
Home educational resources	**Lebanon:** Home educational resources have significant and positive impact on both male and female math results. **Jordan:** Positive, significant impact for both genders.	**Lebanon:** The impact of index is significant and positive for science results for both girls and boys and increases their results by over 9 points. **Jordan:** The index positively influences science results (increases by over 13 points).
Sense of school belonging	**Lebanon:** Not significant estimates. **Jordan:** Not significant estimates.	**Lebanon:** Not significant estimates. **Jordan:** Negative relationship.
Access to computer	**Lebanon:** The impact of access to a computer is statistically significant, however it is stronger for male students: those with access to it score on average of 33 points more. In the case of females, having access to a computer increases performance by 10 points. **Jordan:** Having access to computers significantly increases the results of both males (by 23 points(and of females (by 24 points).	**Lebanon:** The impact of access to computers is stronger for male students – those with access score on average of 33 points more. In the case of females, having access to a computer increases their science performance by 21 points. **Jordan:** The impact of computers is stronger for females (increases their results by 30 points). Boys with access to a computer perform better by 23 points.
Student bullying	**Lebanon:** Experiencing less bullying increases the outcomes of both genders, however only for boys is the impact of the index significant. **Jordan:** Experiencing less bullying significantly increases males' math results.	**Lebanon:** Experiencing less bullying increases the outcomes of both genders and is statistically significant. **Jordan:** Experiencing less bullying increases the outcomes of both genders by 5 points and is statistically significant.
Absent	**Lebanon:** The absence index has a significant and the biggest impact both for male and female students. Boys who miss classes weekly or daily achieve 33 points less, and in the case of girls the results are lower by 34 points. **Jordan:** Males missing classes achieve 39 points lower, while girls achieve 33 fewer points.	**Lebanon:** The absence index has a significant and the biggest impact both for male and female science results. Males who miss classes weekly or daily achieve 52 points less, and in the case of females the results are lower by 43 points. **Jordan:** Males missing classes achieve 43 points lower, while girls' results are lowered by 41 points.
No breakfast	**Lebanon:** Students who miss breakfast achieve lower results (males get 11 points less, females 4 points less); however, the impact of breakfast is not statistically significant. **Jordan:** Results are counterintuitive – often missing breakfast increases results (not significantly though).	**Lebanon:** Students who miss breakfast achieve lower results (males get almost 12 points less, females 7 points less); however, the impact of breakfast is not statistically significant. **Jordan:** Results are counterintuitive – often missing breakfast increases results (significant only for males).

	Mathematics	Science
No homework	**Lebanon:** Spending less than 45 minutes weekly on homework lowers results, but the impact is stronger for females, who achieve more than 8 points less. **Jordan:** Spending less than 45 minutes weekly on homework decreases results (not statistically significant).	**Lebanon:** The results are counterintuitive: spending less than 45 minutes weekly on homework increases results (not significant). **Jordan:** Spending less than 45 minutes weekly on homework decreases results (not statistically significant).
Like learning mathematics/ science	**Lebanon:** The results suggest that enjoying learning mathematics does not necessarily correspond to higher performance. **Jordan:** The index significantly and positively influences females' scores.	**Lebanon:** A positive attitude toward science influences academic results positively (but not significantly). **Jordan:** The index significantly and positively influences males' science scores.
Engaging math teaching	**Lebanon:** The "engaging teaching" factor influences math results negatively (impact is not statistically significant). **Jordan:** There is a negative and insignificant relation between this index and scores.	**Lebanon:** The "engaging teaching" factor influences science results negatively (impact is not statistically significant). **Jordan:** The index significantly and negatively influences males' science scores.
Confident in mathematics/ science	**Lebanon:** The impact of this index is significant for both males and females. Feeling confident increases boys' results by 11 points and girls' by 12 points. **Jordan:** Being confident significantly increases the results of both genders, but the effect for females is greater.	**Lebanon:** Being confident in science significantly and positively influences science performance, increasing males' results by 21 points and females' by 18 points. **Jordan:** Being confident significantly increases males and females results by about 14 points.
Value mathematics/ science	**Lebanon:** The valuing mathematics index is positively connected only with girls' results. For both genders the impact of this index is insignificant. **Jordan:** The index is significantly and positively related to boys' achievement.	**Lebanon:** The valuing science index has a positive but insignificant impact on sciences results. **Jordan:** Insignificant impact of this index.

Source: Regression analysis of TIMSS microdata presented in annex tables A5 to A8

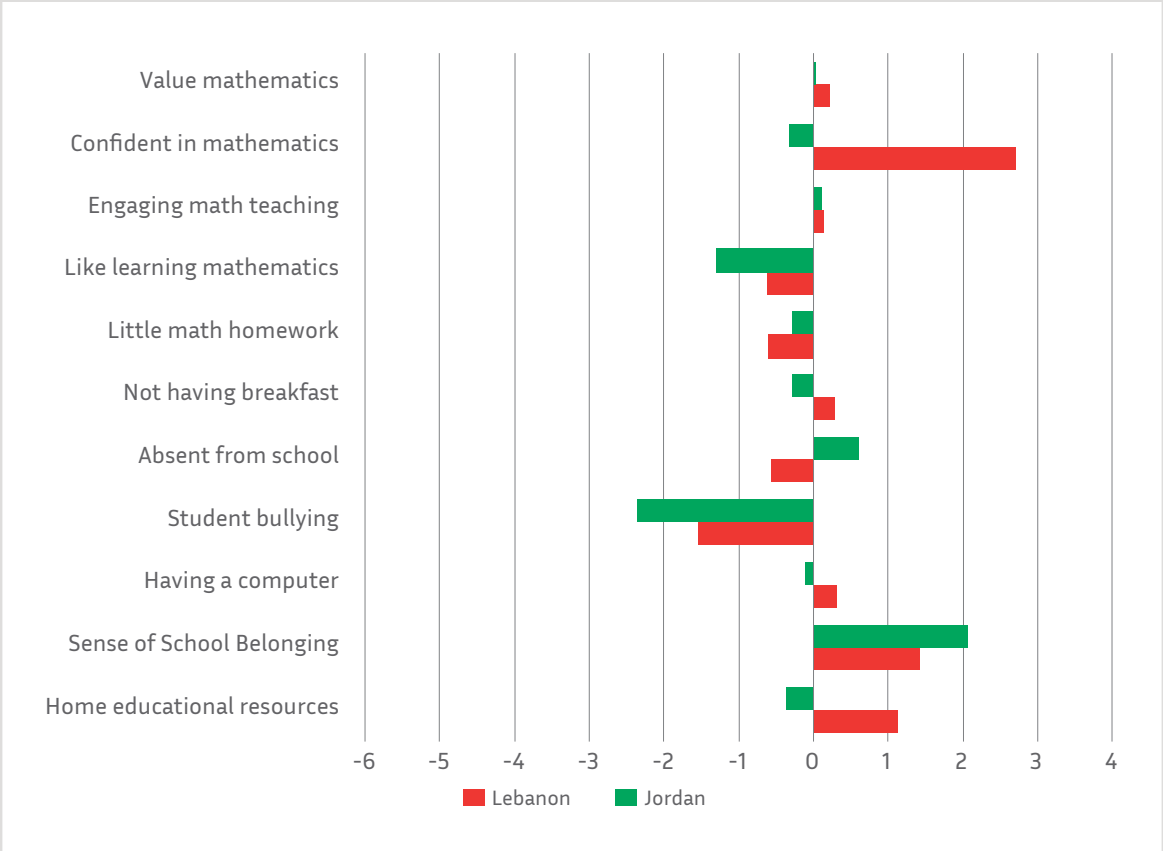
3.2.5. Decomposing the Gender Achievement Gap

The above analysis compares family, teacher, and school resources and levels of attitudes and behavior of students between boys and girls in Jordan and Lebanon. The Oaxaca decomposition method can at the same time estimate associations between levels of variables and their effects on achievement, explaining the performance gap between boys and girls. We used a set of variables that showed significant differences in the above analysis in the level or regression coefficient. Those variables were used to explain associations with the gender gap in mathematics and science between boys and girls in 8th grade in Jordan and Lebanon. The list of variables is presented in the figures below.

The Oaxaca decomposition provides three separate sets of estimates. First is how the difference in levels of variables is associated with the achievement gap between boys and girls. These estimates are called "endowments" and, in this case, show how differences between boys and

girls in levels of resources or attitudes can explain the achievement gap. The second group is called "coefficients" and shows how differences in regression coefficients are associated with the gender achievement gap. In other words, these results show if a particular resource or attitude has a stronger association with achievement for boys and girls and, if there is a difference, whether that is associated with performance differences in mathematics or science. The third section, called "interactions," shows the joint effect of changes in variable levels and coefficients. In our case, we are not reporting this section because all indicators show insignificant interaction effects in all comparisons.

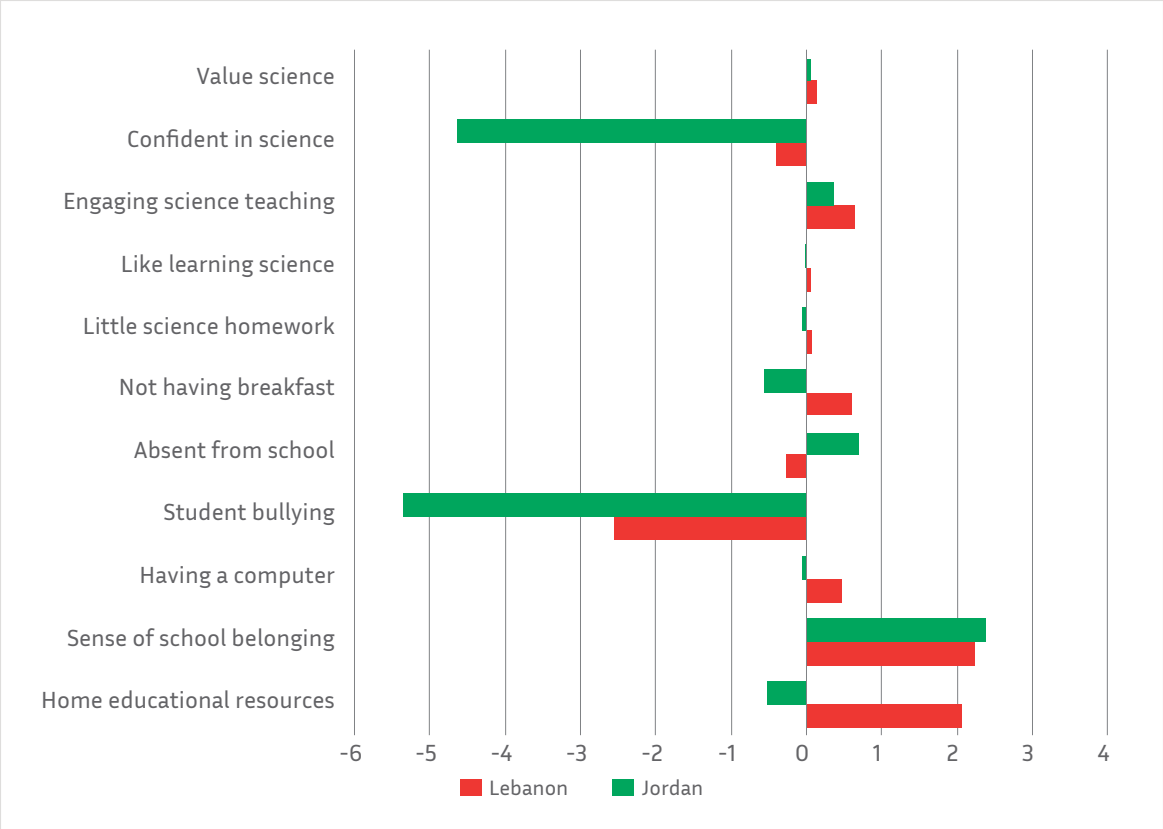
FIGURE 3.16: ENDOWMENT EFFECTS ASSOCIATED WITH GENDER GAP IN MATHEMATICS ACHIEVEMENT IN JORDAN AND LEBANON



Source: Author calculations using TIMSS microdata

Figures 3.17 and 3.18 show estimated endowment effects using the Oaxaca decomposition model. For mathematics, the achievement gap is in general relatively small. The difference is about 6 points in Lebanon in favor of boys and 13 points in Jordan in favor of girls. Thus, it is not surprising that the gender gap is associated with only small differences in the levels of the variables. The most significant difference lies in students' self-confidence in mathematics, which is higher for boys in Lebanon and which is associated with the achievement gender gap. In other words, girls in Lebanon show less self-confidence, which is usually related to stereotypes and poor teaching, and that explains a small part of their lower achievement in mathematics. Student bullying is lower among girls in both countries, and higher values of the index represent less bullying. A larger prevalence of bullying among boys harms their performance so it decreases the achievement gender gap, but the effect is rather small. Similarly, girls show a higher sense of school belonging, but, unexpectedly, that is negatively associated with math performance. Thus, this endowment effect increases the gender achievement gap, although the effect is small. For other indicators, the endowment effects are insignificantly different from zero.

FIGURE 3.17: ENDOWMENT EFFECTS ASSOCIATED WITH THE GENDER GAP IN SCIENCE ACHIEVEMENT IN JORDAN AND LEBANON



Source: Author calculations using TIMSS microdata

The endowment effects for science are small in Lebanon as the science performance of girls is just 4 points higher than for boys, and much more significant for Jordan where girls outperform boys in science by 31 points. Girls in Jordan show more confidence in science and that is associated with the comparatively lower performance of boys. Also, student bullying is associated with the lower performance of boys in both countries, but in Jordan, the endowment effect is twice as large as in Lebanon. The student sense of school belonging is lower among boys, which is associated with better performance. This is also observed in mathematics and with similarly small and hard-to-interpret effects. Other variables have a negligible association with the gender gap in science achievement.

Regarding the coefficients effect for mathematics, differences in this regard between boys and girls were insignificant. Thus, the gender gap in mathematics achievement is not related to differences in how strongly various resources and attitudes are related to the performance of boys and girls.

For science, most results for coefficients effect were also insignificant, except a stronger association with science achievement of positive attitudes toward learning science among boys in Jordan. Girls reported a more positive attitude on average, but without a strong association with performance. Boys in Jordan enjoy learning science less, but those who like it score much higher and close the achievement gap with girls. **This result suggests that developing positive attitudes toward learning science among boys might help to close the achievement gap, while at the same time it seems that the positive attitude toward science among girls in Jordan is not being effectively used by teachers to raise their achievement levels.**

• • •

To summarize the discussion of the gender differences in achievement for Jordan and Lebanon:

Gender achievement overview

- In Lebanon, the gender gap is much smaller than in Jordan. This result is robust and consistent across years and assessments (PISA and TIMS). There are virtually no changes in the performance distributions (apart from mathematics). In Jordan, the gender gap is one of the largest. In the case of reading, there are more high-performing females and more underperforming male students. When it comes to mathematics and science, there are slightly more underperforming boys than girls. In Lebanon, more underperforming male learners and more female high achievers are in reading, while both mathematics and science performance distributions are almost overlapping.

School organization

- Students in Jordan and Lebanon benefit more when they attend mixed-gender schools, regardless of the gender and subject. The reasons may be the differences in the conditions prevailing in these schools and the possibility of contact with peers of the opposite gender. In Jordan, most mixed-gender schools are private, which may lead to differences in conditions.

Student-level indices

- Females generally feel more connected with their schools; however, if Jordanian and Lebanese students are compared, the Jordanians more often indicated being on a higher level of belonging, regardless of gender.
- Boys more often experience bullying, and it affects Lebanese students more often. However, in Jordan the endowment effect is twice as large as in Lebanon. Introducing certain measures to reduce bullying will have a positive effect on performance, especially for boys.
- Absenteeism is negatively related to academic achievement and is equally strong for both male and female students. Students in Lebanon would highly benefit from limiting absenteeism.
- Better educational resources and access to a computer can significantly improve both males' and females' results in Jordan and Lebanon. Having access to computers has an especially positive impact (greater than other student-level indices). It is necessary to pay attention to the economic situation of students, difficult especially in the context of the current crisis. The solution may be organizing some financial support for students.
- Students who find themselves confident in a subject score higher, and this is true for both males and females. The most significant difference is for students' self-confidence in mathematics, which is lower for females in

Lebanon and which is associated with the achievement gender gap (see Borgonovi and Pokropek, 2019; Goetz et al., 2013). In Jordan girls show more confidence in science and that is associated with the lower performance of boys. Teaching in schools should not be subject to prevailing stereotypes; boys and girls should have the same opportunities to develop in science, mathematics, and humanities. It should be emphasized that self-confidence in a given subject largely depends not only on teachers' educational practices, but also on parents (see Casad, Hale, and Wachs, 2015; also see Borgonovi and Pokropek, 2019).

4. LANGUAGE INSTRUCTION AND SECOND LANGUAGE ABILITY IN TEACHERS AND STUDENT

An issue that has already been mentioned in the context of comparability of results between countries is the language of the test. **In some countries, Lebanon in particular, languages of instruction and mother tongue differ for most students**. Lack of proficiency in the first can build a cognitive barrier and be reflected in low educational outcomes. In Lebanon, where Lebanese Arabic is the commonly used language for most students, and standard Arabic and English or French are used in instruction, potential issues in learning may arise for students who are not proficient in the latter two languages. However, not only is the lack of proficiency in English or French problematic, the Lebanese Arabic spoken at home differs significantly from the standard Arabic taught at school, which as it turns out is difficult for many students. Only **about 2 percent of students use the language of instruction in Lebanon at home. This can be compared to 94 percent in Jordan, where standard Arabic is for most students both the language of instruction and the native language used with friends and family.**

4.1. Language of instruction in Lebanon

Lebanon is a country of cultural and lingual diversity, which is evident in the languages used in the educational system. **Although Arabic remains the official language, great emphasis is placed on teaching in English and French**. Both are taught from primary school onwards and are required by education law to be used during science and mathematics classes. This practice intends to provide students with the opportunity to compete in the international labor market.

The effect is that, currently, these languages have different applications, depending, as Shaaban and Ghaith (2002) indicate, on cultural, socioeconomic, and religious factors. Arabic is perceived as a symbol of identity and crucial for religious activities, and Lebanese Arabic is mostly used for everyday communication, especially with the family (Akl, 2007).

French is mainly associated with primary education; it was the first foreign language for 51.4 percent of students in the 2017/2018 school year and dominated in almost all educational sectors. The exceptions are the United Nations Relief and Works Agency for Palestine Refugees (UNRWA) schools, where the first foreign language of 98.6 percent of students is English) (Center for Educational Research and Development (CERD), 2019; pp.18–19) and the entertainment industry (Bahous, Bacha and Nabhani, 2011).

English is thought to be instrumental in higher education and commerce as proficiency in that language facilitates the pursuit of jobs (Ballais, Al Amrawy Al Dbiyat, Charbel, Geyer and Mezedjri, 2018; Shaaban and Ghaith, 2002; Banat, 2020). Research on university students reveal that they have stronger motivations to learn English: according to Diab's (2006) results, 81 percent of students claimed it was necessary to learn English for career reasons and 80 percent because of its universality. In the case of French, the figures are 52 percent and 23 percent, respectively. Moreover, no one agreed with the statement that knowing English in Lebanon is not necessary, while 8 percent believed that it is not necessary to know French. The only area where French had an advantage was for social relations: 53 percent of learners agreed that it was learning French which was important for them, while 37 percent indicated English. The investigation of learners' beliefs about language learning revealed also that students viewed English as an easy (66 percent) language and French as a rather difficult one (only 10 percent rated it as an easy language); however, when all three languages commonly used in Lebanon (Arabic, English and French) were compared, it was Arabic that was considered the most difficult by most respondents (indicated by 64 percent of learners) (Diab, 2006).

Traditional Arabic significantly differs from spoken Arabic, and, as mentioned above, it is considered by many students difficult to master. Therefore, the question whether to teach in traditional or colloquial Arabic often results in an impasse. The "neutral" alternative solution

then is the introduction of teaching in English or French, which provides some kind of uniformity and is widely practiced. However, the **policy of teaching a subject in a foreign language is based on the assumption that students have mastered the second language** to a level enabling them to learn the curriculum to a satisfactory standard or that they will develop that level of proficiency during the course. Research suggests that it takes 6–8 years of education in a language to gain the proficiency level required for academic achievement in secondary school (Owen-Smith, 2010; Yadar, 2014). The assumption that students' language fluency is high enough to learn in English or French is questionable.

Research shows that **regardless of the grade, students in Lebanon, especially those in the lower socioeconomic status, find it challenging to translate from colloquial Arabic to English, as they are not fluent in the second language. Their vocabulary and pronunciation are rather limited, so this hampers their comprehension, demotivates them, and may impact their academic results** (Bahous, Bacha, and Nabhani, 2011). Furthermore, not all parents can help their children, especially when it comes to technical or specialist language (in physics, biology, and so on). This situation creates unequal opportunities that do not appear in mother language education (Annous, 2014) and may lead to educational gaps caused by socioeconomic factors.

On the other hand, teaching in English and French has been common in Lebanon for a quite a long time, so as Bacha and Bahous (2011) noted, children should acquire the second language more rapidly as they should be able to rely on their parents' support. Thus, it might be that the impact of language on learning outcomes should diminish in subsequent years; however, low results from international assessments suggest that the majority of current students struggle in science subjects and that they will probably not acquire sufficient lingual skills to enhance the learning of their children in the future.

Apart from the students' and parents' abilities, **teacher language proficiency also seems to be crucial for students' performance**. A study conducted among Lebanese teachers (Bacha and Bahous, 2011) suggests that some of them have difficulties connected with new teaching approaches. Most science or mathematics teachers do not have a degree in the professional teaching of languages. Only a minority decide to get an English teaching diploma. Although many teachers perceive the curriculum as too challenging given the conditions (students' level or the time at their disposal), they also firmly believe in the value and high prestige of foreign language competence (Bahous, Bacha, and Nabhani, 2011).To sum up, while analyzing the educational outcomes, the language of instruction also deserves attention. Generally, there are **three main issues to examine: learners' proficiency, teachers' training and foreign language proficiency, as well as the language used at home and mother language**.

4.2. Language of instruction and educational outcomes

A large body of research suggests that **students who are more proficient in the foreign language of instruction are, on average, more successful** (Dronkers and Kornder, 2014; Dronkers and Van der Velden, 2013; Hannover et al., 2013). It turns out that language plays a vital role in children's development as it can be understood as an environment for studying, which means that learning can be set in the social context and be a tool that shapes the way of thinking**.** The Sapir-Whorf conception underlines that the structure of a language determines the person's cognitive processes (Berry, 1985). According to this, mother language instruction should bring the best educational results, as it increases access to skills and facilitates classroom interaction and integration (Benson, 2004).

"The most valuable learning tool children have is the language they already know."

Patsy M. Lightbown,
Distinguished Professor Emerita, Applied Linguistics, Concordia University, Montreal

Some researchers have found that primary students educated in their mother tongue obtained higher scores in mathematics and sciences than those taught in a non-native language. These results were also shown by Civan and Coskun (2016), who indicated the negative impact of English language instruction on academic outcomes of the majority of students. They also emphasized that the effect is the highest in the freshman year, and although it reduces over time, it never disappears (Civian and Coskun, 2016).

The impact of proficiency in English on overall academic results in science were also examined by Fakeye and Ogunsiji (2009). The results collected from a randomly selected sample of 400 randomly selected Nigerian secondary school students confirmed that English as a foreign language (EFL) proficiency has a positive and significant impact. Howie (2005a, 2005b), who analyzed the performance of South African learners, showed that the key factor responsible for unsatisfactory results was low proficiency in English. Moreover, those who used the language of assessment more often were more likely to get higher results in mathematics. The problem of being left behind concerns especially poor students who speak a minority language at home (Dronkers and Van der Velden, 2013). In Turkey, poor students speaking a non-Turkish language (mainly Kurdish) were the lowest-performing students in the TIMSS assessment.

Similarly, disadvantaged Guatemala students using a minority language at home performed the worst (about 47 percent reached the minimum in mathematics, compared to 88 percent of students speaking Spanish). Agirdag and Vanlaar's (2018) analyses revealed that there is indeed an achievement gap between minority and majority language students which holds for both reading and math. After taking into account the students' background characteristics, students' academic profile, and school characteristics, the achievement gap narrows but remains significant nonetheless.

The general conclusion of these studies is that academic outcomes are negatively influenced when the medium of instruction is a language other than the students' mother tongue, or a language they use every day. Although Arabic is the mother tongue in Lebanon, it is important to understand that what is mainly spoken in the country is Lebanese Arabic rather than standard Arabic. Furthermore, it has been shown that **the longer children remain in mother tongue education** (understood as their first language), **the better their knowledge retention and performance in school.** Learning in the mother tongue enhances knowledge retention and academic performance because the child is using a fairly developed oral language for learning. If the language children encounter in school – English or French in case of Lebanon – is difficult for them, then they are taking on two challenges simultaneously: trying to understand the subject being taught, and trying to understand the very language in which that subject is being taught. Not only may cognitive and socioemotional difficulties arise to impact their education, but their self-esteem and motivation to learn may also be damaged.

Using an unfamiliar language of instruction discourages students from active participation in classes – students are less interactive, and lectures are "transmission oriented" (Usó Juan, 2006; Yip, Coyle and Tsang, 2007). In cases when the necessary language competence was not developed during the formative years (Tella et al. 2010), comprehension problems are inevitable, especially when students are expected to work with new technical terminology. Even if students present sufficient grammar and vocabulary proficiency, it does not mean their cognitive academic language proficiency is enough to learn the subject content (Cummins, 1981; Rumlich, 2017). They may still have some difficulties in connecting gained information and transforming them into usable knowledge.

There are **two types of language-related learning problems** that should be distinguished. The first arises when the medium of instruction (for example, English or French) is not the students' mother tongue and leads to a **lack of fluency during classes**. The second ***"results from the "distance" between the cognitive structures natural to the student and implicit in his mother tongue and culture, and those assumed by the teacher" (***Berry, 1985, p.20). In the first case, the learners' fluency improvement can be a solution, while the second one requires curriculum modification and ***"building on the student's natural modes of cognition"*** (Berry, 1985, p.20).

The influence of language on educational results also depends on the teaching method being used. The three main approaches each have a different focus:

i. With **CBLT (content-based language teaching)**, the focus is on language and the subject is taught by the language teacher;

ii. With the **Immersion** approach, the focus is on the subject; and

iii. With **CLIL (content and language integrated learning)**, the focus is simultaneously on both the subject and language.

In the case of teaching mathematics or science, the subject content should be at the center. Thus, Immersion and CLIL would be the most appropriate teaching approaches. The difference between them is that the first focuses on the subject, while in the second, teachers focus on both content and language. Moreover, in CLIL, the mother tongue instruction is incorporated into the course, which fosters both language and content learning. It is particularly useful for students with a superficial knowledge of the language of instruction (Clegg and Simpson, 2016). This method also provides better scores than only-English classes. Walter and Chuo (2012) indicated its positive impact on achievement in reading and comprehension skills: CLIL-educated children scored twice as high on mathematics tests at the end of grade 3. These learning gains disappeared when students switched to English-only instruction in grade 4. It suggests that a premature change of language environment may prevent students from sustaining their high performance across the curriculum.[11] The drawback of the CLIL method is that it privileges already high achievers both in language and subject content (Paran, 2013; Leone, 2015).

Attention should also be paid to the fact that the educational results of students also depend on the teachers' own language proficiency. Generally, the language of the subject is often not a teachers' first language, or it is not fully mastered by them because the subject content sometimes requires specialized terminology. **Many teachers admit that they are not adequately trained in the language of instruction** (Jordaan, 2011). This situation is quite common in, for example, South African schools, where students (and sometimes teachers too) display different levels of proficiency in two or more languages. That is a massive challenge, for example, for teachers who must teach mathematics and language simultaneously, but also for students who have to deal with mathematics and communicating in a language they are still learning. It often happens that although the curriculum of a given subject requires teaching in a foreign language, teachers use the students' first language to reach them or because the teachers

themselves lack the requisite competency in that foreign language. This practice was first highlighted when Syrian refugees entered the Lebanese public schools. TThe influx led to a discussion as to whether it would be more appropriate to introduce teaching in Arabic (rather than English or French) to ensure more equal opportunities for all the students even though Arabic was in many cases inconsistent with the subject curriculum. It has not been documented for how long, and on what scale, teaching in Arabic took place in Lebanese schools despite the subject/language inconsistency, but without a doubt, such a practice is likely to influence the students' results in large-scale assessments.

Also, there is a difference between teaching in a foreign language in comparison to the native language. Thogersen and Airey's (2011) conducted a study in a Danish university and found that lecturers need more time to present the same material in English (the foreign language) than in Danish (the mother tongue). Moreover, with English, they used a more formal and less effective style of teaching, and the examples they gave to convey ideas were less practical and less related to daily life. This is similar to the case of Lebanon, where students struggle when learning in English or in French or even in classic Arabic.

To conclude, teachers tend to experience additional difficulties when teaching in a foreign language. These obstacles include struggling with their own insufficient language proficiency, controlling students' language development, and striving for adequate content comprehension. As the teachers' proficiency in the medium of instruction is absolutely indispensable to secure students' comprehension of content as well as their language abilities, it is crucial to implement appropriate measures focusing on improving teachers' competencies in teaching mathematics and science in the given medium of instruction (be it classic Arabic, English, French, or any other language). However, if this does not bring the desired effect, or is deemed unfeasible due to organizational or economic constraints, reverting to teaching in the mother tongue needs to be considered (Fadhili Bin Yahaya et al., 2009).

The difference between home and school/assessment language underlines the issue of parents' support and engagement in their children's education. If parents are not familiar with the language of instruction, it can reinforce the gap between minority and majority language groups (UNESCO, 2016). Whether and what language skills people possess is highly dependent on their socioeconomic status, which affects both motivation and learning outcomes (Ariani and Ghafournia, 2016; Mirza, 2001). Butler and Le (2018), as well as Bahous, Bacha and Nabhani (2011) also found a positive relation between socioeconomic status and parents' attitudes to the role of foreign languages and beliefs and expectations about their children's language proficiency.

Nevertheless some parents, even when their own foreign-language abilities are poor, aspire to do their best and teach their children because they are aware of the future value of gaining a command of certain foreign languages. However, as research (Wong-Fillmore, 1991) indicates, using the weaker language for communicating has a negative impact on their children's cognitive and linguistic development. It causes an inadequate level of development of their first language, which translates into their capacity to learn other languages.

Parents' attitudes also differ depending on the type of school their children attend. In public schools, teachers much more often encounter an apparent attitude of indifference of parents toward their own children's educational achievement. By contrast, in private schools the opposite is true: undue parental interference with teaching practices and questioning of teaching methods are often the issues that teachers must deal with. This pattern is also explained by the socioeconomic situation of the family (Esseili, 2014).

To conclude, the body of existing literature indicates a correlation between the non-mother-tongue language of instruction and educational achievement:

- A discrepancy between home and school language has a negative impact on mathematics and science assessments' results.
- Students who are more proficient in the language of instruction are on average more successful.
- Those who use the language of assessment more often are more likely to perform better on this assessment.
- A change of language environment that occurs too early in the child's educational development may prevent the child from sustaining their high performance.
- The teachers' own language skills in turn shape students' language abilities and condition their comprehension of the subject content.
- Students' language abilities may depend not only on teacher/school characteristics but also on students' background and socioeconomic status. The issue of the language of assessment is problematic primarily for underprivileged students who speak a minority language at home.
- Teaching subjects in foreign languages may have a positive impact on learning the language itself, but not necessarily on the content comprehension of the classes.

To reduce learning disparities in the long term, **implementing bilingual programs or returning to mother language as a medium of instruction could be considered. However, in countries where vast language diversity (for example, South Africa) and more than one language group in the same class are present, such a policy may be challenging to implement**. For example, problems of language choice are present in Nigeria, where there are over 200 ethnic groups and more than 400 native languages.

When looking for the reason why an educational gap has resulted from the low proficiency in the language of instruction, it is also essential to consider a situation in which, due to the insufficiency of students' language abilities, the teachers adjust the language level or very often switch to the mother tongue. This may lead to a situation where children acquire knowledge but not language skills, which are necessary and may also influence results. **Lack of language proficiency may not be reflected in the results of school exams but may be revealed later on in international assessments.**

The reason for this may be the **washback effect,** which refers to a situation where teachers focus directly on preparing students for a specific test, or students focus narrowly on a particular language used in the classes, without fully understanding the larger or deeper substantive topic that was intended to have been processed during the lesson.

4.3. Language of the assessment and PISA test results

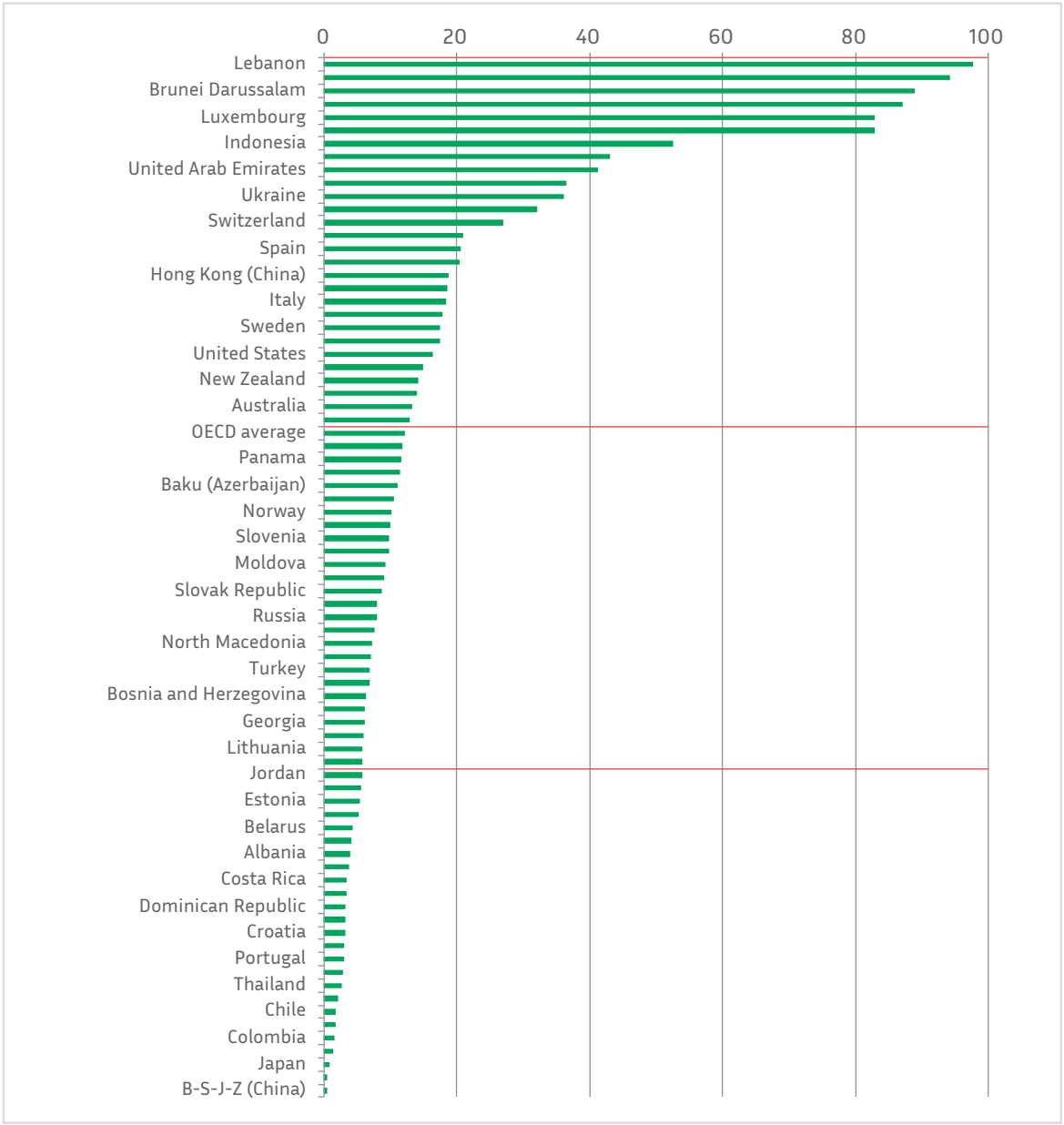
As already mentioned, Lebanon is a country with a trilingual system, where French and English learning begins at an early stage alongside Arabic. Moreover, depending on the school, French or English is taught as a second language, and, from the age of ten, young students learn most subjects in English or French, except for Arabic, history, and geography. The priority given to foreign languages from the beginning of education is especially evident in private schools.

Despite the strong emphasis on language skills, in practice not everyone gets the same training. The student's economic situation, and the educational level of their parents, can be significant moderators of their foreign language proficiency. Furthermore, the difference between the home and school language and the frequency of using the latter may impact test results.

In this chapter, this issue is analyzed with PISA 2015 and 2018 data. In this international assessment, in the case of Jordan, the language of the test was Arabic (mother tongue for most Jordanian students), while for Lebanon, it was English or French (foreign language for almost all students).

Figure 4.1 shows that the problem of assessment language is especially prevalent in **Lebanon, where 97.7 percent of 15-year-olds do not speak the language of instruction at home, compared to just 12.2 percent in OECD countries and 5.7 percent in Jordan.**

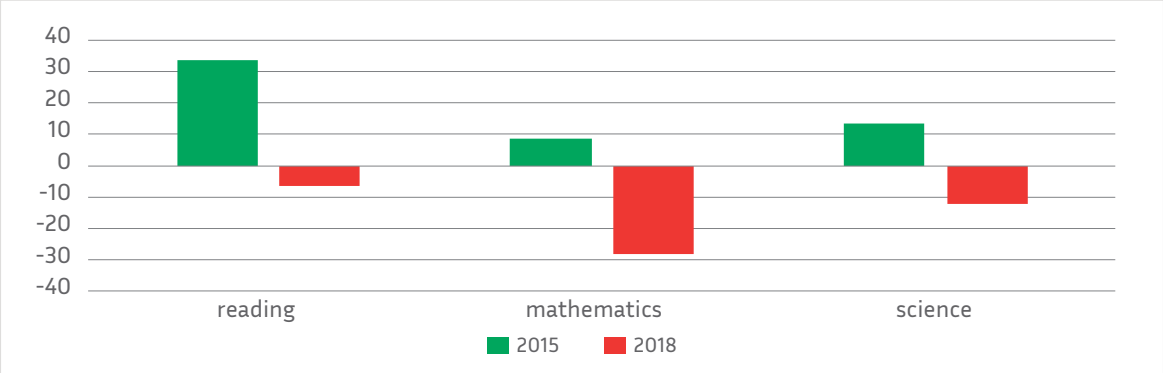
FIGURE 4.1: PERCENTAGE OF STUDENTS WHO DO NOT SPEAK THE LANGUAGE OF INSTRUCTION AT HOME



Source: OECD, PISA 2018 Database, table II.B1.92

As the research literature suggests, a difference between mother tongue and language of instruction will almost certainly result in educational gaps, and in fact those gaps are evident in both Jordan and Lebanon. In a 2015 study, in Lebanon, students who typically used the language of assessment at home outperformed their those who did not in every subject. The greatest advantage emerged in reading tests, where there was a discrepancy of almost 34 points – equivalent to more than one year of instruction. The mathematics and science gaps were 9 and 13 points, respectively.

FIGURE 4.2: ACHIEVEMENT ADVANTAGE OF LEBANESE STUDENTS WHO SPEAK THE LANGUAGE OF THE TEST AT HOME MOST OF THE TIME

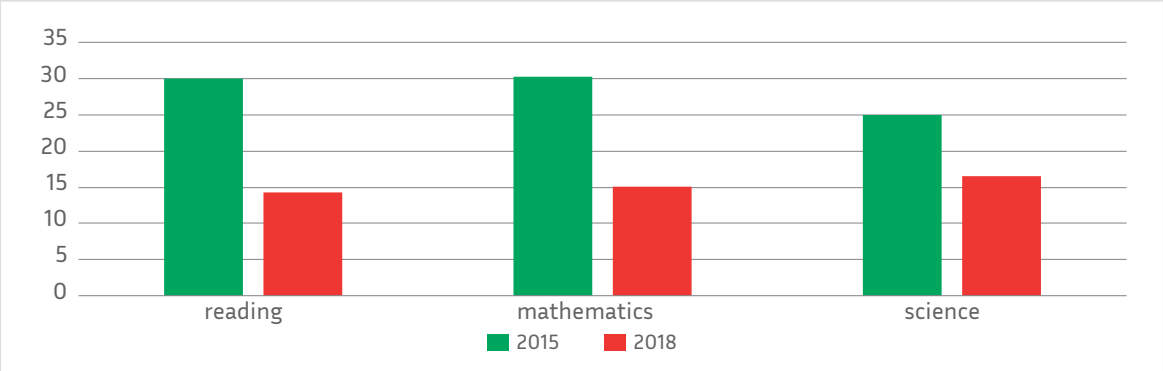


Source: Author calculations using PISA microdata

In 2018 the reverse gap was observed: Students who spoke a language other than the medium of instruction at home performed better; their advantage in mathematics was 28 points (the equivalent of one year of instruction), in science 12 points, and in reading 6 points (figure 4.2). Despite the existing differences, it should be emphasized that the differences in scores were not statistically significant in 2015 nor in 2018.

As in Lebanon, in Jordan too the advantage of students who speak the language of the test at home (most of the time) narrowed in 2018 compared to 2015. **For mathematics, the average advantage of students who usually used the language of assessment at home, was about 30 points in 2015 and 15 points in 2018, and about 25 and 17 points in science**. When it comes to the reading gap, it was 30 points in 2015 and 14 points in 2018 in favor of those who speak the assessment language at home.

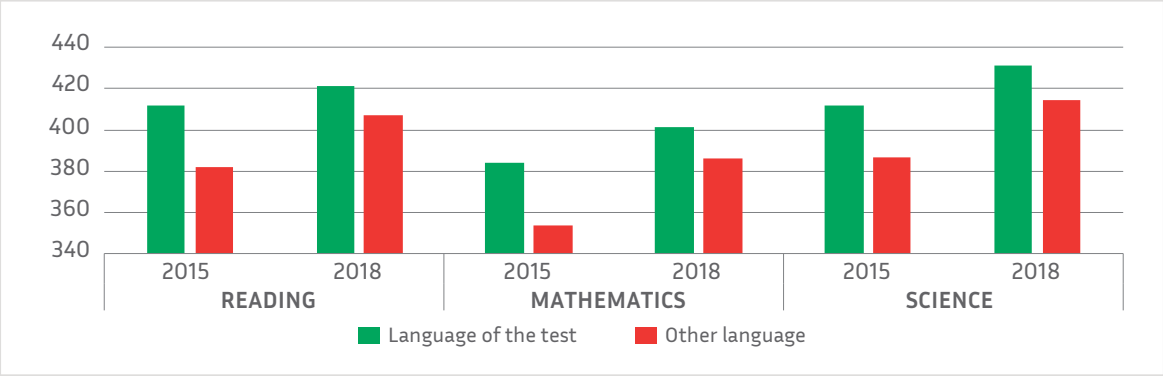
FIGURE 4.3: ACHIEVEMENT ADVANTAGE OF JORDANIAN STUDENTS WHO SPEAK THE LANGUAGE OF THE TEST AT HOME MOST OF THE TIME



Source: Own calculations using PISA microdata

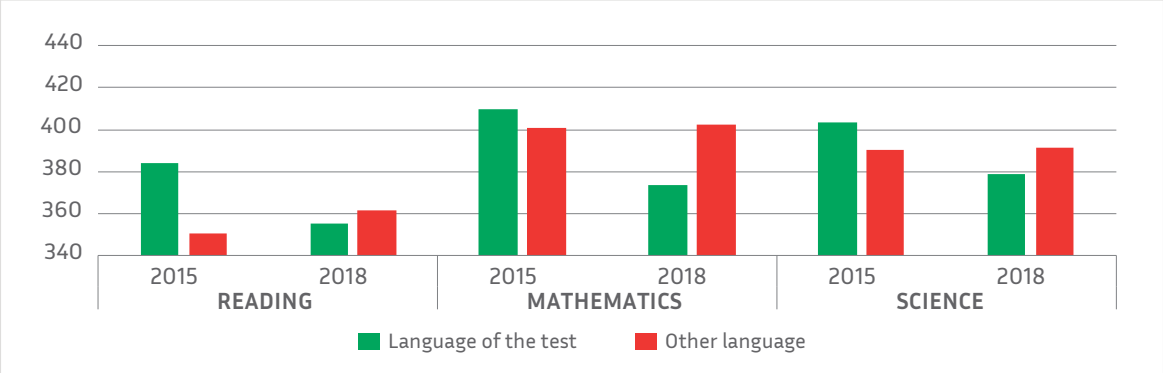
Figures 4.4 and 4.5 show how the performance in mathematics, reading, and science changed between 2015 and 2018. **The language achievement differences in Jordan were smaller in all subjects in 2018** owing to greater improvement among students who speak languages other than the instructional language at home, but the differences among students depending on the language spoken at home were significant in 2015 and 2018; moreover, the differences between the years for both groups of students were significant.

FIGURE 4.4: PERFORMANCE TREND AMONG JORDANIAN STUDENTS WHO SPEAK THE ASSESSMENT LANGUAGE AT HOME AND THOSE WHO USE SOME OTHER LANGUAGE



Source: Author calculations using PISA microdata

FIGURE 4.5: PERFORMANCE TREND AMONG LEBANESE STUDENTS WHO SPEAK THE ASSESSMENT LANGUAGE AT HOME AND THOSE WHO USE ANOTHER LANGUAGE



Source: Author calculations using PISA microdata

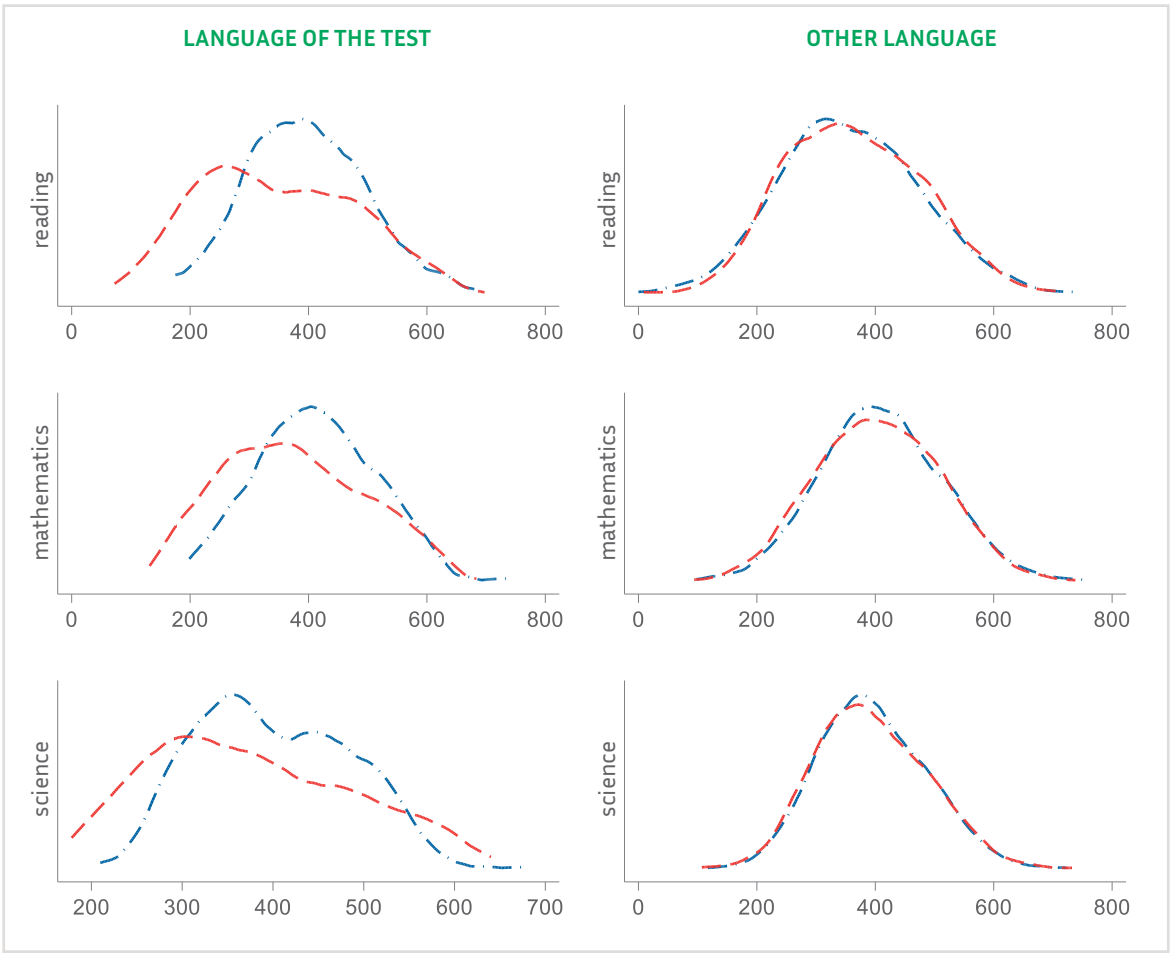
In Lebanon, as already mentioned, in 2018 the advantage of students using a different language appeared and can be explained by both their improvement and the lower results of another group, which was noted in each subject. Here the differences between groups of students, depending on the language in 2015 and 2018, and between these years for both groups of students, were not statistically significant.

Differences between language groups (students who use the language of assessment at home versus those who do not use it at home) are much more considerable in Lebanon in comparison to Jordan, when the students' level of achievement is taken into consideration in each domain. Curiously, the direction of this gap is reversed in Lebanon when contrasted with Jordan.

Students in Jordan who use the language of assessment at home have slightly higher achievements, regardless of the domain or their individual achievement group. In Lebanon, however, low- and medium-achieving students who speak the assessment language at home have lower achievements in comparison to students who do not use the assessment language for daily private communication. The latter difference is much more pronounced in mathematics and science than in reading. Only the students from the high-achieving group in Lebanon post higher test results if they speak the language of assessment at home.

Figure 4.6 depicts the distributions between the 2015 and 2018 cycle of PISA assessment in Lebanon, separately for students who use the language of the test at home and those who speak other languages. There are many more underperforming students in 2018 than in 2015. This difference is similar in all domains (mathematics, science, and reading). The distribution for the highest-achieving learners generally did not change for reading and mathematics, but it improved slightly for science results (more top performers). However, the differences between the years were not statistically significant (table 4.1).

FIGURE 4.6: CHANGES IN PERFORMANCE DISTRIBUTION IN LEBANON BETWEEN PISA 2015 AND 2018, BY LANGUAGE USED AT HOME (DASH-DOT LINE FOR 2015, DASH LINE FOR 2018)



Source: Author calculations using PISA microdata

TABLE 4.1: PERFORMANCE PERCENTILES FOR STUDENTS IN LEBANON WHO SPEAK BOTH THE ASSESSMENT LANGUAGE AND ANOTHER LANGUAGE AT HOME: DIFFERENCE BETWEEN 2018 AND 2015

	Language of the test						Other language					
	p10	S.E.	p50	S.E.	p90	S.E.	p10	S.E.	p50	S.E.	p90	S.E.
Reading	-38.7	63.5	-43.6	50.5	0.5	60.3	11.9	7.5	12.6	7.3	5.7	8.9
Mathematics	-44.9	47.0	-39.1	37.3	-0.1	46.2	-7.4	7.0	4.1	6.7	3.8	7.0
Science	-39.2	33.4	-34.8	39.4	4.9	39.1	-6.5	6.3	1.8	5.8	5.5	7.1

Source: Author calculations, PISA 2015 and PISA 2018 data

TABLE 4.2: PERFORMANCE PERCENTILES FOR STUDENTS IN JORDAN WHO SPEAK BOTH THE ASSESSMENT LANGUAGE AND ANOTHER LANGUAGE AT HOME: DIFFERENCE BETWEEN 2018 AND 2015

	Language of the test						Other language					
	p10	S.E.	p50	S.E.	p90	S.E.	p10	S.E.	p50	S.E.	p90	S.E.
Reading	**19.5**	7.5	8.0	4.3	2.0	4.3	45.1	28.3	24.0	12.0	3.4	12.4
Mathematics	**16.3**	5.3	**16.7**	4.2	**18.4**	5.4	37.1	19.1	**32.1**	11.8	24.8	14.6
Science	**14.6**	5.3	**20.1**	4.3	**23.7**	4.9	27.5	18.0	26.3	11.2	28.8	13.6

Note: Statistically significant differences are bolded (p-value>0.05).

Source: Author calculations using PISA 2015 and PISA 2018 microdata

In Jordan, there were some improvements in 2018 compared to 2015, regardless of the language spoken at home. For students who speak some language other than the language of the assessment at home, the greatest improvements were visible among the low-achieving learners. Smaller but nonetheless significant differences between the years were reported for the low achievers in each domain, and for medium and high performers in mathematics and science.

As the Lebanese educational system is inherently multilingual, it is necessary to analyze differences between the English- and French-educated students. The analyses performed indicate that indeed certain dissimilarities in educational outcomes are present.

TABLE 4.3: PISA 2018 IN EACH DOMAIN BY MAIN LANGUAGE OF INSTRUCTION

	Language of instruction	
PISA 2018 score	English	French
reading	348	357
math	394	394
science	390	380

Source: Author calculations using PISA 2018 microdata

French-educated students, as compared with their English-educated peers, noted higher results in reading, the same in mathematics, and lower in science. This pattern of results holds even when the scores for students' gender, socioeconomic and immigrant status are controlled for:

the French schools still lag behind in science (by 6.5 points) but have an advantage in reading (by 11.6 points). Do note that although these differences are significant, there are not huge, and the scores of both types of schools still fall below the OECD average.

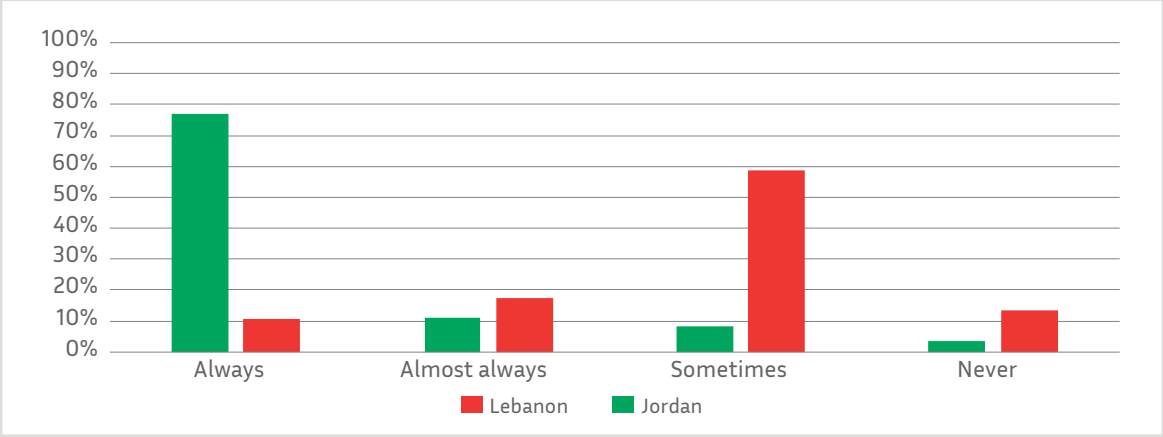
The differences can be explained by the differences between the curricula, which is a serious problem and demands a separate critical comparison of both curricula, teacher education programs and course materials (Bacha and Bahous, 2011). However, the observed small differences also can be explained by reflecting on the role and view of the languages in the country: English is seen as a language of commerce, science and technology, and hence its relevance in PISA 2018 science scores are not surprising. Similarly, French is seen as a language of culture and entertainment, and therefore the advantage of French-educated students in reading tests is predictable (Zakharia, 2011). The language of instruction situation needs to be carefully monitored by the authorities, especially given the fact that French is on retreat and is ceasing to be an important language in tertiary education (El-Hage, 2019; Kadi, 2016). It is to be verified how this situation influences students' motivation and beliefs regarding science education in French, specifically at a time when the percentage of French-educated students passing the brevet exam is falling (Daily Star, 2011).

4.4. Language of the assessment and TIMSS results

The TIMSS assessment also provides information on the frequency of using the language of the test outside school. Both Jordan and Lebanon participated in the 2011 and 2018 TIMSS assessment cycle for 8th graders. Unfortunately, the 4th grade assessment was not conducted in Lebanon, so it is not possible to measure how the effect of the language spoken at home evolves between 4th and 8th grades in primary school.

Figure 4.7 shows how often students speak the language of the test at home. It can be noted that the pattern present in Lebanon differs from that in Jordan. According to students' responses, 77 percent of them in 2015 always spoke the test language at home in Jordan, compared to 11 percent in Lebanon, where most learners reported using the assessment language only sometimes.

FIGURE 4.7: HOW OFTEN 15-YEAR-OLD STUDENTS SPEAK THE LANGUAGE OF THE TEST AT HOME

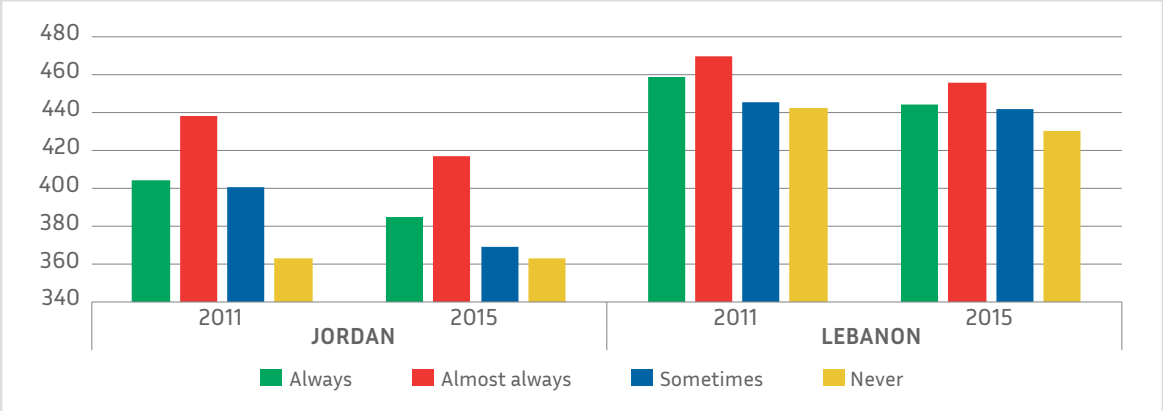


Source: Author calculations using TIMSS microdata

The TIMSS results show the advantage of Lebanese over Jordanian students in mathematics regardless of the year of the assessment and the frequency of using the language of the test. Both in Jordan and Lebanon, those who almost always used the test language at home

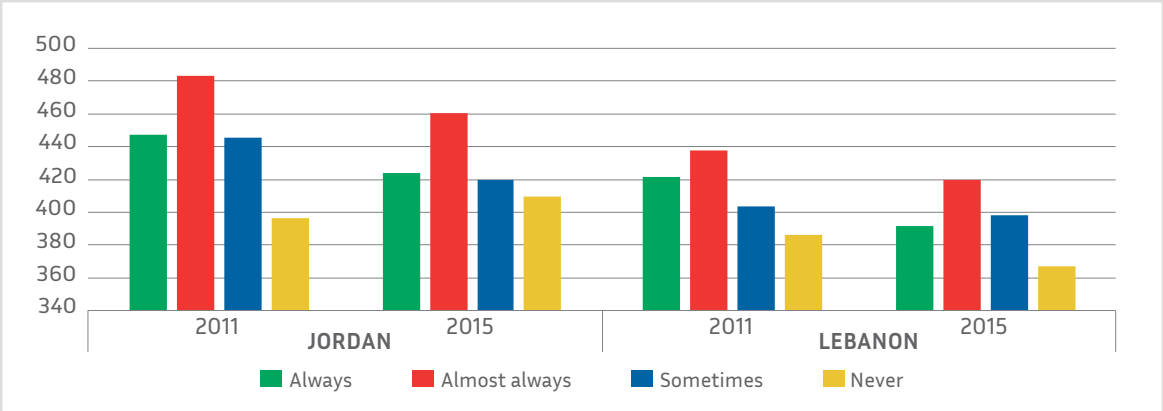
achieved the highest results, and students who never did received the worst scores, regardless of the TIMSS cycle. It can be noted that the achievement gaps due to the frequency of language use were smaller in Lebanon. Given the change over the years, we can see that in the case of Lebanon, the results for all groups deteriorated. In Jordan, a similar pattern is evident, except for the learners who never use the assessment language at home, whose scores in mathematics did not change between the 2011 and the 2015 TIMSS cycle.

FIGURE 4.8: USING THE LANGUAGE OF THE TEST AT HOME AND STUDENTS' AVERAGE MATH ACHIEVEMENT, BY COUNTRY AND YEAR OF THE ASSESSMENT



Source: Author calculations using TIMSS microdata

FIGURE 4.9: USING THE LANGUAGE OF THE TEST AT HOME AND STUDENTS' AVERAGE SCIENCE ACHIEVEMENT, BY COUNTRY AND YEAR OF THE ASSESSMENT



Source: Author calculations using TIMSS microdata

When it comes to science, Jordanian students outperform Lebanese regardless of the year of the study or the frequency of using the language of the test at home. In Lebanon, the results were lower for every category. In Jordan, the situation is similar except for students who never use the language of the test at home, who improved their scores by about 14 points. The results are in line with the teachers' opinions about their students' proficiency in the language of instruction. In Jordan, 27.50 percent of math teachers and 29.53 percent of science teachers reported than none of their students experienced difficulties understanding the spoken language of instruction, while in Lebanon this opinion was expressed by only 14.11 percent and 12.08 percent of teachers, respectively.

• • •

To summarize, according to the literature and research using PISA and TIMSS results for Jordan and Lebanon:

- There is an achievement advantage for students for whom the language of the assessment is also their mother tongue. However, the situation in Lebanon requires a slightly different perspective on these results because Lebanon's first language is Lebanese Arabic, which is essentially an oral language of unstandardized rules and indefinite status. It is advised to reflect on the status of Lebanese Arabic, as perhaps it should be introduced into schools as the main language of instruction instead of classic Arabic, which is, ***de facto***, an additional foreign language to be learned by already multilingual students (cf. Thonhauser, 2001).
- The PISA 2015 results confirm this in the case of students who speak the assessment language at home, who achieve higher scores in most cases, both in Jordan and Lebanon. The data from PISA 2018 indicate that this advantage decreased between the PISA cycles.
- In Lebanon, the data revealed an advantage for those learners who speak at home another language than the assessment one, which mainly results from the changes in the outcomes of the lowest-achieving students; however, the revealed differences are not statistically significant.
- The TIMSS data confirm the difference in frequency of speaking the language of the test at home between Jordan and Lebanon: according to the students' declarations, 77 percent of Jordanian learners always spoke the test language at home, compared to only 11 percent of their Lebanese peers, who mostly declared using the assessment language sometimes (59 percent of students).
- In both countries, students who almost always use the language of the test at home performed the best in mathematics and science, regardless of the year of international assessment. The high results of these students may result from their language proficiency, which would confirm the conclusions of the literature review.
- Children's language skills depend not only on their approach to learning but also on the language proficiency of their teachers, which, research shows, is often inadequate. Moreover, since the language in which the classes are actually conducted is usually not checked, teachers may switch from language to another, or even hold classes fully in Arabic. Because teachers usually do not have a formal language-learning background, they should be provided with appropriate training that focuses not only on improvement and reinforcement of the target language but also on what teaching the subject in a foreign language should look like.
- The multilingual approach practiced in Lebanon should not be abandoned; many other countries are in fact striving for something similar by opening bilingual schools or classes. These practices aim at giving students a better start to their future. However, for this to happen, foreign languages should be

taught from an early age (which in theory is done in Lebanon), and the quality of teaching must be at a high level. Both the language skills of students and teachers should be monitored. In the case of the latter, the method teachers employ in conducting their classes needs to be looked at. A sample-based national study that would include systematic class observations is an advisable step in order to fully evaluate Lebanese everyday teaching practice. Without this step, it would be impossible to tell whether the problem lies in the curriculum, the teachers, the materials used, or the students' motivation and abilities.

- The level of language proficiency that students should acquire at specific levels of education should be strictly defined and described, preferably in the terms of the Common European Framework of Reference for Languages (CEFR).
- Students' education in foreign languages should start from the preschool level. Improved language skills, and lessened socioeconomic gaps in this respect, could be two of the many positive aspects of improving preschool education.
- The qualifications and employment procedure of teachers should be reviewed. Foreign language teachers should have appropriate qualifications, preferably acquired during their studies. Therefore, introducing a course preparing for foreign language teaching at the universities is worth considering, if such does not yet exist. Teacher language proficiency should also be monitored, preferably by linguistic assessments just before graduation from university.
- Additional steps warranting high student and teacher language skills should be introduced in Lebanon. Foreign languages should be taught already from the preschool education level. Students who fall behind in foreign language learning should be identified and offered remedial language classes early on in primary school. High priority should be given to broadcasting language educational programs on television in their original versions with Arabic subtitles. This fun and interactive way of learning should be promoted all over the country, given its low cost and potentially high benefits. Teachers should be motivated to continue their language education even after obtaining a job. A system of scholarships supporting internships and studying abroad should be introduced, as an instrument both to enhance the level of language skills and to motivate students to work hard.

5. TARGETING GROUPS OF DISADVANTAGED SCHOOLS: CLUSTERING AND LATENT PROFILE ANALYSIS

Although all schools share the goal of educating and preparing students for life in society, these schools face different challenges and thus often need a different approach. Identifying groups of schools with similar problems **would ensure that solutions and treatments are tailored to the specific problems and that schools that need the most help receive the targeted measures.** Using targeted policies increases the effectiveness of interventions.

Implementing targeted policies first requires a clear identification of vulnerable schools. This process should be done using a systematic approach. In this chapter, we conducted this process using both k-means clustering and latent profile models. In the second step, the most disadvantaged schools were described in terms of their statistical characteristics. Finally, evidence-based, most effective measures are proposed.

5.1. Grouping schools based on achievement

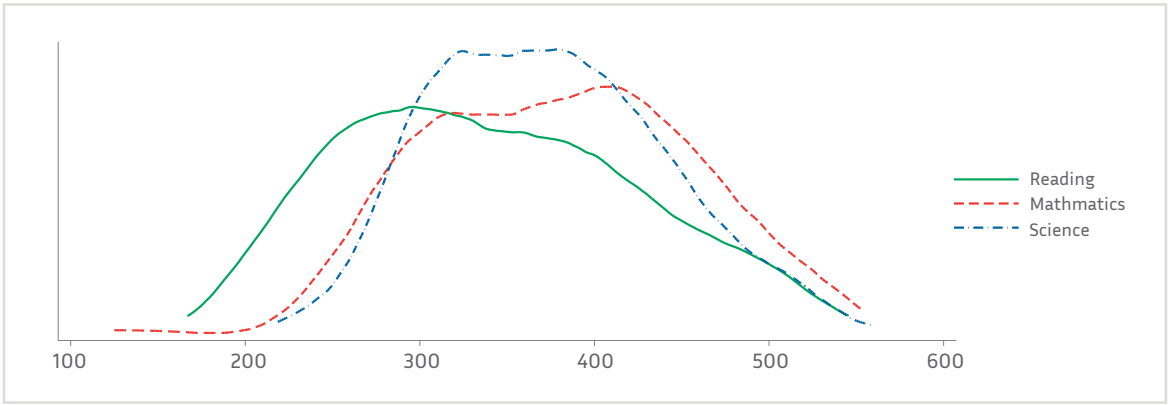
Clustering allows us to identify schools similar to each other on the basis on a set of predefined variables. This way, the groups of schools that need the most help can be identified, and personalized policies can be adapted to meet their needs. Before moving on to the process of clustering, first it is worth to measure differences in student results across schools within the country.

Lebanon

A total of 313 different schools from Lebanon took part in the last PISA assessment. The analysis showed that the **average student's results differ a lot between schools** (there is a large across-school variance). The highest school average result in reading was almost 556 points, which is much higher than the OECD average (+56 points), while the lowest school average result was only 153 points (which means that students there are on average almost illiterate). This creates a difference of more than 400 points between the best-performing and worst-performing schools. The average school score in reading in Lebanon is 340 points. This means that the lowest-performing schools can be even up to 6–7.5 years of education behind[12] the average student in Lebanon. This creates an enormous gap between the average students and students from disadvantaged schools, which has a strong impact on their future life.

While analyzing the distribution of average Lebanese school results (figure 5.1), it is worth noticing the bimodality in the graphs: the hump, especially visible in reading and mathematics, implies that these graphs are a composite of two distinct graphs (two different distributions). This may suggest the presence of latent classes.

FIGURE 5.1: DISTRIBUTION OF AVERAGE LEBANESE SCHOOL RESULTS



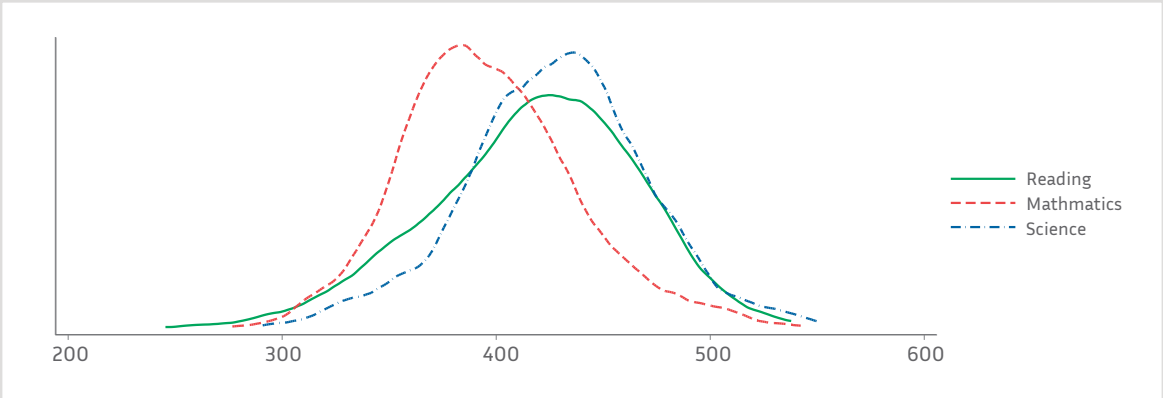
Source: Author calculations using PISA 2018 microdata

Jordan

In the case of Jordan, the difference between the worst-performing and best-performing schools is smaller but still significant. The highest average reading score in school is almost 533 points, while the lowest is only about 256 points, a 277-point difference. Schools in Jordan have not only less diverse results in reading than in Lebanon but also a higher average score (418 points). This implies that the difference between the average school and the worst-performing is equivalent to about 4.5 to 5.5 years of education.[13]

It is worth noticing that the graph representing the distribution of average results in Jordanian schools (figure 5.2) in reading inclined toward higher results, while the graph representing mathematics inclined in a different direction. This uneven distribution of results may suggest that in reading, more students have a worse result than the national average, while in mathematics, the opposite is true.

FIGURE 5.2: DISTRIBUTION OF AVERAGE RESULTS IN JORDANIAN SCHOOLS



Source: Author calculations using PISA 2018 microdata

Although student scores vary between domains and countries, both in Jordan and Lebanon the differences between the group with the highest scores and the group with the lowest scores are appallingly large. This indicates a high demand for clusters that reduce the educational gap between students.

5.2. Methodology of schools grouping

To identify groups of homogeneous schools, two methods were used: k-means and latent profile analysis. The first method involves dividing the schools into a number of groups (called clusters) so that the schools have as few differences as possible in one cluster and are, at the same time, as dissimilar as possible to schools from other clusters. The second method relies on searching for hidden patterns that suggest the best division of the clusters. The execution of each method is detailed below.

The k-means method

Clustering is the process of grouping similar observations. Clustering algorithms *"are presented with a set of data instances that must be grouped according to some notion of similarity"* (Wagstaff, Cardie, Rogers and Schroedl, 2001, p. 577). The aim is to **minimize** within-group

differences and **maximize differences between the groups**. The **k-means** is one of the methods used for allocating elements to the appropriate group. To perform it, the following steps are taken:

1. Choice of the number of groups - k.
2. Selection of initial seeds ("means") – centroids for k clusters.
3. **Assigning each observation** from the dataset to the closest cluster centroid (the distance of observations from centers is counted as Euclidean distance).
4. Recomputing centroids for each of k clusters based on the assigned observations.

The procedure is repeated until the observations cease to change the group at subsequent assignments.

To determine the optimal number of clusters, a Pseudo F index describing the **ratio of between-cluster variance within-cluster variance can be used**. The selection of the number of clusters is based on maximizing the index where GSS is the between-group sum of squares, WSS is the within-group sum of squares, N is the number of observations, and K is the number of clusters.

$$Pseudo\ F = \frac{GSS/_{K-1}}{WSS/_{N-K}},$$

The latent profiles method

If it is believed that there are groups in the population but the variables needed to identify them are not known, then the latent profile method might be the way to properly describe them. Kaufman and Rousseeuw (1990) define this analysis as the classification of similar objects into groups, where the number of groups, as well as their forms, are unknown.

The latent profiles method helps to identify and describe the **unobserved** groups. It informs **who is likely to be in a group** and how that group's characteristics differ from those of other groups. In a typical latent class model, a model is fitted to a set of **categorical observed variables**. A latent class model that instead of categorical observed variables has continuous observed variables is often referred to as **latent profile model**.

After selecting the number of groups, the optimal density (mean, variance) distributions (Gaussian) are determined for each variable. This way, the probability of belonging to a certain group in the case of a specified value of a variable is known. The probability of belonging to a class is calculated on the basis of the probabilities of all the given variables.

5.3. Creating groups of the most similar schools in terms of an average score

As mentioned before, the k-means method relies on identifying the number of groups, and dividing schools into groups with the aim of reducing the differences between them in one cluster as much as possible and maximizing the differences between the schools among different clusters by observing multiple variables. According to Calinski-Harabasz Pseudo-F statistics, it is optimal to create precisely three groups of schools for both Jordan and Lebanon. The created clusters differ greatly among the two countries in terms of average student results in reading in the group.

TABLE 5.1: THE AVERAGE READING SCORES IN CLUSTERS

	Results of group with the weakest schools	Results of group with average schools	Results of group with the highest-performing schools
Jordan	349	419	471
Lebanon	257	354	462

Source: Author calculation using PISA 2018 microdata

These average group scores and average PISA scores for Lebanese and Jordanian students are visualized on the axis below (figure 5.3), where the blue color identifies the scores in Jordan and green identifies the scores in Lebanon. It is also worth noting that while the structure and distances between average results for the clusters in groups are relatively similar, the cluster with the lowest results in Jordan is closer to the second (middle) cluster in Lebanon than to the one with the weakest results. This only shows the enormity of the **problems faced by students in the group with the lowest scores in Lebanon.**

5.4. Identification of the characteristics of each group of schools

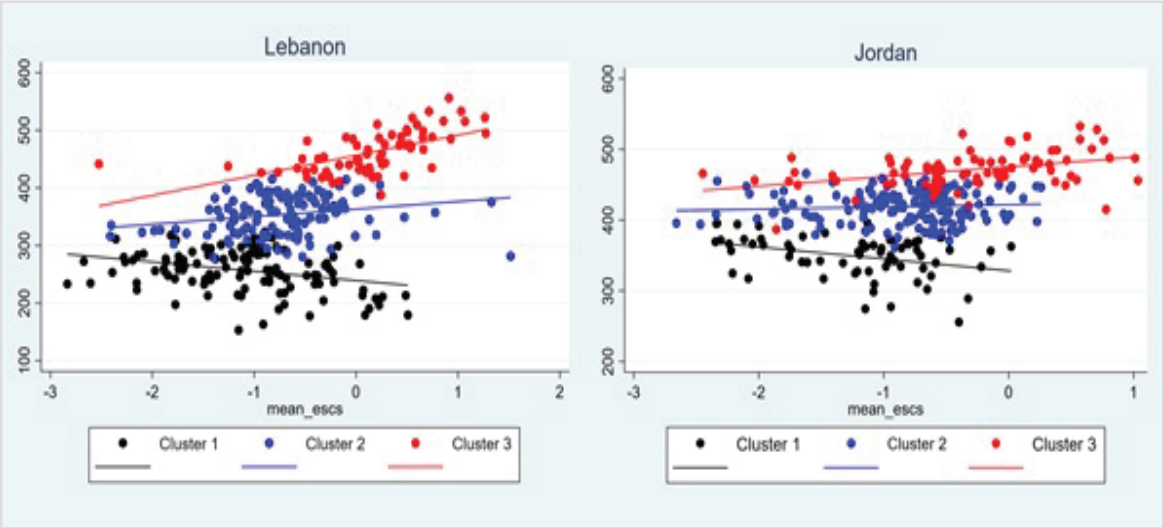
To better understand the characteristics of the three groups, in addition to the results from international assessments, it is worth looking at the background of the schools in each cluster and the scale of the specific problems – the socioeconomic status, the location, the school ownership structure, the schools' competitiveness over students, the inadequately qualified staff, the absenteeism, and the bullying problem. Each is discussed in turn below.

Socioeconomic status

Socioeconomic status is continuously linked to academic achievement (Coleman et al., 1966; Hackman, Farah, and Meaney, 2010) and the relation is contingent upon, among other things, school level and location (Sirin, 2005). The school systems in low socioeconomic status (SES) communities are often under-resourced (Aikens and Barbarin, 2008), and children from such backgrounds show slower rates of academic progress (Morgan et al., 2009) and hence lower literacy and mathematic skills compared to those from high-income families (Reardon et al., 2013; Doerschuk et al., 2016). Moreover, low-SES increases dropout rates, is correlated with low self-concept (Li, et al., 2020; Ali, McWhirter and Chronister, 2005) and negatively influences children's career aspirations (Diemer and Ali, 2009), perpetuating the low-SES status of the community.

As both intuition and research inform us, the index turns out to be one of the factors with the biggest differences between the clusters. According to PISA (OECD, 2016), **fewer than one in ten disadvantaged students in both Jordan and Lebanon is a top performer in science, after taking socioeconomic status into account.** Students from schools with the most disadvantaged backgrounds belong mainly to the first group (the one with the lowest scores). Analogically, most socioeconomically advantaged schools belong to the third group (the one with the highest scores). What is interesting is that students from schools included in the third group in Lebanon have, on average, even better socioeconomic conditions than the mean for an OECD student.

FIGURE 5.3: DEPENDENCE BETWEEN MEAN STUDENTS' SOCIOECONOMIC STATUS AND MEAN READING SCORE OF STUDENTS BY GROUP OR CLUSTER

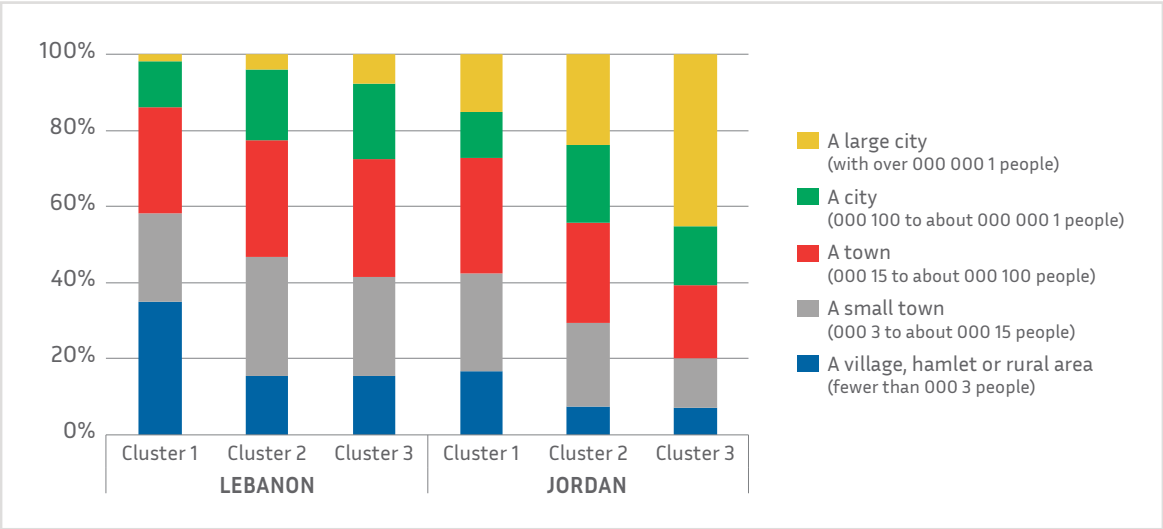


Source: Author calculations based on PISA 2018 microdata

Location

One of the main features of the most disadvantaged cluster is that it consists of a huge number of schools from smaller cities and villages. In Lebanon, almost 35 percent of the first group represents the schools from the villages, hamlets, and rural areas, where each village or area fewer than 3,000 residents, while almost 60 percent of this group live in towns with fewer than 15,000 people. Meanwhile, in Jordan, the share of people from village areas is over twice smaller than in Lebanon, but still, about 42 percent of the group live in areas with fewer than 15,000 people. We might therefore conclude that students from smaller cities may face bigger challenges in their education, and while addressing the priority groups to receive help, smaller settlement units should be considered.

FIGURE 5.4: SHARE OF SCHOOLS FROM DIFFERENT LOCATIONS BY GROUP



Source: Author calculations based on PISA 2018 microdata

This is a worldwide pattern, that students from bigger cities obtain much better results than those from smaller towns (Ellah and Ita, 2017; Hao, Hu and Jamie, 2014; Logan and Burdick-Will, 2017; OECD, 2013a). But it is especially evident in Jordan, where more than 45 percent of the third group lives in large cities with more than 1 million residents. Multiple factors may be contributory, but undoubtedly, students from larger cities often come from higher-income families, have better opportunities to choose the best school for them, and have access to more extracurricular classes, which are often lacking in less-populated cities. In addition, according to PISA data, urban schools are usually larger, better resourced, less likely to experience staff shortages, and usually have a higher proportion of qualified teaching staff.

School ownership structure

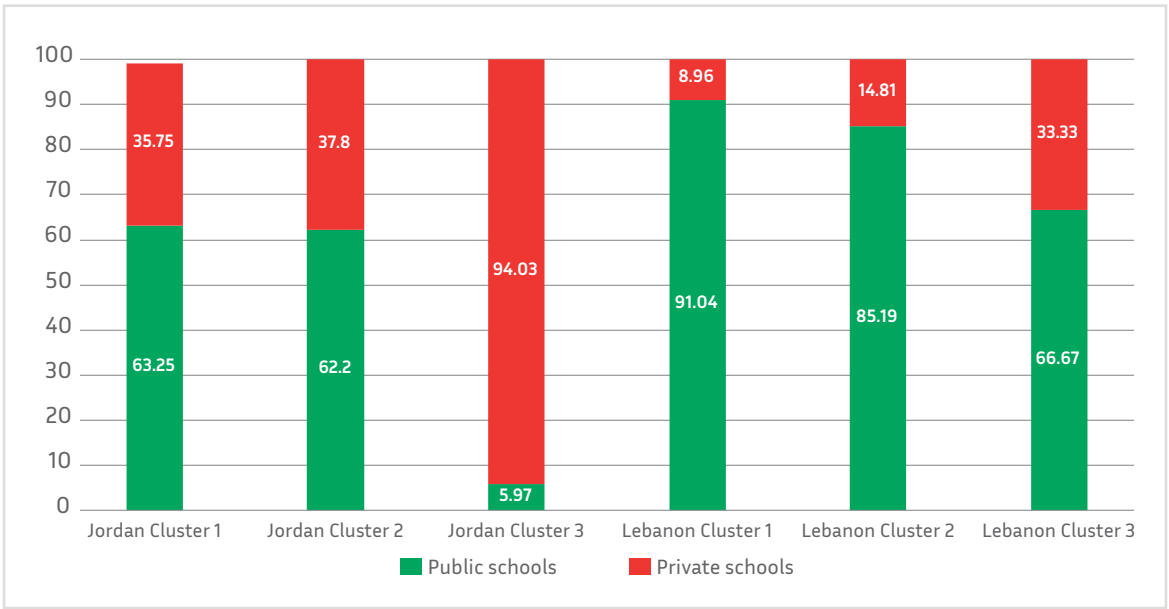
The higher the score, the greater the share of private schools among the schools attended by students from a given group. Lebanon stands out with more than 94 percent[14] of schools in the third group private schools. Although the results in Jordan are not as striking as in Lebanon, the increase in the share of private schools, along with the increase in the results, is also evident. In the third cluster, the share of private schools is three times greater than in the first.

From these results, it can reasonably be concluded that private schools generally offer a higher quality of education than public schools. More attention therefore needs to be paid to the second group of schools in addressing education-level issues.

Competition among the schools over students

The number of other schools in the area attended by students from the region significantly differentiates clusters. Schools that had to compete with at least two other schools in the area gained a decisive advantage in educational performance. This is proven by the fact that in the group with the highest scores (3rd group), such schools represent 77 percent of all the schools in the group in Lebanon and 52 percent in Jordan, respectively. However, it should be noted that these schools also constitute the largest percentage of the first and second groups, which may indicate the segregation and concentration of the best students in one school.

FIGURE 5.5: SHARE OF PUBLIC AND PRIVATE SCHOOLS IN GROUPS



Source: Author calculations using PISA 2018 microdata

TABLE 5.2: SHARE OF SCHOOLS IN THE GROUP, DEPENDING ON IF THEY HAVE OTHER SCHOOLS IN THE NEIGHBORHOOD

Which of the following statements best describes the schooling available to students in your location?	Lebanon			Jordan		
	Cluster 1	Cluster 2	Cluster 3	Cluster 1	Cluster 2	Cluster 3
There are two or more other schools in this area that compete for our students	38.9	59.7	**77.1**	40.3	44.0	**52.4**
There is one other school in this area that competes for our students	25.5	19.3	11.5	25.4	25.7	21.4
There are no other schools in this area that compete for our students	36.4	21.0	11.5	34.3	30.8	26.2

Source: Author calculation based on PISA 2018 microdata

Inadequately qualified staff

An additional problem was the **inadequately qualified staff of teachers** who, due to their lack of competence, did not provide the students with the appropriate material and thus reduced the quality of education. In both countries, teachers' inadequate qualifications are particularly evident for the disadvantaged school cluster. Undeniably, the major influence and responsibility for students' performance lies with teachers. Simply put, students achieve better educational results if they have a good teacher (Avvisati, 2018). Some research (Van den Broeck et al., 2020) reveals that a teacher's high expectations can even compensate for the detrimental impact of low socioeconomic status on students' aspirations and thus also their academic results. On the other hand, an inadequately qualified teacher not only does not provide students with good-quality education but also tends to discourage them from pursuing more advanced education. The training of teaching staff should, therefore, be a key priority when developing new policies.

Absenteeism

Teacher absenteeism is different across the performance distribution and varies between the two countries. The best-performing group (third cluster) experiences the lack or absence of educational staff much less frequently than the other two groups. In Lebanon, nearly 85 percent of schools in the third group have no problem with the absence or lack of teachers, while for the first group, this result is nearly 60 percent. **In Jordan, the problem of the absence of teachers in the third group is still greater than in the first group in Lebanon**. **Only half of the students in the third group admit that there is no problem with teacher absenteeism, while in the first group, this value drops by another 20 percent.** This draws attention to teacher absenteeism as a serious problem in education in Jordan.

The behaviour of teachers may also affect students' attitudes toward school, potentially leading to truancy (Blazar and Kraft, 2017; Gershenson, 2015; Ishak and Suet Fin, 2013). This and other variables may have had an impact on the greater tendency of first-cluster students (the worst-performing group) to be absent from school. In Lebanon, both in the first and second groups, about 13 percent of students admitted to frequent truancy, while in the third group, this figure was halved. The Jordan statistics are much more striking **– nearly 34 percent of the students in the first cluster (the worst-performing group) admitted to very frequent school truancy, and only about 11 percent reported that they never miss school lessons.**

TABLE 5.3: PERCENTAGE OF STUDENTS WHO ENGAGE IN TRUANCY, BY GROUP

	Lebanon			Jordan		
	Cluster 1	Cluster 2	Cluster 3	Cluster 1	Cluster 2	Cluster 3
Not at all	27.5	38.5	51.6	10.8	24.1	34.2
Very little	33.9	29.5	32.3	30.8	32.9	34.2
To some extent	25.7	19.7	9.7	24.6	27.9	20.7
A lot	12.8	12.3	6.5	33.9	15.2	11.0

Source: Author calculation based on PISA 2018 microdata

Jordan has a particularly severe problem with the absence of students, both high- and low-performing. According to table 5.3, less than 35 percent in the third cluster (the best-performing group) never skipped school, while in Lebanon, the value exceeds 50 percent.

The absence of students (more spread out among the boys) from class not only works to their disadvantage but also to the disadvantage of their peers. First, it lowers the overall morale of the class, and second, the teacher has to spend more time with previously absent students to make up for the material instead of moving forward with the usually-present students (OECD, 2013a).

The large-scale assessments (TIMSS, 2015) revealed the massive impact of absenteeism on student achievement. The effects were equally strong for boys and girls. Schools where students rarely reported being absent had significantly better performance in mathematics. **The policy aims in both countries (and in particular Jordan) should be to identify the reasons for the high rates of absence from class and to take action as soon as possible to make class attendance more attractive to students.**

"My son used to love his school before, but when he went to a new school with male teachers, he started asking me on a daily basis if he could skip school. He keeps asking not to go to school, but he didn't used to ask me this before."

(In-depth interview with a parent — representative of the Research Triangle Institute (Early Grade Reading and Mathematics Initiative))

"It is crucial to raise awareness about the effects of bullying in schools, a problem capable of destroying our students' childhoods."

Queen Rania of Jordan

Bullying

Bullying is negatively related to student performance (TIMSS, 2015). Regardless of gender, scores in both mathematics and science decline with increased frequency of being bullied. In both countries, the numbers of students who admitted that they experienced intimidation or bullying (a lot, or to some extent) are frighteningly high and have the highest values in the first groups of schools (the lower-performing clusters): about 32 percent in Lebanon and 39 percent in Jordan. In the third group, these values are not more than half as high but still indicate a large problem. Experiences that affect students' sense of security and belonging at school can lead to not only negative attitudes toward school, teachers, and learning but also poor coping skills regarding problems in their family and professional life in the future (Schäfer et al., 2010).

Looking at the analyzed data, it is clear that the first group struggles with the worst conditions both in terms of access to education and the learning atmosphere. These schools are usually in smaller towns and villages, where there is a lack of teachers, especially well-qualified ones. Violence and truancy are also more common in these schools. However, these schools are often the only choice for students as there are no other schools in the area, so they do not have the option of changing their school environment for the better.

5.5. The impact of selected characteristics on students' performance within the groups

To identify the influence of particular variables on the results, regressions were performed in clusters of schools. After dividing the observations into groups, the effect of many variables ceased to be significant. Estimates of parameters differ significantly between the groups. Analyses were performed separately for the two focus countries.

5.5.1. Regression analysis for Lebanon

The support students gain from their parents is crucial to their results. Research shows that a higher level of parental involvement is often associated with higher student outcomes (both cognitive and noncognitive) (Borgonovi and Montt, 2012). This variable significantly affects schools from all groups, but **advantaged schools (the ones from the third group) benefit the most**. Additionally, the third group has the highest average value of the mean emotional support index (the value is even higher than the average among OECD countries). In the first group, the coefficient is the lowest, but it is also significant. **Therefore, parental support and involvement in the student's life should not be ignored; it should rather be treated as a necessity to create a favorable learning environment. However, it is hard to influence these variables by policy only.**

TABLE 5.4: REGRESSION COEFFICIENT WHERE THE DEPENDENT VARIABLE IS THE MEAN READING RESULT AND THE EXPLANATORY VARIABLES ARE THE SELECTED INDEXES

	Without clustering		Cluster 1		Cluster 2		Cluster 3	
	Coefficient	Std.Err.	Coefficient	Std.Err.	Coefficient	Std.Err.	Coefficient	Std.Err.
Emotional support	79.2*	6.2	17.2*	5.5	20.4*	6.6	49.4*	13.3
Motivation to master tasks	74.6*	7.1	14.4*	5.0	12.9	8.5	58.7*	16.1
Attitude toward competition	57.9*	8.4	14.2*	4.7	9.4	8.8	-4.2	18.5
Home educational resources	85.4*	6.4	6.0	7.5	24.2*	6.9	56.8*	7.9
Positive feelings	83.8*	5.8	17.5*	5.3	28.1*	7.5	29.5*	14.1
Self-efficacy level	62.9*	6.0	14.1*	4.9	14.3	7.4	22.6*	9.7

**Variable is considered to be statistically significant in the model (p-value<0.05)*

Source: Author calculations based on PISA 2018 microdata

While considering support at home, it is notable that achievements are positively correlated with the mean index of the students' educational resources at home. These include, for example, having a quiet place to study or access to necessary school equipment. This variable has no significant influence on the first group of schools but has an impact on the second and third groups (especially the last).

Mean school performance is also positively related to mean student motivation to master tasks. The relation is the strongest, again, in the third group of schools, **where the motivation index is strongly and positively correlated with students' performance**. The third group has the highest average value of motivation index, even greater than the OECD countries' average. This relation in the first group of schools is much smaller, while in the second group it is insignificant. Bradley et al., (2001) showed that limited access to learning materials arising mainly from poverty prevents the creation of a positive literacy environment and often is responsible for generating education gaps even before formal schooling begins.

The attitude toward competition is also an important factor. However, this index is a significant predictor only in the first group. Among those students, **the ones who like to compete with others achieve on average higher scores in international assessments**.

The positive feelings index has a particular impact on learning outcomes. They are significant for all three groups, and an increase in positive feelings has a positive impact on learning. This is particularly noticeable for the second and third groups, which react similarly to this variable.

Finally, the self-efficacy level, which can be defined as the extent to which students believe in their capabilities to execute specific tasks, is a variable affecting the first and third groups, but only in the latter did students report higher self-efficacy than the average student across OECD countries.

In conclusion, in Lebanon, most of the variables (home educational resources, positive feelings, self-efficacy level, motivation to master tasks, emotional support) have a more considerable impact on the group with better results (third cluster). Attitude toward competition, however, has a significant impact only on the first cluster, the one with the lowest scores.

5.5.2. Regression analysis for Jordan

In Jordan, the emotional support students receive from their parents also has an important connection with students' results, but here the largest beneficiary of this factor is in the first group. **The increase in the emotional support index by one standard deviation can be attributed to the equivalent of about one year of additional education** (25–30 points on the PISA scale). The aver) index is still the biggest in the third group, and only there is it greater than the average of the OECD students.

TABLE 5.5: REGRESSION COEFFICIENT WHERE THE DEPENDENT VARIABLE IS MEAN READING RESULT AND THE EXPLANATORY VARIABLES ARE THE VARIOUS INDEXES

	Without clustering		Cluster 1		Cluster 2		Cluster 3	
	Coefficient	Std.Err.	Coefficient	Std.Err.	Coefficient	Std.Err.	Coefficient	Std.Err.
Emotional support	72.4*	5.2	33.2*	8.7	22.8*	5.2	25.3*	7.9
Motivation to master tasks	76.9*	4.8	44.4*	8.3	28.8*	5.3	29.6*	7.7
Attitude toward competition	88.3*	7.4	41.0*	13.0	21.9*	7.1	20.5	10.6
Home educational resources	31.4*	3.7	-12.1*	5.2	8.5*	3.2	15.5*	4.7
Positive feelings	83.4*	6.1	29.9*	10.8	25.3*	6.0	23.7*	10
Self-efficacy level	73.2*	6.3	38.8*	8.9	19.6*	6.0	23.3*	9.5
Enjoyment of reading	81.1*	10.8	70.7*	17.5	43.6*	8.6	0.7	10.1
Meaning in life	68.5*	9.3	45.7*	10.8	9.2	7.4	10.5	12.7

**Variable is statistically significant*

Source: Author calculations based on PISA 2018 microdata

In the third cluster of schools, students benefit from educational materials the most. However, the first group has a negative relation (in Lebanon, this relation was insignificant). In Jordan, all the groups have lower access to educational resources at home than the OECD average.

Students' motivation to master tasks is positively related to outcomes among all three groups. Additionally, the first group benefits from this index the most (which is different than in Lebanon). The average value of motivation among all schools is greater than the OECD average, but among disadvantaged schools (first group), the value is still below the OECD average.

In Jordan, a positive attitude toward competitiveness has a strong relationship with students' reading performance in the first group of schools (the same group as in Lebanon), but there is also a significant relationship between variables in the second group. All groups have a higher value of attitude toward the competition index than the OECD average.

The positive feeling index among students **is similarly important in all groups** (just as in Lebanon) and has a positive impact on learning and gaining better grades. Self-efficacy level affects all the groups, but it also has the biggest impact on the first – almost twice as big as for the second group.

While analyzing the Jordanian data, the two new variables, which were not analyzed in the Lebanese case, were included: enjoyment of reading, and meaning in life. The first has quite a strong impact on the first and the second groups, while the second affects only the first group's results.

In conclusion, in Jordan many variables (emotional support, attitude toward competition, positive feelings) have a similar effect on all students. **The strongest positive impact on the students who had the weakest results are level of self-efficacy and motivation to master tasks.**

5.6. Latent school profiles

To check the robustness of clustering results and explore further differences, we used another method of allocating schools into groups – the latent profile model. The assignment was not only based on mean school students' results from reading but also on shortages of educational staff in the school, and the type of area where the school is located. The same variables that were taken into account in the section above will also be addressed here, and the differences between them will be explained in the summary of this passage. The latent profiles will be analyzed separately for the two countries.

5.6.1. Lebanon

The Bayesian Information Criterion (BIC) was used to determine the optimal number of Latent Classes. BIC indicated that 2 is the optimal number of groups in the case of Lebanon. The results are consistent between the two methods.

TABLE 5.6: SHARE OF SCHOOLS FROM GROUPS CREATED BY THE K-MEANS METHOD IN THE GROUPS CREATED BY THE LATENT PROFILE MODEL

		k-means		
		1	2	3
Latent profile model	1	99.1	67.3	5.8
	2	0.90	32.8	94.2

Source: Author calculations based on PISA 2018 microdata

Comparing to the previous allocation into 3 groups, over 99 percent of students from the most disadvantaged group (the first group) were assigned to the first group in the second allocation. Over 94 percent of schools from the most advantaged group (the third group) ware assigned to the second group by the latent profile model. Over 67 percent of schools from the middle group (the second group) were assigned to the first group by the latent profile model. **Latent profiles clearly overlap with clusters 1 and 3 from the previous method, and the former group 2 has now been distributed between the two new groups.**

5.6.2. Jordan

In Jordan, schools were also assigned to the new groups, but here the distribution differs significantly. Similarl to Lebanon, several schools from the previous first group that was created in the k-means analysis were assigned to the first group (over 43 percent), and most schools from the previous third group were assigned to the last group (almost 61 percent).

TABLE 5.7: PERCENTAGE OF SCHOOLS FROM GROUPS CREATED BY THE K-MEANS METHOD IN THE GROUPS CREATED BY THE LATENT PROFILE MODEL

		k-means		
		1	2	3
Latent profile model	1	43.3	29.0	20.2
	2	29.9	25.9	19.1
	3	26.9	45.1	60.7

Source: Author calculations based on PISA 2018 microdata

The latent classes division differs slightly from the previous method, likely due to the inclusion of new variables in the analysis such as the type of area where the school is located and shortages of educational staff in the school, which is a particular problem in Jordan, and not only for the low-performing schools. However**, the groups with the worst and best results were largely overlapped in both methods, which means that the results are robust.**

5.7. Conclusive group characteristics across methods

The following is a summary of the group's characteristics across the two methods. It clearly indicates what should be taken into account when creating targeted policies.

TABLE 5.8: COMPARISON OF GROUP CHARACTERISTICS WITHIN THE DISADVANTAGED GROUP

	Lebanon	Jordan
Location	Consistently, the most numerous part of the disadvantaged group is made up of cities with fewer than 100,000 inhabitants, while in the more privileged group, there is a smaller share of people from rural areas and a larger share from large urban areas.	There are some common patterns but the distribution of schools is not as clear across the settlement size as it is in Lebanon.

	Lebanon	Jordan
Teachers	**The problem of a lack of teachers is consistently visible.** In line with the results of both methods, lack of access to high-quality teaching is a problem in the disadvantaged schools group (for example, the teacher absenteeism problem).	Both approaches **confirmed significant problems with the teachers, mainly with absenteeism and a low level of qualifications**.
Student absenteeism	**Both methods revealed the scale of the problem of students skipping classes in the most disadvantaged schools.**	**Both methods imply the enormous scale of the problem of student absenteeism in Jordan**.

Source: Author evaluation

Summarizing the characteristics of the vulnerable schools: although in Jordan it is not possible to define the location factors directly, in Lebanon there is a clear division between students from the group with the weakest results, who tend to live in rural areas and small towns, and students from the group with the best results, who tend to live in large towns. In both countries, students from the underperforming groups had more problems with the absence of teachers and of their classmates than those with better results, although in each group, but especially for Jordan, these factors need intervention and improvement.

Finally, the results of both methods were compared to identify variables that have a decisive impact on each of the distinct groups of schools. The results are in general robust across methods and identify several key factors that differentiate the performance of schools.

TABLE 5.9: CONCLUSIVE COMPARISON OF THE IMPACT OF SELECTED CHARACTERISTICS ON STUDENTS' PERFORMANCE

	Lebanon	Jordan
Emotional support	The emotional support students receive from parents is essential to students' results in all groups, but it is especially influential in schools from the groups with the best results (third and second, respectively).	Emotional support from parents appeared to be consistently important across all groups of schools.
Motivation to master tasks	The motivation index has the biggest impact on students from the better-performing groups.	Students' motivation to master tasks is positively related to all of the groups in both methods. However, the disadvantaged group benefits from this index the most.
Attitude toward competition	The impact of this index on average performance is only significant for schools in the first group (consistent in both methods).	Attitude toward competition is positively related to all the groups in both methods.

	Lebanon	Jordan
Home educational resources	Statistically, a student from a school from the disadvantaged group is, on average, less equipped with relevant home educational resources than the student from the second group. Students from schools with better results in both methods benefit more from additional resources.	While home educational resources are significant to all groups in both methods, surprisingly they do not always have a positive impact on students – while in latent profiles, they are positively related to the first group, in the clustering method, it is the opposite.
Positive feelings	The positive feelings index was significant and positively connected with reading scores across methods and was more strongly correlated with results for better-performing schools.	The index has a similar correlation with achievements in all the groups of schools.
Self-efficacy level	In both methods, the relationship between reading score and self-efficacy level was stronger for the better-performing group.	The self-efficacy correlation with achievement is strongest in the disadvantaged group.

Source: Author evaluation

Summarising, parental emotional support has a similar impact on students in all groups in Jordan, while in Lebanon, the greatest impact is experienced by students in schools with better results. The same is true of motivation to master tasks, positive feelings, and home educational resources. Differences in the impact on groups between Jordan and Lebanon occur at the self-efficacy level, where a stronger relationship with the better-performing group is maintained in Lebanon, while in Jordan it is maintained with the worse-performing group. The same is true of attitude toward competition, which in Lebanon only affects the group with the weakest results and in Jordan affects all groups. It is therefore clear that policies and reforms in both countries have to take into account the different mechanisms occurring within different groups of vulnerable schools in both countries.

A huge body of work supports the thesis that district-level interventions are more effective than school-level measures, although the difference is not substantial (Schueler et al., 2020). The literature also shows that a greater number of interventions and reforms does not necessarily translate into a greater, positive effect on educational outcomes. It is more important that the new policy is properly adjusted to the educational needs of a given group.

The most common forms of interventions in low-performing schools are principal replacements and new forms of funding, teacher replacements, professional development or technical assistance for administrators, human resource changes, and teacher professional development. However, according to research, extended learning time and teacher replacements are the more promising interventions for improving education. Another common solution is introducing academic support, referring to a variety of strategies, instructional methods and school resources addressed to children at risk of diminished academic achievement. The programs aim at monitoring students' needs, providing motivation and direct instruction, and guiding them toward academic achievement. These measures usually take the form of classroom- or school-based strategies or after-school programs. As research shows, such activities positively influence students' decision to stay in schools and are especially helpful for children with behavioral and emotional disorders (Somers and Piliawsky, 2004; Bowman-Perrott et al., 2013).

Looking back over the qualitative findings, it is clear that students' educational performance is a result of both the factors connected with the school environment, such as the schools' location, number of schools in the region, teaching quality, and the approach to the bullying problem, as well as factors connected with the student himself or herself, such as the emotional support received from parents or their socioeconomic status. However, it is essential to acknowledge that different groups of students require different approaches, and so only the proper involvement can lead to a higher quality of education without creating or widening already existing gaps.

From the analysis, we might conclude the following recommendations for three types of groups in Jordan and Lebanon:

- **The disadvantaged group of schools** (with the lowest assessment scores): This group is characterized by difficult external conditions that harm the quality of their education. At the same time, the education in these schools is at an appallingly low level, which is currently not sufficient to introduce the student into adult life in society (the situation of these schools in Lebanon is particularly critical). These are usually schools in smaller towns or villages, which are often the only choice for students because there are no other schools in the area. This raises the problem of student absenteeism and violence, which is detrimental to the education not only of the students directly affected, but also of their classmates and the school as a whole.

Lebanon:

The schools of this group in Lebanon experience serious problems that need to be solved quickly by universal methods. What is needed here are **both interventions to change and adapt the core curriculum to their needs, and secondly, careful monitoring of their learning progress.** The motivation to learn and the self-efficacy related to it, as well as positive feelings, positively affect students in this group, which indicates the need for interventions in these areas. Additionally, competition turns out to be an important factor and could be used as a motivational incentive; it is recommended that within- and inter-school competitions be organized.

It is also worth thinking about courses and motivation measures for teachers to ensure that their competences and willingness to teach are at a higher level. One should also look at the possible problem of the inequitable distribution of school resources that favors larger urban centers and consequently leaves schools in smaller towns and villages not only with a smaller range of extracurricular activities but also other conditions that discourage both students and teachers from developing strong school ties and social bonds, leading to frustration (burnout) especially among the teachers.

Jordan:

Schools in this group in Jordan require a new curriculum adapted to the needs of low-achieving students. Given the often-difficult socioeconomic situation of students, there is a need to adapt to support their current situation. A particularly strong influence on the behavior and academic achievement of this group of students are emotional factors, especially motivation and competition-related indices. A definite problem is absenteeism among both students and teachers, which can take on an endogenous character.

What is needed here is both an awareness campaign against this problem and a scheme to motivate both sides to systematically and actively participate in education. Apart from paying attention to the control of teachers' work, it is also worth taking a closer look at the conditions in which they work and getting to know their needs and expectations and finding interventions that would effectively improve teachers' job satisfaction, keeping in mind the available resources.

- **The middle group** (with average achievements among both Lebanese and Jordanian schools)
  The achievements of the second group in Lebanon are closer to the levels of the first group in Jordan than the equivalent of the second group, which shows that the situation in these groups, especially for Lebanon, is critical. It is also worth remembering that in both these countries, the average results are lower than the average results in the OECD countries. The second group cannot therefore be neglected either, and reforms should be introduced to ensure that the level in this group is raised and kept from declining.

  Lebanon:

  It is recommended that great emphasis be placed on home educational resources, among other things. Some forms of material support (for example, equipping with educational materials) should be considered for students in this group, especially in the light of the current crisis affecting education in Lebanon.

  It would also be a good idea to work on involving parents in supporting their children and providing them with an appropriate learning environment, including emotional support. To this end, a social campaign could be launched to inform parents about the problems students face in school and how they can support them in their educational progress. Similarly, teachers should be aware of how their own behaviour can shape students' attitudes and how important it is to support and strengthen students' positive attitudes and feelings toward learning and coming to school. In terms of providing a suitable learning environment, care should also be taken to combat the problem of bullying and other kinds of violence in schools, and the curriculum should be adapted so that it not only matches the school's resource and infrastructure level but also addresses important social issues such as allaying violence problems. It is also important to emphasize the purpose of education in order to enhance students' internal motivation.

  Jordan:

  A serious problem faced by students in this group in Jordan that lowers their level of education is absenteeism, both among students and teachers. **This issue should be addressed as a priority**. Supporting those parents who can provide emotional support to students is also worth to consider. To this end, it is useful to carry out an information campaign to let parents know how they can provide a good learning environment for their children. Psychological workshops at school for parents is also a good idea.

- **The top-performing group** (with the highest assessment scores)
  The third group had the highest scores in the assessment. However, it should be remembered that, compared to OECD countries, even this top group ranks as an average group. Therefore, action should be taken to further develop the level in this group. It is also worth remembering that the best students often motivate peers to catch up to their level and will also be able to educate future generations. Therefore, it is worthwhile to focus on this group as well and to ensure its further undisturbed development.

  Lebanon:

  Students in the best-performing group in Lebanon should be further motivated to achieve even greater educational success. It is also worthwhile to support their families because home educational resources have a definite positive impact on their education. Social campaigns conducted in schools, informing students about their possibilities to continue their education, may be useful to create positive feelings and motivate students to continue their education.

  Jordan:

  Schools from the group with the best results in Jordan mostly compete for the same students. This can be used as a motivational element to create national competitions among schools via publicly available school evaluation results. However, it will probably only positively affect schools from larger cities, which have the educational establishments to compete with. In addition, there is a risk of creating student segregation. It is also worthwhile to conduct social campaigns to develop positive feelings among students and support their wellbeing by both parents and teachers.

The above conclusions are summarized in the table below.

TABLE 5.10: RECOMMENDATIONS FOR EACH GROUP IN BOTH COUNTRIES

	Lebanon	Jordan
Disadvantaged schools	Adapting the curriculum, providing educational materials and school equipment, monitoring students' results in assessments, launching awareness campaigns to show the importance of education. Developing motivation schemes for teachers, creating additional courses, working on the bullying problem, and monitoring the effects of introduced changes and improvements.	Adapting the curriculum, monitoring students' and teachers' work, launching awareness campaign to show the importance of education. Enhancing teachers' motivation, exposing and sanctioning teachers' misdemeanors, offering additional courses to improve teaching qualifications. Working on the problem of bullying and absenteeism, and encouraging parents to support their children.
Middle-achieving schools	Motivating students, giving them emotional support (both from parents and teachers,) enhancing home educational resources, working on the bullying problem.	Working on attitudes toward competition, offering students emotional support (both from parents and teachers), working on the problem of bullying and absenteeism.
Top-performing schools	Fostering positive feelings, enhancing home educational resources, motivating students to master tasks, launching social campaigns on the perspectives of education.	Evaluating attitudes toward competition, enhancing, emotional support, fostering positive feelings and working on students' wellbeing.

Source: Author evaluation

Apart from the above recommendations it can be added that in order to fully understand the problems of low-performing schools, it is necessary to assess their situation with a research project aimed at doing only this. No intervention is possible without a thorough diagnosis. Such diagnosis should entail qualitative and case-study methods, as quantitative techniques may be of less use for this particular purpose. In-depth interviews and in-class observations are recommended as the main research tools here. It is important to address measurements from the point of view of all important school agents: principals, teachers, but also students and their parents. School spaces and equipment should be also analysed (cf. Benade, 2021; Roscigno et al., 2006; Sharplin, 2002; Starkey et al., 2021; Wright et al., 2021).

Such research should especially concentrate on teacher working conditions in the low-performing schools and compare teacher qualifications, skills and attitudes between the teachers from high- and low-performing schools. Issues demotivating and discouraging teachers from working in such schools should be identified and addressed by pinpoint policies. It is to be remembered that a "supportive and conducive" working environment is the main in-job factor helping to retain teachers especially in hard-to-staff areas (See et al., 2020). Teacher wellbeing, exhaustion, and burnout should be also taken into consideration in such a research project, along with all other, formal and informal, aspects of employment (Green, 2021).

Regarding teacher support, but also accountability in the low-performing schools, we recommend the creation of a teacher support and mentoring office that would operate on a regional and applied basis. Such "teacher supervisors" should be recruited from among the most highly motivated and experienced teachers. Their role would be to advise teachers on methods, materials and techniques, but also to monitor teachers' wellbeing and aid them in solving student behavioral problems. The supervisors would also serve to enhance school-parent relations as well as help to build a communication channel through which information from teachers could go quickly and unobtrusively to local and national authorities.

Supervisors could also act as additional help to hold misdemeanant teachers accountable and help to decide which teachers should be let go of. It is important to note that these supervisors should not be administrative clerks but active agents who would patrol their school district and play an active role in shaping the school environment to be more "supportive and conducive" for both teachers and students.

Having said that, it is of course natural that any sector plan should also include the issues of teachers' wellbeing, emotional support and adequate accountability. Employment procedures and training requirements described in the Plan should be reviewed and adjusted to find solutions on how to support teachers in the most disfavorable regions.

Bullying and absenteeism are serious problems plaguing especially the low-performing schools. It is impossible to plan any specific recommendations solely on the basis of ILSA data. National-level or, even better, regional-level studies are needed. An excellent example of how to launch such a research and remedy project is presented in the study by Kanetsuna and Toda (2017) who have developed a few principles for a successful anti-bullying project.

First of all, it needs to be aimed at the classroom level since this is the level at which bullying is most often present. Secondly, any anti-bullying initiative must encompass all school agents: principals, teachers, students and parents, and preferably also local authorities if they have any say in school matters. Thirdly, raising the awareness of anti-bullying is crucial. The latter can be addressed by various moves, including media campaigns, meetings and project-based work. One of the most promising ideas to increase anti-bullying awareness are drama-based activities that can even later be presented in other schools, displayed on

the Internet or broadcast on TV. It should be easy to develop this idea further, for example, by organising interschool contests for best anti-bullying drama or pieces of art such as poems, short stories, short videos, or paintings. The best of such pieces of art could be awarded prizes at the school, regional, and national levels.

Another important aspect of anti-bullying actions is student empowerment. Setting up student committees that would then plan and introduce anti-bullying measures in their own schools is regarded as one of the especially effective strategies. Of course, parents should also be included in these anti-bullying actions, for example, by their presence at drama shows and by participating in meetings with teachers and principals where the problem of bullying would be presented to them. Other bullying indices and anti-bullying initiatives can be consulted in the paper by Ttofi and Farrington (2011).

As evidenced by research, another major problem, absenteeism, may also be related to bullying (Kearney, 2003), because absenteeism usually is caused by a mixture of subjective and objective reasons (Cook et al., 2017). Among the former, causes such as school anxiety, bullying and lack of motivation and interest are the most important. Among the latter, financial problems, child labour, health reasons, and transportation are dominant (Amalu and Abang, 2016; Cook et al., 2017). Evidence indicates that establishing and maintaining strong, genuine teacher-student and teacher-parents' relations is key to preventing absenteeism. Cook and co-authors point out that teachers visiting students' homes and meeting their parents there is the best way to develop such relationships.

Moreover, schools need to maintain thorough documentation of students' attendance in a way that is easily accessible and understandable to both teachers and parents. Furthermore, teachers and parents should be in contact with each other through phone and e-mail. However, the key prevention strategy is to intervene early and take the necessary steps when the first signs of truancy appear. Cook et al. advise that in case of die-hard absenteeism, teachers should call for professional, psychological or even legal assistance, as most often these cases are beyond their help. Discussing problems with transportation, child labour or health issues is relevant but beyond the scope of this report.

A final idea for addressing the low-performing schools problem is to find high-performing schools in disadvantaged, underserved rural areas. Such schools can serve both as case studies and role models. Studying them as case studies may help to identify key characteristics that other struggling schools are lacking. Showing them as role models may help to build convincing social campaigns.

Finally, it is to be remembered that many problems of the low-performing schools may stem from outside of the educational world. Because low-performing schools are mainly located in rural, economically disfavoured regions, socioeconomic causes may be dominant in their problematic situation. It is important to monitor and address students' and parents' educational aspirations in these regions also with media campaigns (Gil-Flores et al., 2011; Marjoribanks, 2002; 2003). Most likely, some of the in-school problems (for example, violence, absenteeism, low motivation) are impossible to solve completely without resolving the socioeconomic challenges of their immediate vicinity.

6. QUALITY OF EARLY CHILDHOOD EDUCATION IN JORDAN AND LEBANON

Early childhood education and care (ECEC) is a crucial stage in children's development. It encompasses a child's first years up to age 6 or 7 and includes educational and childcare services from infancy to preschool. It is an important stage for all children, but especially for more vulnerable children such as those from families with limited economic, cultural, and educational resources. Differences in vocabulary between the children of parents with high educational attainment level and those with low educational attainment can be substantial already at age 2. These differences translate into future educational achievements, attitudes, and behaviors (Morgan et al., 2015). The research literature, which mostly focuses on large-scale randomized control trials in the United States, suggests that preschool education can bring large benefits, especially for children from disadvantaged backgrounds. However, it requires appropriate interventions to ensure the high quality of educational services (Meloy et al., 2019).

Defining standards for early childhood education and care in general, and in particular for preschool education, is more difficult than for school education mainly because besides typical academic-oriented or cognitive outcomes, there are many other outcomes expected, including the development of social skills, proper attitudes, and acceptable behavior. In general, successive educational stages should ensure comprehensive development, which can only be achieved when the stages are seamlessly meshed so that the completion of one stage is a proper preparation for the next one. **Early childhood education ought to equip children with knowledge and skills that will ensure successful learning in primary school. However, it should also guarantee socioemotional development and high-quality childcare for working parents** (see OECD, 2012).

International comparisons of early childhood education and care are highly limited due to the unavailability of comparable data on its quality and outcomes. Usually, the data on access to preschool education are discussed with only few attempts to compare the quality of services or outcomes (see OECD, 2020 for the first international assessment of outcomes for five-year-olds across three countries).

Early childhood education in Jordan **consists of two years of kindergarten (KG1 and KG2) for children ages 4–6, and nurseries available for younger children. While the nurseries are handled by the Ministry of Social Development (MOSD) and the Ministry of Health (MOH), the other stages are under the control of the Ministry of Education (MOE)**.

In Lebanon, **the ECE includes nurseries attended by children up to age 3, which fall under the responsibility of the Ministry of Social Affairs (MOSA – public daycares) or the Ministry of Public Health (MOPH – private daycares), along with a kindergarten stage with three grades (for children ages 3 to 6), which is managed by Ministry of Education and Higher Education (MEHE)**.

Good-quality preschool education should prepare children for a successful transition into primary education, and it should compensate for early learning disadvantages to ensure an equal start for all learners. **The basic challenge facing mainly the Jordanian education system is to guarantee access to ECEC services for the majority of children. Limited access to early education for disadvantaged families can result in widening the school readiness gap and affects the inequality in student progress in primary education. In Jordan, pre-primary enrollment rates are alarmingly low**, a result not only of the limited access to preschool facilities, but also of families deciding not to enroll their children in school because pre-primary enrollment is not compulsory.

In 2018, the gross enrollment rate in pre-primary education was only 27 percent (defined as the number of children enrolled regardless of age, divided by the population of the age group that corresponds to the official age group of this level). It is also noteworthy that the differences among genders are slight but tend to favor males (27.03 percent of females and 27.24 percent males attended pre-primary education in 2018 (UNESCO Institute for Statistics, n.d.)).

On the other hand, according to some studies, Jordanian **national statistics may underestimate enrollment** because many children attend kindergartens that are not licensed by the MOE. Therefore, they are not counted in official statistics (King, DeStefano, and Shukri, 2018). It is questionable whether the quality of services provided without the MOE's supervision is sufficient to prepare children for a successful start in primary education.

In contrast, Lebanon's gross enrollment rate reported in 2016 was 85.9 percent, an increased compared to 2015, when it was 77.8 percent. The net enrollment rate was 82.2 percent (CEIC, 2018), so the gap between gross and net enrollment rate is greater than in Jordan. This may indicate the challenge of over-aged and under-aged students that Lebanon faces in primary and secondary education, mostly due to the large share of grade repeaters among Lebanese students, that already appears at an early stage. **As in Jordan, in Lebanon, the enrollment rates are also somewhat higher for males** (the gross enrollment rate in 2016 was reported at 83.69 percent for females and 88.14 percent for males).

In Lebanon, the preschool attendance is a source of inequality as most preschools are privately owned and concentrated in the central region or urban locations (Standing Committee for Economic and Commercial Cooperation of the Organization of Islamic Cooperation – COMCEC, 2018). Private provision, mostly limited to urban locations, favors higher-income families and creates geographical inequalities. However, the reliance on the private sector is not very different from primary and secondary education. In Lebanon, **private schools constitute 54 percent of the total (**Mikhael and Daou, 2018). **The two systems are parallel and have little** connection with each other (International Alert, 2015, p.3).

When **early education was considered, 74.88 percent of children attending preschool education were enrolled in private institutions. Although in Jordan** most schools are government-owned, there is also a large presence of the nonstate sector (private schools constitute 45.12 percent, MOE – 51.99 percent, other governmental – 0.61 percent, UNRWA – 2.27 percent (Ministry of Education, 2019), and when it comes to preschool education the private sector dominates – in 2018 the percentage of enrollment in pre-primary education in private institutions was 73.4 percent (UIS, n.d).

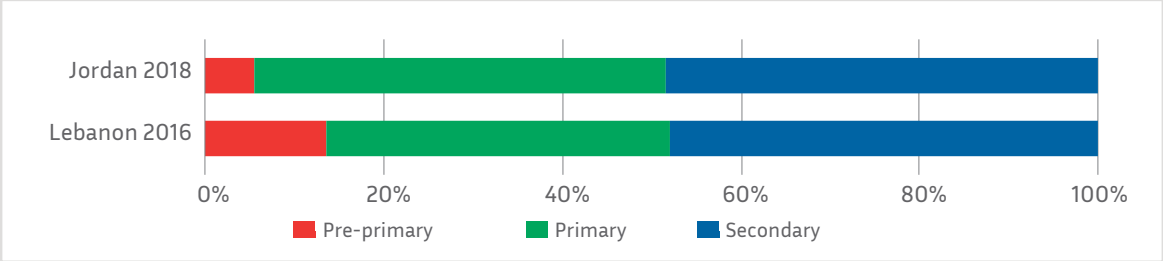
Summarizing, the low enrollment rate in pre-primary education may result in children's lack of preparedness to enter primary school. Limited knowledge, as well as insufficiently developed skills, attitudes, and behavior can impair learning in early primary grades and result in increasing difficulties at later stages of education. This concerns mainly Jordan, which struggles with shortcomings in access and participation in pre-primary education. However, the high enrollment rate in Lebanon also does not mean that all children receive a high-quality education. **In both countries, the majority of children are in the early education programs provided by the private sector.**

Research carried out by Tran et al. (2019)[15] showed that the early childhood development index (ECDI),[16] which measures whether children ages 3–5 years are developmentally on track in 4 domains – literacy-numeracy (language-cognitive), physical, social-emotional, and approaches to learning – was significantly higher for Lebanon (ECDI score equal to 6.72) than for Jordan (ECDI score equal to 5.52) (Tran et al., 2019).

An earlier study on the ECDI (focusing only on the cognitive and socio-emotional domains) revealed that 10 percent of Jordan and 7 percent of Lebanese children presented low levels of cognitive development (scoring below 5 ECDI points), while 30.7 percent of Jordan and 17.7 percent of Lebanese children had low socioemotional ECDI scores (McCoy et al., 2016). These data suggest that, indeed, the situation of preschool-age children is better in Lebanon.

The disproportion in preschool education in both countries is also reflected in the distribution of the teaching staff. According to the data, only 5 percent of Jordanian teachers employed in public and private educational institutions worked in pre-primary education, whereas in Lebanon, it was 13 percent. When it comes to the student-teacher ratio, there was one teacher for 17.6[17] students in pre-primary education in Jordan in 2018 (which is higher than in secondary but lower than in primary education) (UIS, n.d.). In 2016 in Lebanon, the student-teacher ratio was 15.6 (Trading Economics, n.d.).

FIGURE 6.1: DISTRIBUTION OF TEACHERS BY SCHOOL LEVEL



Source: UIS (access 1.07.2021), http://data.uis.unesco.org/
Trading economics, https://tradingeconomics.com/lebanon/indicators-wb-data.html?g=education

To conclude, the above information on preschool enrollment, ECDI, and student-teacher ratios indicates that Lebanon is in a better position than Jordan when early childhood education is considered.

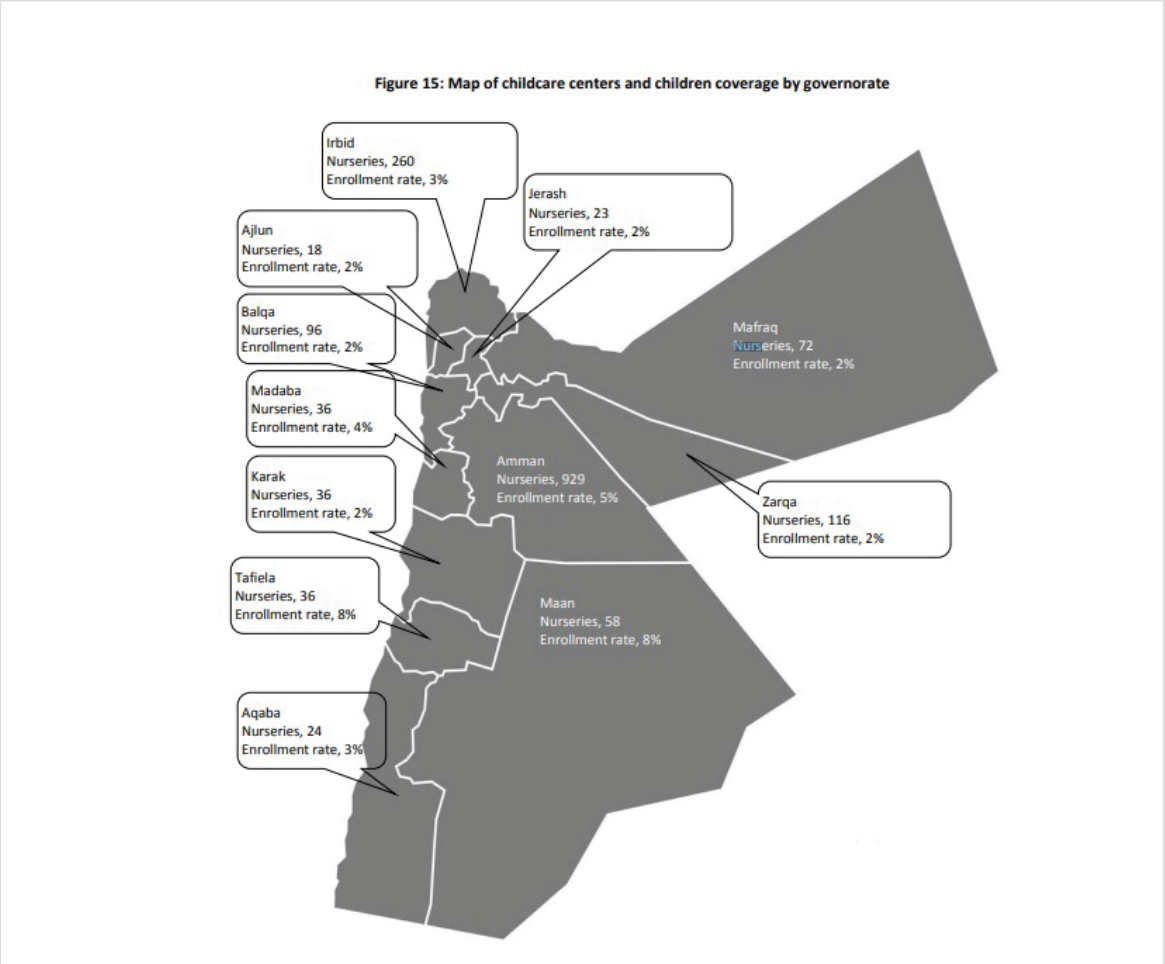
In the following sections, the picture of the nurseries and kindergartens in Jordan and Lebanon will be presented. To examine the quality of the childhood programs, attention will be paid to staff qualifications, quality and quantity of equipment, children/teacher ratio, curriculum, and community evaluation of the preschool programs.

6.1. Nurseries in Jordan and Lebanon

In Jordan, the MOSD and MOH are responsible for designing the daycare centers framework as well as setting standards, licensing, and supervising the nurseries. It is estimated that there are 1,340 licensed nurseries in total ("divided amongst public schools (570), Non-Governmental Organizations (NGOs) (31), private facilities (603), and workplace-based nurseries (136)") (World Bank, 2020, p.92). The estimated nursery enrollment is at 3 percent (Government of Jordan, 2016). Moreover, both nursery distribution and enrollment rates vary by region. Most nurseries are situated in major urban cities. It should also be emphasized that, according to the estimates, 50,000–60,000 children attend unlicensed, home-based, childcare facilities (World Bank, 2019). The extremely low enrollment rate may be explained by a lack of demand for services at the existing price-quality ratio.

The Queen Rania Foundation Survey (2019), which tests the quality of services offered at 437 registered nurseries, indicated that **most of the nurseries are private or are run by MOE-teachers and are located in urban areas and in central region of Jordan**. Although nurseries serve a wide range of ages starting from new-born children (70 days or less) to those of KG2 age (this may be due to the reduced availability of kindergartens), not many of them provide services to children with disabilities. In terms of average child-to-caregiver ratios, they were similar across various types of nurseries and ranged from 6 to 7. Regardless of the nursery type, the caregivers are relatively young: 55 percent of caregivers in private and 41 percent in work-based nurseries were under 30 years old.

FIGURE 6.2: MAP OF CHILDCARE AND CHILDREN COVERAGE BY GOVERNORATE



Source: http://documents1.worldbank.org/curated/en/912201589370426331/pdf/Final-Addendum-to-Technical-Assessment-Additional-Finance-Economic-Opportunities-for-Jordanians-and-Syrian-Refugees-PforR-P171172.pdf

When it comes to their education, the community college level or 2-year diplomas were the most common degrees in private, work-based and community-based organization (CBO) nurseries, while the Tawjihi certificate (held by 40 percent of caregivers) was the most common degree in the MOE-based nurseries. It should be underlined that the **majority of caregivers did not receive pre-service training, and in the previous two years, only 30 percent participated in in-service training, with especially low rates of in-service training in MOE-based (5 percent) and private (12 percent) nurseries**.

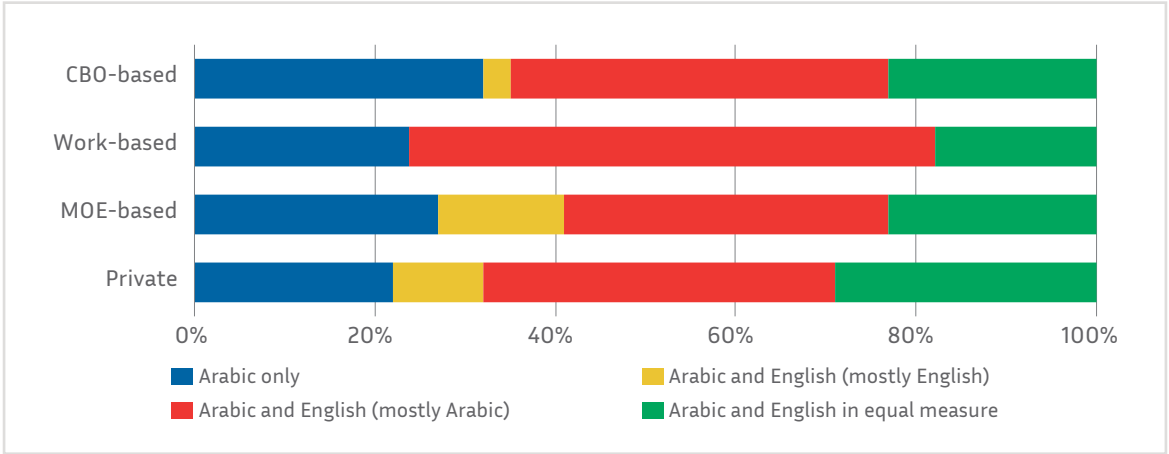
In most cases, nursery education is provided mostly in Arabic, with some service in the English language. Despite the fact that schools should follow an appropriate curriculum that uses teaching strategies that support children's development, many caregivers (30-40 percent depending on the nursery type) reported not implementing any specific curriculum or development program. Moreover, the nurseries differed in teaching pre-literacy skills – over 80 percent of the surveyed caregivers in private nurseries serving children ages 3–5 reported teaching children to recognize letters of the alphabet and 57 percent reported teaching "reading many words," compared to nearly 50 percent and 42 percent of caretakers in the MOE-based nurseries. Even though there are no differences in the required physical environment between types of nurseries, according to the administrators' reports, when all environmental issues are considered, the MOE-based nurseries provide the poorest availability of resources, which may be related to financing shortages (Queen Rania Foundation, 2019).

TABLE 6.1: PROFILE OF SAMPLED NURSERIES, QUEEN RANIA FOUNDATION (QRF) NATIONAL ECD SURVEY 2015

		Private	MOE-based	Work-based	CBO-based
Area type	Urban	98%	79%	77%	58%
	Rural	2%	21%	24%	42%
Governorate	Central	81%	54%	65%	32%
	North	16%	26%	29%	36%
	South	3%	20%	6%	32%
	Amman	58%	32%	53%	17%
	Zarqa	8%	14%	12%	7%
	Balqa	11%	6%	-	7%
	Madaba	4%	3%	-	3%
	Irbid	15%	20%	18%	13%
	Jerash	-	1%	-	7%
	Mafraq	1%	3%	6%	7%
	Ajloun	1%	2%	6%	10%
	Karak	-	1%	6%	10%
	Tafilah	-	10%	-	13%
	Ma'an	2%	4%	-	7%
	Aqaba	1%	5%	-	3%
Years since establishement	25 years or older	13%	28%	18%	39%
	15 to 24 years	13%	35%	59%	13%
	5 to 14 years	37%	31%	24%	32%
	4 years or newer	37%	6%	-	16%
N		**171**	**218**	**17**	**31**

Source: Queen Rania Foundation (2015), Nurseries in Jordan Findings from the Queen Rania Foundation National Early Childhood Development Survey 2015, p. 12, retrieved from https://www.qrf.org/sites/default/files/2019-07/qrf_nurseries_report_en.pdf

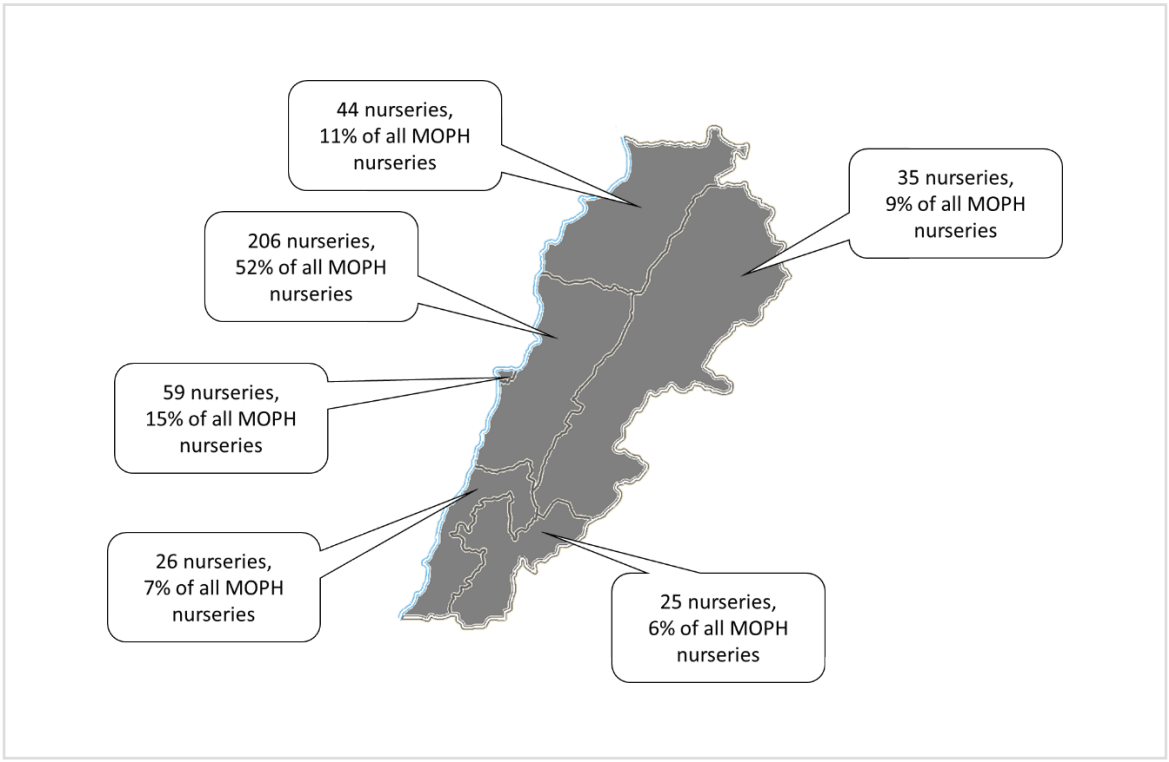
FIGURE 6.3: LANGUAGES TAUGHT AT NURSERIES IN JORDAN



Source: Queen Rania Foundation (2015), Nurseries in Jordan Findings from the Queen Rania Foundation National Early Childhood Development Survey 2015, p. 14, retrieved from https://www.qrf.org/sites/default/files/2019-07/qrf_nurseries_report_en.pdf

In Lebanon, the nurseries enroll children up to the age of three and are under MOSA or MOPH control, which set criteria for opening public and private daycare centers, respectively. Despite the existence of the association for daycares in Lebanon, the scope of services provided by private and public nurseries differs. That can be noted in foreign language education, which, in private as opposed to public[18] institutions, starts with three-year-old children (Shabban, 1997). As in Jordan, in Lebanon also, the private sector remains the main provider of nursery care.

FIGURE 6.4: MAP OF MOPH NURSERIES BY GOVERNORATE



Source: Author elaborations based on MOPH data

Most of the MOPH nurseries are localized in the Mount Lebanon Governorate (over half of all the nurseries in Lebanon). The smallest number of nurseries are based in the south of the country. Despite the small changes, the percentage of the total number of nurseries for each governance has been rather stable. However, we might observe the rise in the number of private nurseries from 196 in 2011 to 395 in 2020. For example, according to MOPH (MOPH, 2012) there were 125 nurseries in the Mount Lebanon Governorate in 2011, while now, there are over 200. This means there was an over 60 percent rise in the number of nurseries in that region.

TABLE 6.2: NURSERIES IN LEBANON, MOHP DATA

The location of the nursery	Number of the MOPH nurseries	% of the total number of MOPH nurseries
Akkar	9	1.84%
Aley	20	4.10%
Baabda	97	19.88%
Baalbek	9	1.84%

The location of the nursery	Number of the MOPH nurseries	% of the total number of MOPH nurseries
Batroun	4	0.82%
Beirut	59	12.09%
Bint Jbeil	1	0.20%
Chouf	17	3.48%
Hermel	1	0.20%
Jbeil	11	2.25%
Kesrouan	52	10.66%
Koura	10	2.05%
Metn	93	19.06%
Nabatiyeh	23	4.71%
Rashaya	2	0.41%
Riyak	1	0.20%
Rmeich	1	0.20%
Saida	21	4.30%
Sohmor	1	0.20%
Sour	5	1.02%
Tripoli	18	3.69%
West Bekaa	5	1.02%
Zahleh	16	3.28%
Zgharta	12	2.46%

Source: Author elaborations based on MOPH data

6.2. Kindergartens

Kindergartens constitute a bridge between the home and the school. During this time, children gradually get used to the school environment, learn cooperation, and get ready for the next educational stage.

In Lebanon, kindergartens have three grades, for which the specific goals and competences that the child should acquire are formulated. The curriculum aims to prepare students for the start of learning at the primary level and develops the basis for learning in a language different than the mother tongue. After graduating from KG1, children should be able to participate in group work, interact with other children, understand simple concepts, understand and follow instructions, demonstrate eye-hand coordination, name basic colors and shapes, and express themselves using pictures and written symbols.

In KG2 foreign language education is introduced, and in addition to the skills already acquired in KG1, children should be able to use English or French to retell simple stories, write alphabet letters and have developed a basic understanding and usage of the Arabic language.

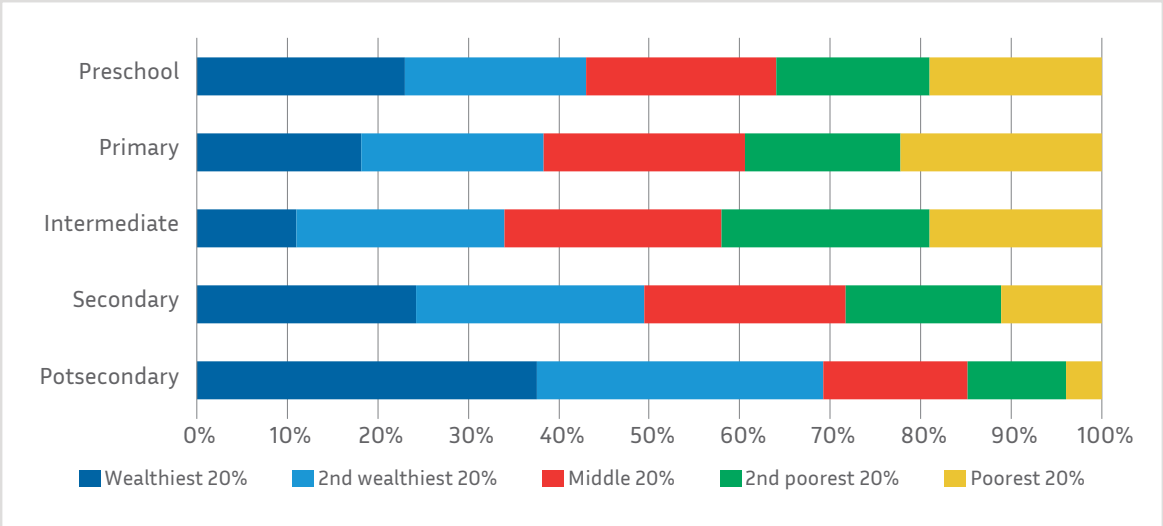
In the final stage – KG3 – children continue to improve their math skills (writing numbers) and language abilities. By the end of the preschool cycle, they should be able to express themselves orally and in writing. However, linguistic expression competencies, especially those concerning writing abilities, are likely too advanced for children at kindergarten age.

As mentioned above, foreign language education at an early stage is especially important because English or French are required languages of instruction for specific subjects at the later levels of education. According to data from the Center for Educational Research and Development (CERD), an increasing number of students favor English as their primary language, which is reflected in the number of Lebanese students enrolled in schools where English is the medium of instruction. This proportion rose from 39.76 percent in 2011–2012 to 43.39 percent in 2016–2017 (Mikhael and Daou, 2018). Previous studies perceived language as one of Lebanon's main problems in the preschool education as the teaching of languages in the curriculum is too general (Lebanese Association for Educational Studies, 2006).

Another issue worth mentioning is enrollment, which rises with the KG level and varies geographically. Over 60 percent of children in preschool are enrolled in the private sector (CRDP, 2018, p.15), which according to the opinion of households, provides higher quality and better infrastructure (Abdul-Hamid, Yassine, 2020). Additionally, households show a large difference in satisfaction with teachers' skills in basic science (for example, protecting his/her environment, localization in time and space) and foreign languages (Abdul-Hamid and Yassine, 2020).

While the socioeconomic factor differentiates children's enrollment between various stages, and the gap between disadvantaged and favored children in secondary and postsecondary cycles is clear, it does not seem to be that strong at the preschool level.

FIGURE 6.5: COMPOSITION OF EACH SCHOOL LEVEL BY SOCIOECONOMIC QUINTILE IN LEBANON



Source: Abdul-Hamid H. and Yassine M. (2020), p.14

In Jordan, kindergartens cater to children ages 4–6, function 25 hours per week (Kaga, 2007), and are under the responsibility of the MOE. The kindergarten services are provided mainly through the private sector, and the children who benefit are usually from middle- and upper-income families. However, it should be noted that, in rural areas, the majority of enrollment was in public kindergartens (RTI International, 2018).

According to an MOE (2019) report, 99.88 percent of kindergartens and 75.75 percent of class-units in the 2018-2019 school year were private. Kindergarten teachers constituted 6.02 percent of the total number of teachers (15.12 percent in the private sector (6356 teachers), 1.3 percent in public (1826), and 0.31 percent (6 in other governmental institutions). The gross enrollment ratio among 4–5-year-old children was 38.7 percent (39.3 percent for males, 38 percent for females), while net enrollment was 37.7 percent (38.2 percent and 37.1 percent respectively). The data from 2016 (Jordanian Government, 2016) reveal that the enrollment **in KG1 was considerably lower compared to KG2, and amounted to 18 percent and 60 percent, respectively. According to another international survey, only 39 percent of those who had attended KG2 had also attended KG1**.

As already mentioned, **in Jordan, there are some discrepancies between the official figures and those revealed in some studies** (King, DeStefano, and Shukri, 2018). In a national survey conducted in 2017 on a representative sample of parents of children in the first grade of the primary school of all governorates in Jordan, 84 percent of parents (92 percent when only Jordanian parents are considered) admitted that their child had attended kindergarten the previous year. This is because a **considerable number of kindergartens are not officially registered, the reason being that they fail to meet governmental regulations, or their owners believe that the licensing processes are too bureaucratic.**

In Jordan, caregivers expressed moderate satisfaction with the childcare programs, while parents expressed rather lower satisfaction (Al-Omari et al., 2011). Parent–caregiver relationships were rated very low by both sides. Other research has also shown that many kindergartens do not implement the curriculum[19] and that most teachers have limited competences and make limited use of ICT (information and communication technology) (Jordan MOE, 2018).

Ahmad et al. (2015), who analyzed learning experiences and daily routines in a private facility in the city of Al-Zarqa, revealed that academic activities (encompassing exercises in which "*children acquire new knowledge and develop skills in traditional scholastic subject matters*" *(*Ahmad et al., 2014, p.1) took, on average, 70 percent of the day (21 percent of that time was devoted to teaching Arabic, while only 10 percent was devoted to teaching basic science). Children are also taught foreign languages, and the results show that 7 percent of them wrote in English, compared to 21 percent of the sample writing in Arabic. The remaining time is divided into teacher-guided activities (16 percent) and free play (14 percent). **Although the purpose of kindergarten is to prepare children to enter the primary cycle, the 2014 Early Development Instrument**[20] **indicated that due to insufficient socioemotional development, a quarter of children attending KG2 in Jordan were "not ready to learn"** (World Bank, 2017).

To conclude, in Jordan, there is poor monitoring of the kindergarten stage, and there are major discrepancies in the enrollment data. The kindergartens still face challenges in accessibility (concerning mainly children from the bottom income quintiles) and quality. The latter is closely connected with teachers' competences and facility conditions.

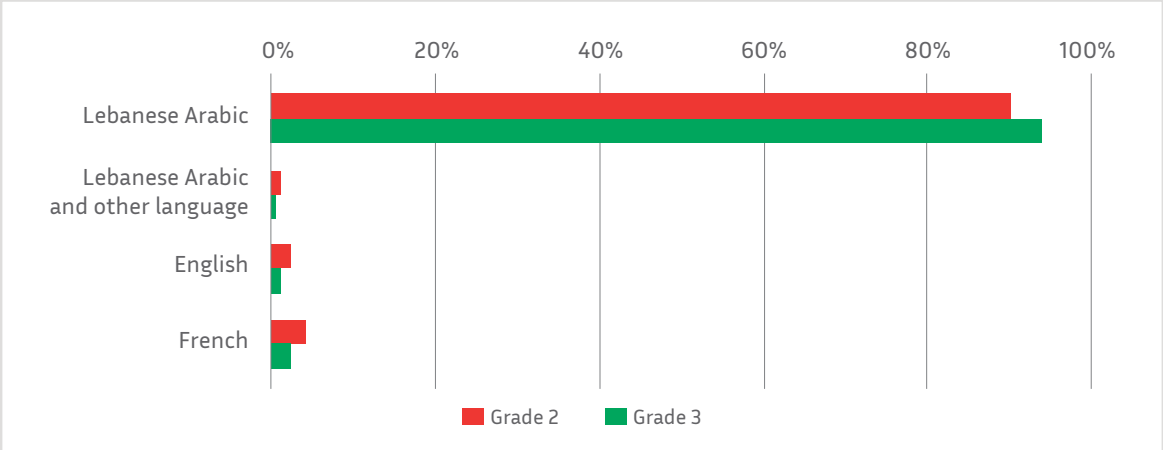
6.3. EGRA results

Early childhood education should ensure an equal educational start for all children. Moreover, it should prepare children for later educational cycles, and its quality should be reflected in students' educational outcomes. In both Jordan and Lebanon, there are gaps in preschool service provision and differences in teaching practices, without the guarantee that education

of sufficient quality is available to all children. The analysis of Early Grade Reading Assessment (EGRA) results may give some insight into the relationship between later educational outcomes and preschool education.

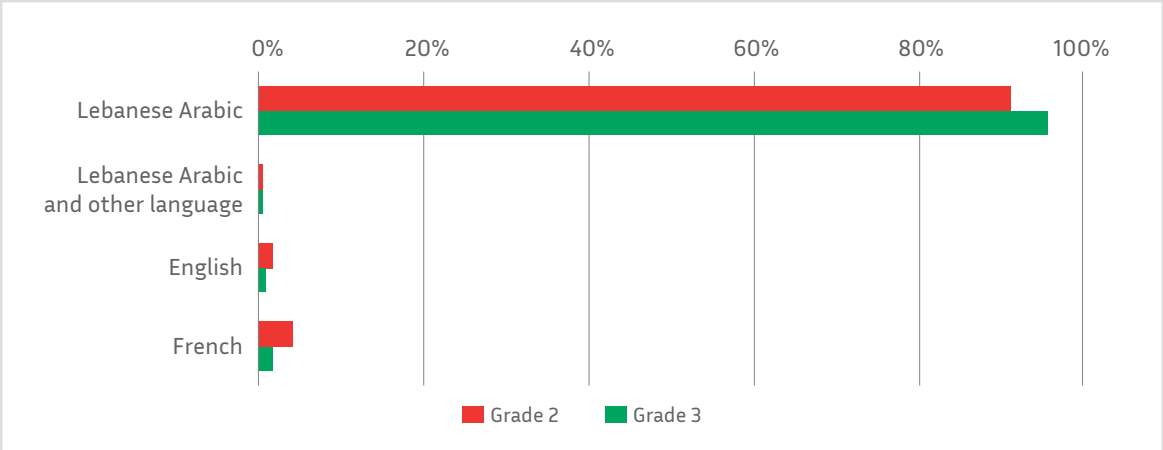
The EGRA is carried out in Arabic among students from 2nd and 3rd grades. It focuses on **students' literacy, which is an important prerequisite for further learning.** The assessment consists of letter identification, syllable sounding, listening and reading comprehension, invented word decoding, oral reading, and student interviews. The assessment components may differ between countries; therefore only the results of subtasks implemented in both countries are presented. **In the case of Lebanon, the issue of language should also be taken into account as education takes place not only in Arabic but also in English or French. According to the students' own declarations, despite multilingual education, children attending 2nd and 3rd grades mostly use Lebanese Arabic both at home and among peers**. When it comes to reading, Arabic is also the most commonly used language.

FIGURE 6.6: LANGUAGE MOST OFTEN USED AT HOME BY GRADES 2 AND 3 CHILDREN IN LEBANON



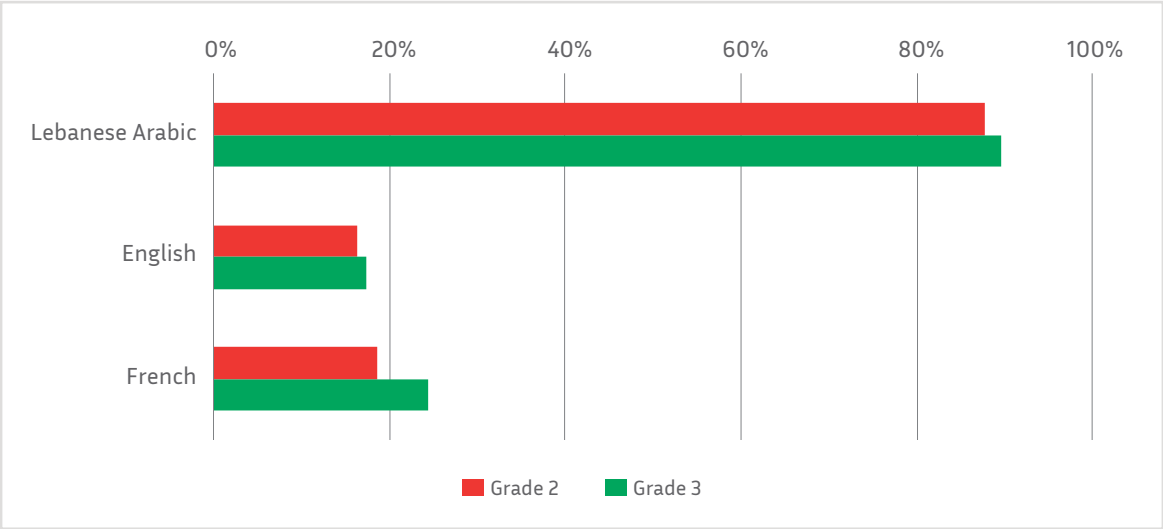
Source: EGRA data analysis

FIGURE 6.7: THE LANGUAGE MOST OFTEN USED BY GRADES 2 AND 3 CHILDREN IN LEBANON WHEN TALKING WITH FRIENDS ON THE PLAYGROUND



Source: EGRA data analysis

FIGURE 6.8: LANGUAGE IN WHICH GRADES 2 AND 3 CHILDREN READ



Source: EGRA data analysis

The EGRA results show that Jordanian G2 and G3 students generally outperform their Lebanese peers in almost all subtasks and that Jordanian children attempted more questions, showing higher motivation to perform well. So **even though the preschool enrollment rate is much higher in Lebanon, and accordingly more children should be well prepared to continue their education at a higher level, no positive effect of that on school performance is evident. The reasons behind this may be the relatively lower quality of Lebanese preschool education, poor teaching standards at higher grades, or problems related to the language of instruction**.

Bearing in mind that there is an inherent relationship between mother tongue proficiency and effectiveness of learning a foreign language, low literacy levels among Lebanese children translates into a lack of English/French language skills (Butzkamm, 2007). It may also negatively affect learning mathematics and science over the entire education period. Lebanese teachers stress that the main barrier to effective science and math teaching is inadequate language proficiency among students, including Arabic, because the standard Arabic taught in school differs from the Lebanese Arabic that is the mother tongue of most. More than 90 percent of chemistry teachers claimed this (Ayoubi and BouJaoude, 2006).

Although classes are run in a foreign language, many students use Lebanese Arabic to explain themselves or ask for clarifications, and use English to give shorter factual answers to teachers' questions (Salloum and BouJaoude, 2017). Although the teachers are concerned about the foreign language skills of their students, the level of proficiency presented by them also leaves much to be desired. The problem is that not all of them had the opportunity to learn English/French properly. Teachers often switch or repeat the explanations in Lebanese Arabic to ensure comprehension or when they are themselves poor foreign language speakers. They also use Lebanese Arabic with English keywords, which makes students respond in the same way. Research on mathematics teachers from private schools reveals that only 66 percent of them had a good command of the English language (Amanatallah and Moukarzel, 2018). Another study of student teachers in Lebanese universities also indicated that there is a discrepancy between self-perception and reality in terms of language proficiency (Mirza, 2001).

TABLE 6.3: AVERAGE EGRA RESULTS

Subtask	Lebanon			Jordan		
	Overall	G2	G3	Overall	G2	G3
Correct Sound of Letters Per Minute	10.5	9.0	11.9	47.9	47.3	48.6
Correct Invented Words Per Minute	-	-	-	12.2	10.8	13.7
Percentage of Syllable Sound questions correct	44.8%	40.1%	49.6%	31.7%	29.8%	33.8%
Percentage of Letter Sound questions correct	10.4%	8.9%	11.8%	47.9%	47.3%	48.5%
Percentage of Invented Word questions correct	15.1%	-	15.1%	24.4%	21.6%	27.2%
Oral Reading Fluency	28.8%	20.8%	36.9%	46.2%	37.8%	55.0%
Percentage of Reading Comprehension questions correct	22.7%	18.2%	27.3%	36.9%	27.3%	47.0%

Source: EGRA data analysis

To conclude, a lack of appropriate first-language education from an early age can affect children's learning outcomes in foreign languages and other subjects. The barrier is related not only to students' language skills but also to those of teachers. The problem starts and gets passed on because today's teachers themselves had poor English language teachers while in school.

An additional problem in Lebanon is the significant difference between standard formal Arabic and colloquial everyday Arabic. Students often struggle with traditional Arabic, and English or French are often seen as easier to learn. At this point, however, the issue of refugees studying in Lebanon who do not speak foreign languages and therefore cannot benefit from the Lebanese multilingual curriculum should be addressed. It is important to provide an adequate educational opportunity for both Lebanese students and refugees, and the solution should not be at the expense of the other group. In other words, Lebanese students should not be deprived of the chance to learn in a foreign language or suffer from the low standard of classes, and at the same time, refugees should not be deprived of education. Instead, the curriculum should be adjusted to their current possibilities and needs in order to avoid unfilled gaps in education, negatively affecting future school attainment.

It is worthy to add that ILSAs data are probably not enough to address the issue of refugees and second-shift students in Lebanon or Jordan. Separate studies, advisably financed by international organizations, should investigate this topic more thoroughly in the future.

• • •

Summarizing, preschool education may play significant role in shaping later educational performance of Lebanese and Jordanian students. Early childhood education should equip children with knowledge and skills that will ensure successful learning in primary school.

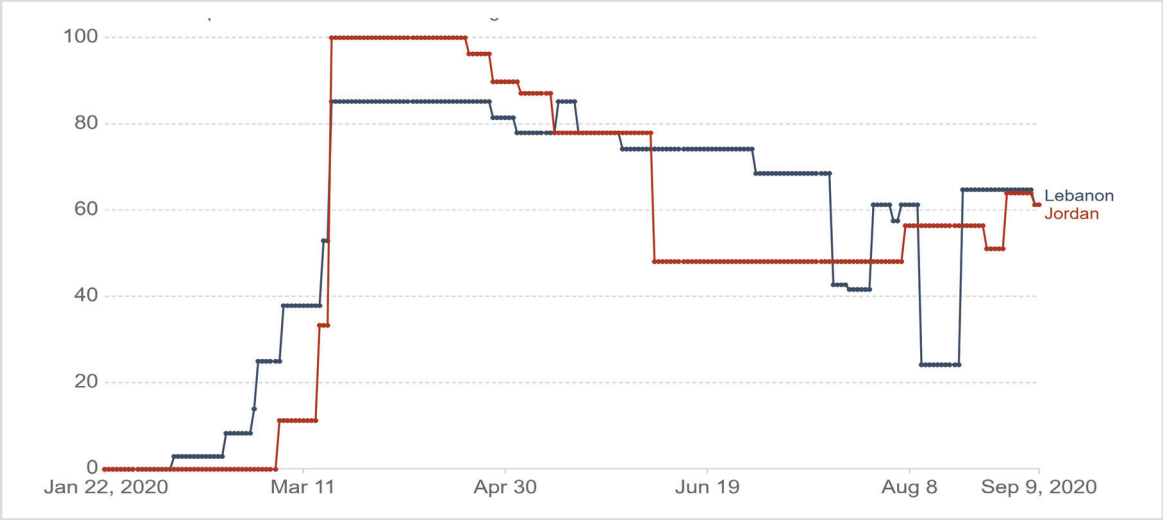
- Lebanese and Jordanian early childhood education is highly privatized, which creates unequal access to educational facilities and learning gaps among children in the preschool years.
- The existing curricula in both countries do not provide realistic continuity between the preschool and the elementary stages of education.
- Both in Jordan and Lebanon, the programs often lack competent caregivers and teachers.
- Early childhood education attendance is positively associated with cognitive skills such as decoding skills and oral reading fluency. This is an important issue, especially in the case of Lebanon, where foreign languages are widely employed as the media of instruction.

7. RECOVERING FROM THE COVID-19 CRISIS IN JORDAN AND LEBANON

The emergence of the SARS-COV-2 virus has had an undoubtedly tremendous impact on the labor markets, health systems, education systems, and the economies of the region, putting not only governments but also billions of citizens under an enormous pressure. The dire situation forced the representatives of over 190 countries (UNESCO, 2020) to introduce a range of lockdowns of varying severity, resulting in school shutdowns and a need for an immediate switch from traditional in-person to remote learning. Only a few countries and educational systems managed a smooth transition; most experienced significant difficulties in terms of teachers' and students' abilities to work remotely. Over 1.5 billion students (UNESCO, 2020) were affected by these changes.

The need to resort to online teaching on such a large scale, and on such short notice, has revealed the structural weaknesses and limitations of many educational systems. In the light of the current events, this may lower students' achievements (for example, through incomplete curriculum realization) and thus affect their future.

FIGURE 7.1: RELATIONSHIP BETWEEN NUMBER OF COVID-19 CASES AND GOVERNMENT RESPONSE IN LEBANON AND JORDAN



Source: Hale, T., Webster, S., Petherick, A., Phillips, T. and Kira, B., 2020. Oxford COVID-19 government response tracker (OxCGRT) retrieved from https://ourworldindata.org/coronavirus

The actions taken by various governments, and hence the severity of the circumstances faced by their education systems, are closely related to the epidemiological situation in each specific country. Since this differs across countries, so do the remedial measures taken by the governments. The severity of governments' response (see figure 7.1, above) to the crisis can be measured by **the stringency index** [ii] **(taking values from 0 to 100), allowing for cross-national comparisons of adapted interventions.**

At its peak, the index value reached 85 for Lebanon and 100 for Jordan,[21] which means the strictest restrictions on schools, workplaces, transport, traveling, and so on. On September 9, 2020 the index fell to **61.11 for both Jordan and Lebanon, which indicates a loosening of restrictions**. However, the COVID situation is dynamic. In Lebanon, after the explosion at the port of the city of Beirut in August, a steep increase in coronavirus cases and deaths was reported. In September, the highest number of daily new cases was recorded and reached over 800. Until September 23, 30,852 positive diagnoses and 315 deaths[22] had been confirmed.

ii The stringency index is a composite measure based on nine response indicators including school closures, workplace closures, and travel bans, rescaled to a value from 0 to 100 (100 = strictest).

Almost 90 percent of the daily cases were residents, which indicates a fast local spread of the virus.[23] In Jordan 5,679 positive diagnoses and 33 deaths were registered. An increase in the COVID-19 cases was also observed there since mid-August.

Given the current economic situation in Jordan and Lebanon, **COVID-19 is a crisis within a crisis, and its consequences for the education sector may be different and more severe than in many other countries**. The only way to conquer the arising problems is to address the main reasons for inequality during the lockdown, consider appropriate measures, and prepare the education systems for significant challenges after the pandemic to ensure that high-quality education is available for everyone.

This chapter will discuss the measures introduced by both countries in reaction to the COVID-19 crisis, with a particular focus on the limited access to technological tools. It will also discuss teachers' and students' digital competencies. Finally, the report will provide conclusions and related recommendations for the Jordanian and Lebanese education systems.

7.1. The digital gap in distance education

To ensure continuity of learning and minimize negative effects on students, educational systems had to provide substitutive distance-teaching methods as most countries transitioned in-class education to the virtual world. It was not an easy process. **Remote learning requires more effort from both teachers and students, as well as access to technical facilities necessary for efficient learning**. Distant learning cannot provide equal access to education for everyone. It has rather become a source of inequality, exclusion, and segregation and may deepen already existing gaps and stereotypes. In some cases it may be so severe that it would require students to repeat the school year or may lead to an increase in dropout rates.

This is likely to hit already marginalized communities the hardest. An analysis by Azevedo, Hasan, Goldemberg, Iqbal and Geven (2020) suggests that COVID-19 will contribute to a fall in the quality and level of schooling and learning and, depending on the scenario, result in a global educational loss of between 0.3 and 0.9 years of schooling, adjusted for quality. This in turn will translate into a decline in the effective years of schooling that children receive during their lifetime from 7.9 years to between 7.0 and 7.6 years. It is estimated that, in the absence of any compensation measures, the COVID-19 crisis will lead to a yearly earnings reduction for the current school cohort of at least $355 and possibly as much as $1,408. This shows how long-lasting an effect the current crisis is likely to have.

In short, although online learning is a necessary solution, it does not address everybody's needs. **Those who are the most disadvantaged usually are not able to benefit from implemented solutions. This is a classic example of the Matthew Effect** (Merton, 1968), where those in a better situation benefit the most and their advantage increases. It can lead to greater differences and barriers between the rich who have access to private education, the Internet, and digital technology, and the poor who have been cut off from education, or who have access only to low-quality education. Nonetheless, remote learning is a necessary solution; having implemented it, countries then should focus on ensuring equal access to relevant materials and equipment for all students.

Summarizing, the main barrier to online education is a digital gap which has three dimensions (Moreno and Gortázar, 2020):

1. Access to the Internet and adequate devices at home.
2. The adequate use of devices at home.
3. Preparation of schools (systems) for remote teaching.

The scale of these three types of difficulties, and their impact on remote education in Jordan and Lebanon, will be discussed in the following sections of the report.

7.2. The COVID-19 impact on students in Jordan and Lebanon

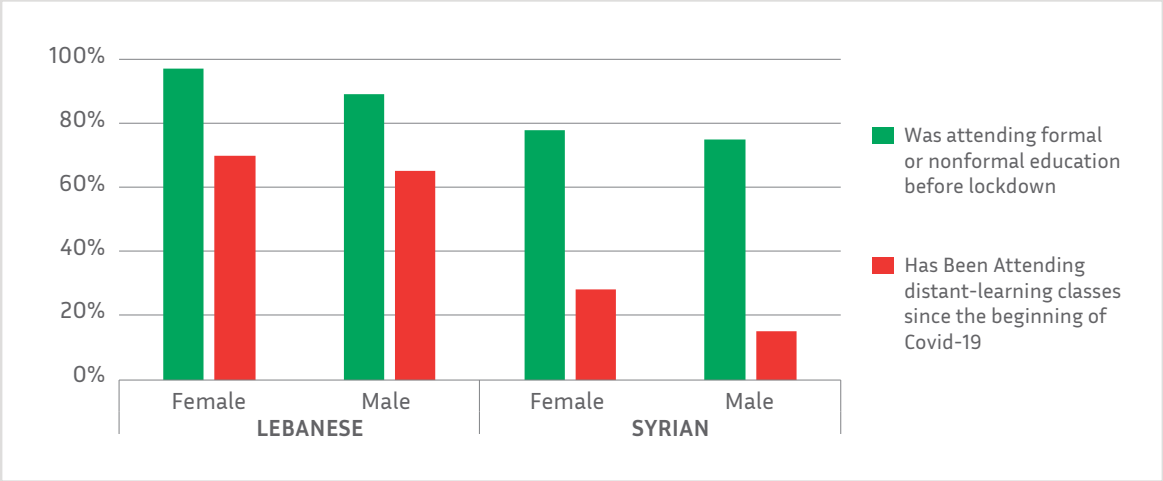
With the virus outbreak, most governments, including Jordan and Lebanon, decided to close schools to prevent the spread of the disease. These were necessary steps, but they led to the exclusion of many students from education. The solution applied was to switch to remote learning, but it was more of an evolving process than a quick and simple step, during which both teachers and students had to learn how to use new educational tools. Governments tried to support educational systems but, despite the actions taken, there is no doubt that the situation influenced many students in a negative way. **According to the data, more than 1.3 million Lebanese and 2.3 million Jordanian students were affected by the school lockdowns.**

TABLE 7.1: NUMBERS OF LEARNERS AFFECTED BY SCHOOL LOCKDOWNS IN JORDAN AND LEBANON

Affected learners in Lebanon	1 363 393	Affected learners in Jordan	2 372 736
Total females	676 904	Total females	1 187 832
Total males	686 489	Total males	1 184 904

Source: UNESCO, 2020 Covid-19 impact on education, data from 30/07/2020

FIGURE 7.2: ANALYSIS OF VULNERABLE GROUPS OF ADOLESCENTS' EDUCATION IN LEBANON DURING THE COVID-19



Source: Covid-19 multi-sectoral need assessment, Lebanon (Plan International, 2020)

The survey, conducted among Lebanese students, indicated a drop in attendance since distance learning started. About 97 percent of Lebanese girls and 89 percent of boys who participated in the study attended formal or non-formal education, and only 70 percent and 65 percent of them attended distance learning after the lockdown.

When it comes to Syrian students, 78 percent of females and 75 percent of males reported attending schools before they were closed. However, only 28 percent and 15 percent, respectively, attended remote classes (Plan International, 2020). **The results show that both before and after the introduction of remote learning, girls' attendance was higher. The critical situation among the Syrian students demands attention regardless of gender. Most likely, it was the poor financial situation and lack of needed tools for remote education that led to such a low attendance in distance learning among this group of students.**

The results suggest some segregation and inequalities in access to education during COVID-19. Apart from the financial reasons, the drop in attendance may also result from the lack of teachers' know-how of online teaching, including IT skills, methodology and good practices in distance education, including classroom management (control over students).

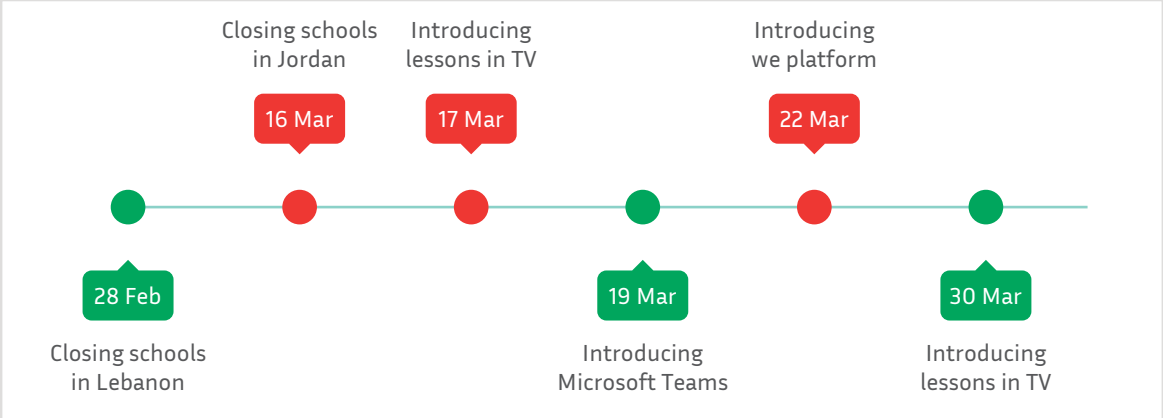
No data for Jordanian students' attendance in distance education during COVID-19 were found. Note, also, that the survey conducted in Lebanon is not representative. Thus, the data should be interpreted with caution.

7.2.1. Actions taken by the Lebanese and Jordanian Governments in response to the COVID Crisis

Depending on the pandemic situation, countries decided to close schools at different times. In general, initial measures were set earlier in Lebanon than in Jordan. **However, after the school closures, Lebanon experienced a long lag in rolling out remote-education tools. The distance learning was rolled out more comprehensively in Jordan, where just after the school closures on March 16th, easily accessible TV lessons were established.** They were set by the Ministry of Education and covered Arabic, English, computers, physics, mathematics, financial literacy, history, and Jordanian history. On March 22nd, a dedicated web platform was introduced. The TV lessons were also used in Lebanon, but they were addressed only to the final grades (9 and 12) to prepare students for exams. However, Microsoft Teams, enabling the conducting of synchronous online classes, was introduced. It should be underlined that the implementation of these solutions does not mean that each student and teacher had adequate access and abilities to use them, which applies to both countries.

It turns out that the level of preparation of countries for distance learning and the sequence of their actions and types vary.

FIGURE 7.3. TIMELINE OF GOVERNMENTS' DECISIONS ON EDUCATION DURING COVID-19 IN LEBANON AND JORDAN



Source: Author collaboration based on information from Reuters, ArabNews and Tele Liban

7.2.2. Distribution of educational materials in Jordan and Lebanon

Following the World Bank's report (World Bank, 2020) in both Jordan and Lebanon, a multi-modal system of education was rolled out**. Lebanon distributed educational materials through 5 streams of communication, 4 of which required access to the Internet or appropriate technological equipment. In Jordan, teachers distributed educational materials through 3 streams of communication, all 3 of which required access to the Internet or appropriate technological equipment, so they excluded already disadvantaged students in a poor socioeconomic situation who could not afford Internet access.**

TABLE 7.2: STREAMS IN REMOTE EDUCATION IN JORDAN AND LEBANON

Stream	Lebanon	Jordan
Virtual interactive classes	+	-
Recorded classes online	+	+
Other online tools	+	+
TV	+	+
Radio	-	-
Paper-based	+	-

Source: Author elaboration.

7.2.2.1 Education distribution channels in Lebanon

On March 17, 2020, the Lebanese Ministry of Education and Higher Education published a document proposing three paths to support remote learning for students (MEHE, 2020):

- ***TV recorded classes***

About a month after the schools' closure, Tele Liban, the national broadcasting television station, started broadcasting lessons on TV. From Monday to Friday, the national television channel broadcast half-hour programs in one of the three languages between 11:00 and 13:00 for grade 9 students, and between 13:00 and 17:30 for grade 12. Initially, the lessons were intended for classes taking the official exams (Brevet and Terminal). Although the government decided to cancel the Brevet[24] exams, the lessons for 9th grade were continued. The courses were conducted in English, Arabic, and French, and were later placed on Tele Liban's YouTube channel.

- ***Virtual interactive classes and other online tools***

Lebanon has launched a national platform developed by Microsoft for all grade levels (UNESCO, 2020). Since March 19 (MEHE, 2020), Microsoft Teams has been free for educational purposes, and the Ministry encourages teachers to use it and provides IT support if problems are encountered.

- ***Paper-based resources***

The Ministry presented the idea of schools organizing communication by traditional means, that is, by providing copies of educational content in paper form, sending them to students through the directors of schools and institutes, and then sending them back for the teacher's corrections.

7.2.2.2 Education distribution channels in Jordan

The distribution channels used in Jordan for sharing educational materials include:

- ***TV classes***

The Ministry of Education provides TV lessons (for example, on the sports channel), which cover the material for the Tawjihi (the exam ending the secondary level of education). Lessons cover Arabic, English, computers, physics, mathematics, financial literacy, history, and Jordanian history.

- ***Recorded classes online***

Since March 22, 2020, students have been able to use the Darsak platform, which was created as a result of cooperation between the Ministry of Education, the Ministry of Digital Economy and Entrepreneurship, and private companies. On the website, students have access to lessons (in video form) for all levels of education. Lessons are added according to a weekly schedule and are available only for one week from the moment they are added. Children have access to the platform at any time, but only between 6 am and 4 pm are they not charged for using the Internet to access the platform. Between March 22 and April 22, 2020, 1,738,535 learners accessed online/televised lessons; moreover, about 100 000 teachers used Darsak, and the learners visited the Darsak online platform about 13 million times (UNHCR, 2020).

- ***Other online tools***

Teachers and students also often use UNRWA (UNESCO, 2020) and the NoorSpace platform, where after logging in with a National ID number, students get access to the list of homework. The aforementioned Darsak platform was also connected to its website "exams.darsak," which enables students from the 4th to the 12th grades to take part in interactive assessments. This is how the Ministry of Education can evaluate students' progress and learn about aspects that need further improvement. Teachers are also encouraged by the government to use Microsoft Teams. Moreover, the Ministry of Education has created a platform[25] for teachers with courses on how to use the recommended tools and how to strengthen their digital skills.

As can be observed, the actions taken by the ministries were quite supportive and aimed to guarantee equal access to education by ensuring, among other things, Internet access, paper-based materials, and televised lessons. However, the greatest responsibility lies with teachers, who were given freedom in choosing their preferred tool or medium, and the way of organizing their classes.

7.3. Accessing the Internet and appropriate devices – the first dimension of the digital gap

Despite the measures taken to minimize the negative impact of school closures, it is inappropriate to assume that all children have understood the content delivered through remote learning or even that everyone had access to it. When initially introducing remote education, attention should be paid to the **problems connected with access to essential tools for distance learning, which is the first dimension of the digital gap.**

In the following sections, attention will be paid to access to digital devices in Jordan and Lebanon.

7.3.1. Access to TV

One of the most popular media in the world is TV, with almost three-quarters of the world being able to access it (World Bank DataBank, access: July 1st, 2020). **Also, in Jordan and Lebanon, it is the most common source of information: 96 percent of Jordanian households and 95 percent of Lebanese households have access to TV, which means it is available in almost every house, making it a suitable medium for educational content.** However, the problem arises when there is only one TV set in the household, which is shared with family members who ignore the educational needs of others.

Additionally, in Lebanon, even access to equipment does not guarantee access to educational materials because of the frequent electricity cuts and the lack of alternative sources of energy, which the country has long struggled with.[26] In this matter also, the most vulnerable suffer the most. Despite these problems, and the fact that students do not have the possibility to ask questions or ask for further explanation, TV is still the most effective tool to disseminate educational materials in countries where access to the Internet or other electronic devices is restricted. However, it should be remembered that educational materials created for TV lessons should be prepared by a group of experts and adjusted to the medium in such a way that they would comprehensively implement all the material specified in the curriculum.

TABLE 7.3: HOUSEHOLDS WITH TELEVISION (IN COLOR) IN JORDAN AND LEBANON

Country	% of households with TV
Jordan	96%
Lebanon	95%

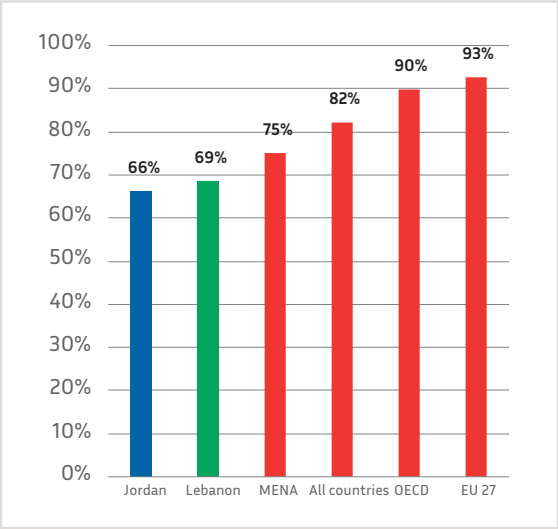
Source: Households with Television (%), World Bank, WDI

7.3.2. Access to the computer and the Internet

Online educational materials require an Internet connection and a laptop or similar device, which are not as common as TV. **According to the PISA data focusing on 15-year-old students, about 29 percent of Jordanian and 22 percent of Lebanese students do not have a computer at all; more than 3 out of 10 youths do not have access to a computer they could use for learning purposes; and 2 out of 10 must share one computer with the whole family. Additionally,**

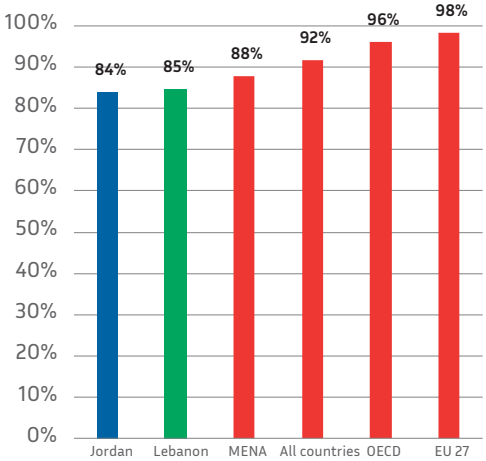
> The difficulty is when you have a household with five kids, one phone, and a limited Internet package.
>
> *Tamara Alrifai, spokesperson for the United Nations Relief and Works Agency*

FIGURE 7.4: ADOLESCENTS WHO REPORT THAT A COMPUTER IS AVAILABLE THAT THEY CAN USE FOR SCHOOLWORK



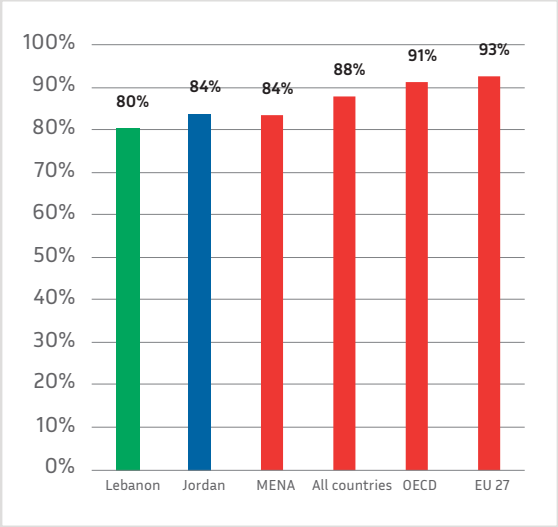
Source: Author calculations based on PISA 2018

FIGURE 7.5: ADOLESCENTS WHO REPORT THAT THEY HAVE AN INTERNET CONNECTION



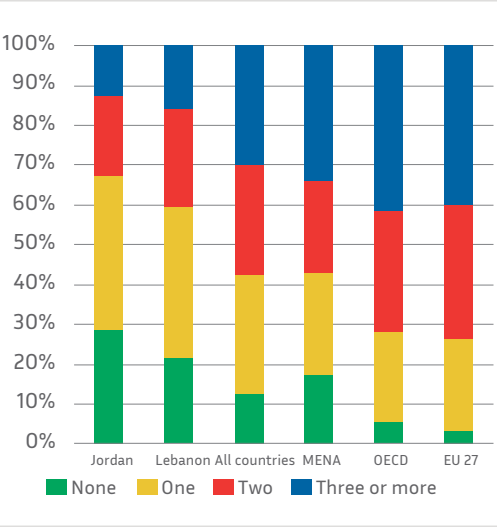
Source: Author calculations based on PISA 2018

FIGURE 7.6: ADOLESCENTS WHO REPORT HAVING A QUIET PLACE TO STUDY



Source: Author calculations based on PISA 2018

FIGURE 7.7: NUMBER OF COMPUTERS AT HOME REPORTED BY ADOLESCENTS



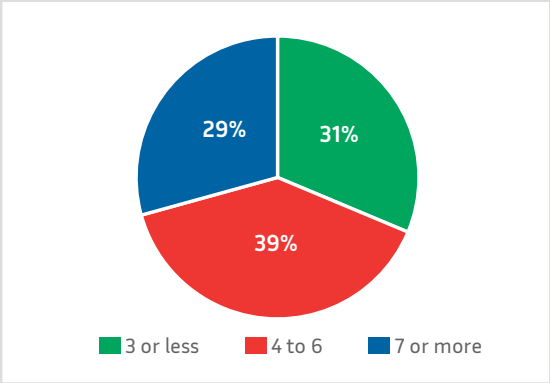
Source: Author calculations based on PISA 2018

15 percent of 15-year-olds, both Lebanese and Jordanian, do not have Internet connection. Another problem is the lack of a suitable place to study – 20 percent of Lebanese and 16 percent of Jordanian students reported not having one.

According to data, the average Lebanese household size is 4.3 people. **This means about 60 percent of students either had no computer, or had to share it with approximately 3 other people in the family** (Plan International, 2020). **Among the most vulnerable groups of students, only 53 percent of adolescent girls and boys had access to learning materials at home**, 71 percent mentioned stationery products, 58 percent books, smartphones or tablets, and only 18 percent mentioned PC or laptops.

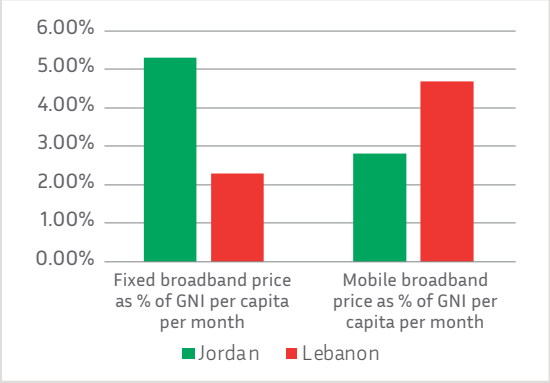
In Jordan, the average household size is 4.8, and 29 percent of households consist of 7 or more members. This means that over 67 percent of students either had no computer, or had to share it with approximately 4 other people in the family.

FIGURE 7.8: PROPORTION OF HOUSEHOLDS BY SIZE IN JORDAN



Source: Multisectoral rapid needs assessment: COVID19 – Jordan, May 2020

FIGURE 7.8: PROPORTION OF HOUSEHOLDS BY SIZE IN JORDAN



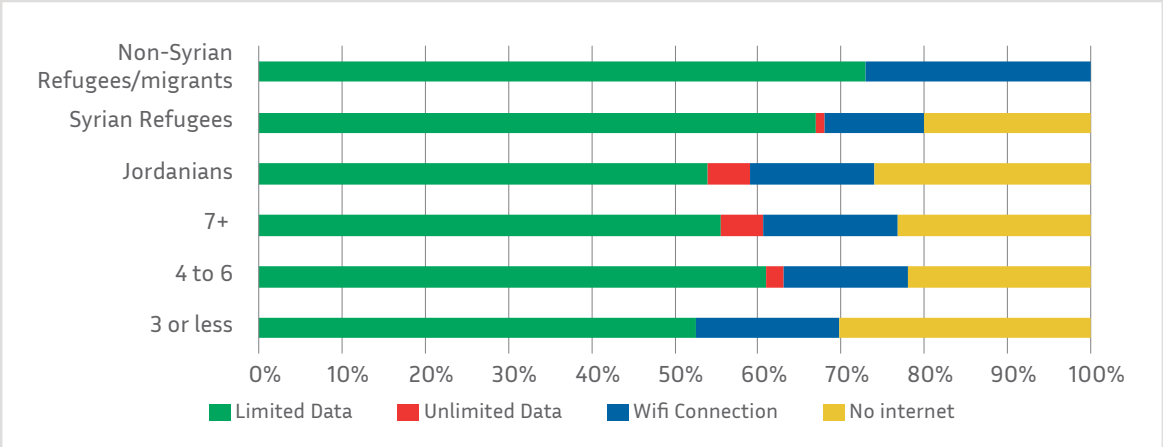
Source: Multisectoral rapid needs assessment: COVID19 – Jordan, May 2020

Research among the most vulnerable groups reveals that over 23 percent of respondents did not have access to the Internet, where 30 percent were smaller households with 3 or fewer members.

It has been shown (Gelvanovskaet al., 2014) that Internet access and usage become common when its price does not exceed 3–5 percent of monthly income. In Jordan and Lebanon, the fixed broadband price is 5.30 percent and 2.30 percent of their gross national income (GNI, while the mobile broadband price is 2.80 percent and 4.70 percent, respectively. As can be noted, only **the Jordanian broadband price slightly exceeds the designated range, so generally, access to the Internet should be rather common** in the two countries.

Figure 7.10 shows what kind of Internet connection is used by vulnerable Jordanian students depending on their age and nationality. **All groups had mostly limited-data access, and interestingly only non-Syrian refugees did not struggle with a lack of Internet connection.**

FIGURE 7.10: TYPE OF INTERNET CONNECTION AT HOME AMONG THE VULNERABLE GROUPS IN JORDAN AND BY AGE

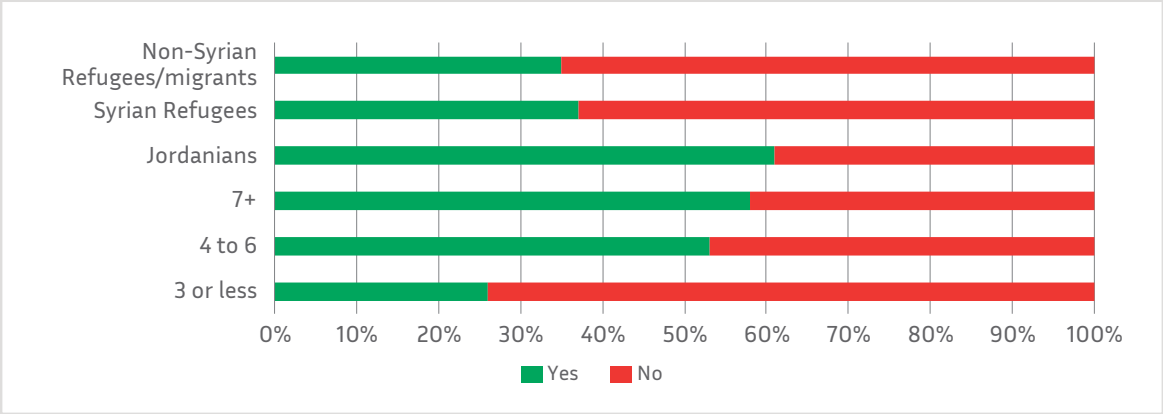


Source: Multi-sectoral rapid needs assessment: COVID19 – Jordan, May 2020

7.4. Lack of appropriate skills to use available devices for education purposes – the second dimension of the digital gap

Even having Internet connection cannot guarantee students' participation in education, as evidenced by the share of vulnerable students using Darsak, which does not match with the share of students having Internet connection. Fewer Syrian and non-Syrian refugees reported having access to Darsak than having an Internet connection. **The reverse is true for vulnerable Jordanian students: more of them admitted having access to Darsak than to the Internet, which implies that somebody is supporting them**. As for access to the platform based on the age of the student, naturally, the older children have access more often.

FIGURE 7.11: ACCESS TO THE DARSAK PLATFORM AMONG THE MOST VULNERABLE GROUPS IN JORDAN



Source: Multi-sectoral rapid needs assessment: COVID19 – Jordan, May 2020

The differences between having access to the Internet versus Darsak may result from the fact that online learning is heavily reliant on actions that require a high flow of the Internet but also from the lack of control over children and the increasing dropout rate.

In the light of this data, it can be concluded that **a large group of students during the current crisis have been cut off from educational materials or did not have appropriate space for studying. These were more often refugees (Syrians) and boys, who had lower accessibility to educational materials.**

Regarding equipment and Internet access, generally Jordan and Lebanon are in a similar situation, according to PISA 2018 data (the students of Jordan indicate a slightly lower availability of tools). Even if the students had access to the educational tools and materials, there still might be wide-ranging differences between the amount of work and engagement they put into learning at home. Some might have kept up to date with the shared lessons, whereas others may not have been engaged at all. Another factor is the lack of appropriate skills to use available devices for education purposes, which is the second dimension of the digital gap.

Lebanon's lag in introducing substitute teaching methods (for example, TV courses and online classes) into in-class education that would ensure continuity of education and allow coverage of the curriculum may be the cause of the worse educational results of its students, especially when they did not maintain any contact with teachers at that time. The use of different solutions (paper materials, synchronous and asynchronous online education) and different experiences of countries in their application may also affect the quality of education and

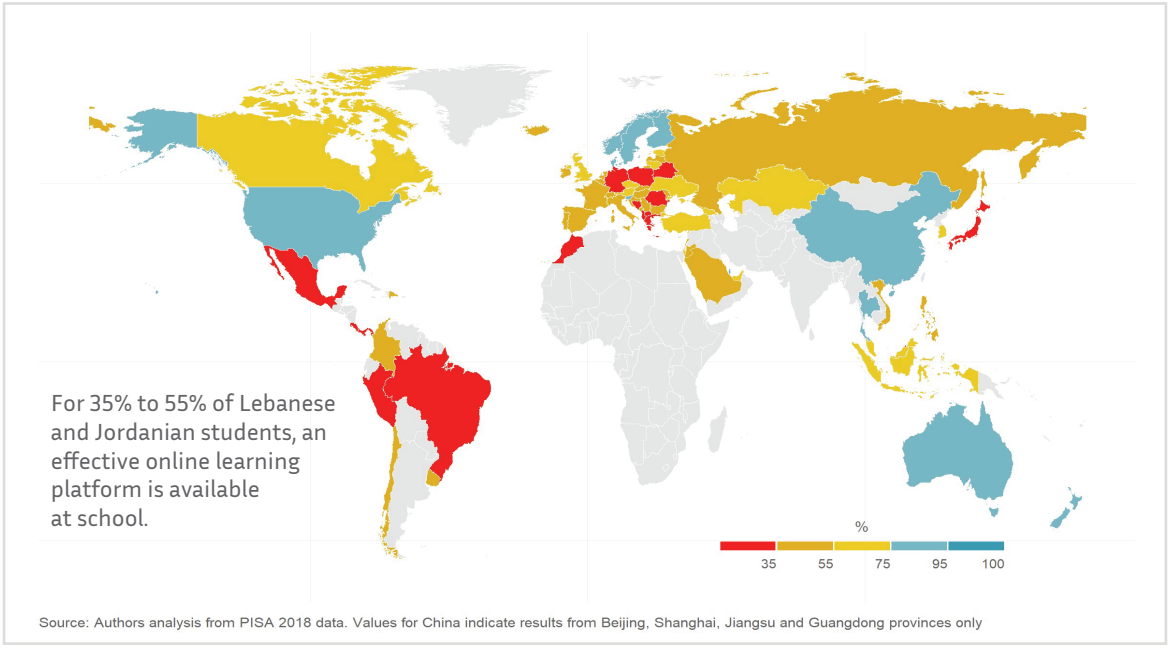
translate into larger or smaller differences in students' performance between countries. Often the introduced solution could have not been adjusted to the possibilities of the society, resulting in lower effectiveness of the applied method. This does not mean that in the case of another country, a given solution will also fail. Therefore, when choosing digital education strategies, it is important to take into account the available resources.

7.5. Preparing schools and teachers for remote teaching – the third dimension of the digital gap

While analyzing the third dimension of the digital gap – schools' preparation for remote teaching, also known as "the school factor" (Moreno and Gortazar, 2020) – with PISA 2018 data (principals' questionnaire), it can be noted that the results for Jordan and Lebanon are alike: their schools display a similar level of preparation for transition to distance learning.

Figure 7.12 shows that **35-55 percent of 15-year-olds are in schools where, according to the principal, an effective online learning platform is available, which indicates insufficient access to educational platforms in these countries**. The majority of the existing online platforms were provided in the private sector of education and therefore made these schools better prepared for the outbreak. **A similar situation is evident in other Middle East and North African countries,** apart from Qatar and most European countries. Universal access to educational platforms can be observed in a few countries, including the Nordic nations, Singapore, Qatar, and a few Chinese provinces.

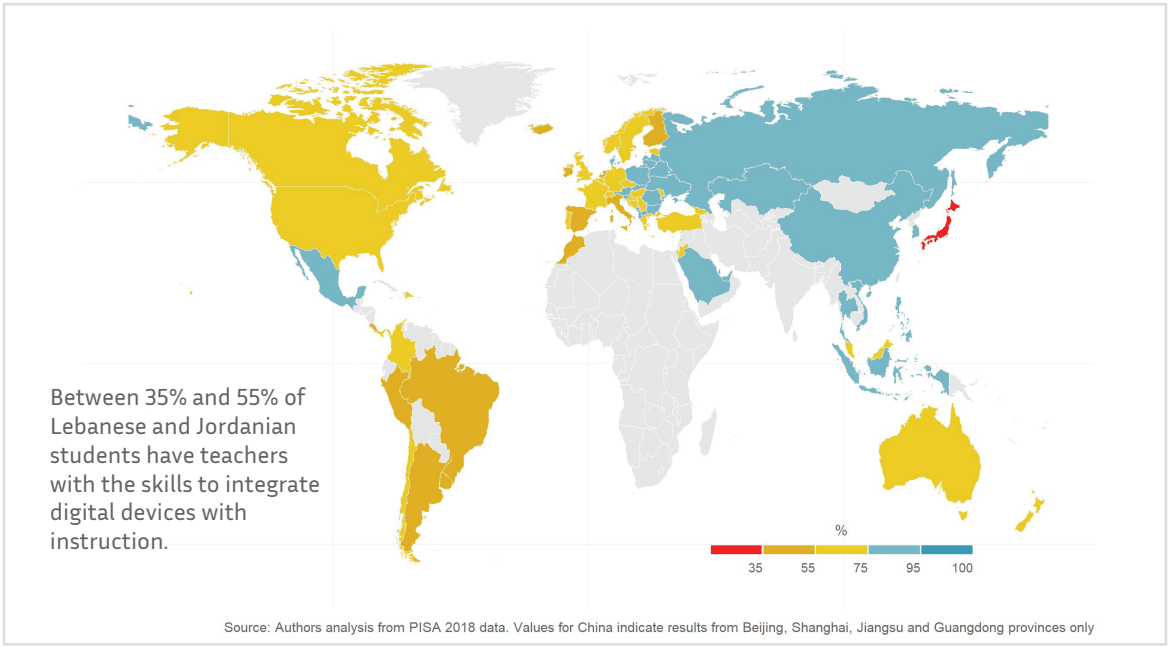
FIGURE 7.12: PERCENTAGE OF 15-YEAR-OLD STUDENTS WHOSE PRINCIPAL AGREED OR STRONGLY AGREED WITH THE STATEMENT THAT AN EFFECTIVE ONLINE LEARNING SUPPORT PLATFORM IS AVAILABLE



Source: PISA 2018 student questionnaire data

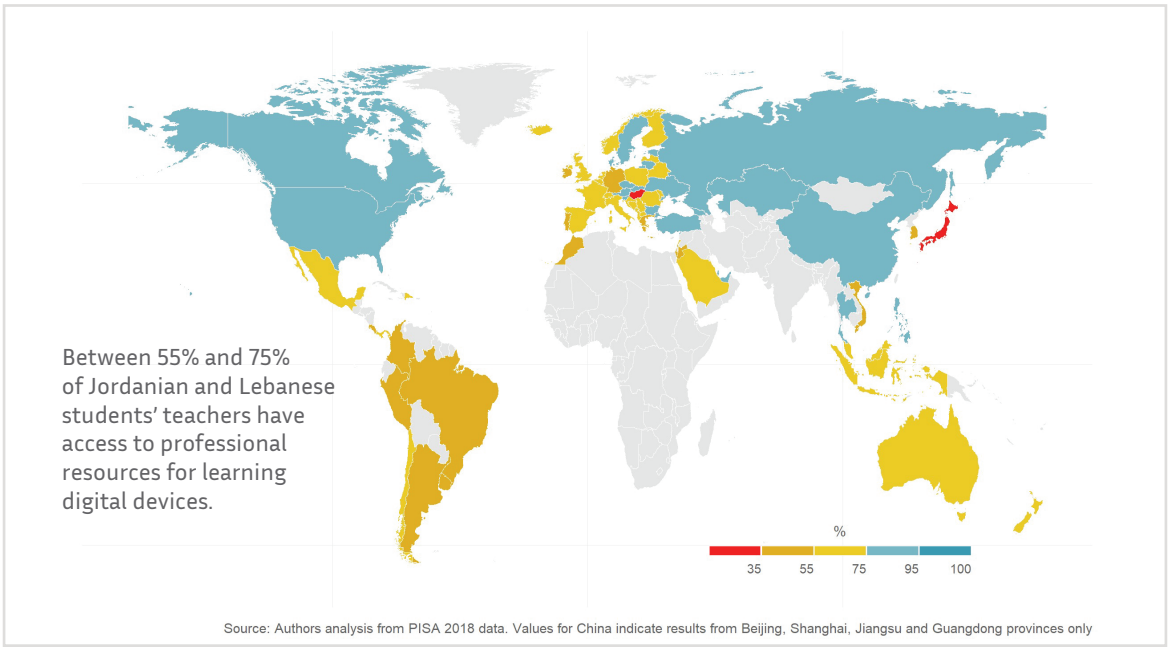
When it comes to the principals' opinion on teachers' technical and pedagogical skills, it is generally more positive. **In Jordan and Lebanon, 35-55 percent of teachers are thought to have the necessary technical and pedagogical skills to integrate digital devices in instruction**.

FIGURE 7.13: PERCENTAGE OF 15-YEAR-OLD STUDENTS WHOSE PRINCIPAL AGREED OR STRONGLY AGREED THAT TEACHERS HAVE THE NECESSARY TECHNICAL AND PEDAGOGICAL SKILLS TO INTEGRATE DIGITAL DEVICES IN INSTRUCTION



Source: PISA 2018 student questionnaire data

FIGURE 7.14: PERCENTAGE OF 15-YEAR-OLD STUDENTS WHOSE PRINCIPAL AGREED OR STRONGLY AGREED THAT EFFECTIVE PROFESSIONAL RESOURCES FOR TEACHERS TO LEARN HOW TO USE DIGITAL DEVICES ARE AVAILABLE



Source: PISA 2018 student questionnaire data

The principals' opinions on teachers' skills to apply digital devices in instruction generally reflect their belief about the availability of resources for teachers to learn to use digital devices (except for Mexico, the US, Canada, and Saudi Arabia). **The Jordanian and Lebanese principals were rather positive in their views on the availability of resources for teachers to learn how to use digital resources. According to them, 55–75 percent of students study at schools where professional resources for teachers are provided.** However, it should be emphasized that the PISA 2018 questionnaire presents the opinions of teachers with no experience of a pandemic-like situation, not even taking such a scenario into account, and not previously dealing with large-scale remote teaching. In the light of the current events and problems faced by teachers, a similar study could provide completely different results, especially since there are many private schools in Lebanon which did not engage in synchronous teaching until the next academic year, which is partly because of their poor economic situation.[27] Moreover, other factors also need to be considered – for example, the recent unfavourable economic and sociopolitical situation in Lebanon could not be without effect on teachers' preparedness and engagement in distant education.

7.6. Social problems related to remote education during COVID-19

7.6.1. Increase in domestic and gender-based violence

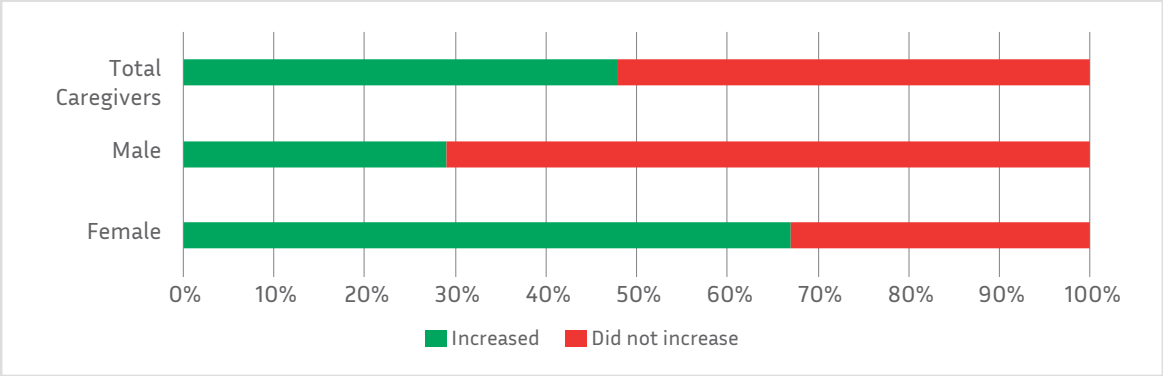
The lockdown restrictions introduced by the governments under the safety measures, apart from affecting trade, production, education, and the health sector, also had an impact on social relations. People were forced to alter their habits and deal with the anxiety and stress resulting from economic uncertainty and fear of infection with COVID-19. Places and activities which before the pandemic had been escape points, were no longer available, which led to significant pressure on family members.

As the Ebola experience has shown, fear, anxiety, and chaos tend to promote negative behaviors. During the COVID-19 pandemic also, there was an increase in undesirable events such as child labor, child marriage, and so on among the most vulnerable groups. The greatest increase visible was violence against children (82 percent). **Domestic violence is more widespread within families with young children** (OECD, 2020). At the same time, **exposure to domestic violence is detrimental to children's self-esteem and educational attainment, as it leads to a stronger likelihood of having difficulties with forming relationships and participating in social life** (Byrne, 2007). Apart from the responsibility to educate, schools have also a social mission. Although many of them are not well prepared to deal with children affected by domestic violence (Münger and Markström, 2019), schools traditionally act as safe havens – free from physical abuse and sexual harassment. As a result of the pandemic and the school closures, many children have lost their only safe place. The violence at home significantly affects the environment for learning, which is now the home environment. Poor conditions and feelings of insecurity translate into lower educational results and higher school dropout rates (Kiesel, Piescher, and Edleson, 2016; Kithonga, and Mbogo, 2018; Lloyd, 2018) because education and psychosocial health are intertwined (Olofsson et al., 2011).

The second-highest increase was noted for gender-based violence (40 percent). In the first several months of the pandemic, it became evident that houses were not a safe place, especially for females (Plan International, 2020). According to the UNDP, before the outbreak **31 percent**

of women in Lebanon suffered from violence from a partner. In addition, 18 percent of men in Lebanon agreed with the statement that there are times when a woman deserves to be beaten and that she should tolerate violence to keep the family together.

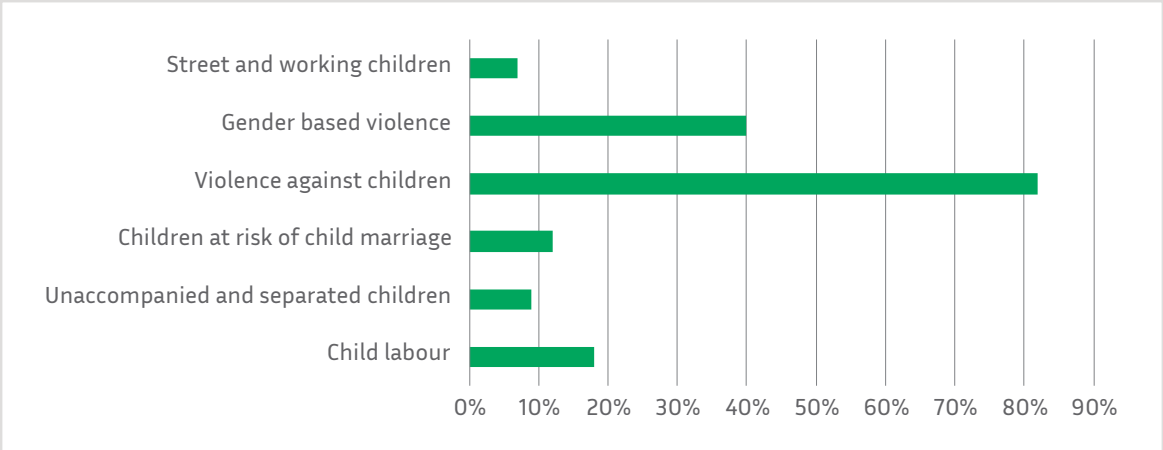
FIGURE 7.15: PERCEPTIONS OF A CHANGE IN VIOLENCE RATES AGAINST MALES AND FEMALES DURING THE LOCKDOWN, REPORTED BY CAREGIVERS IN LEBANON



Source: COVID-19 multisectoral needs assessment conducted by Plan International

When it comes to the perception of violence during the **lockdown, 29 percent of males and 67 percent of females agreed that the problem of violence increased during the pandemic**.

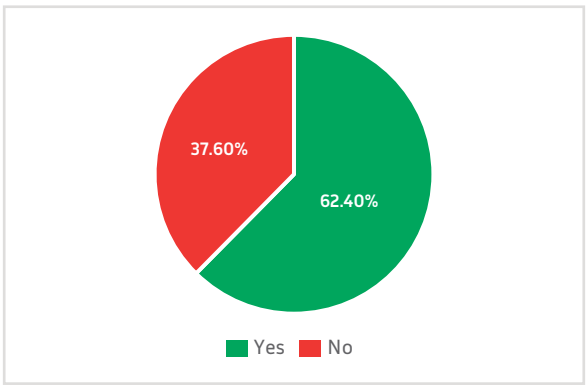
FIGURE 7.16: INCREASE IN VARIOUS BEHAVIORS AMONG VULNERABLE GROUPS



Source: UN High Commissioner for Refugees

In Jordan in 2019, the perpetrators in 88 percent of the gender-based violence (GBV) cases that were reported to case management agencies were husbands (GBV IMS Taskforce Jordan, 2020). **After the first two weeks of the lockdown, a 68 percent decrease in reported cases of GBV was noted. However, it does not mean they did not take place**. A more likely explanation is that because of social isolation, many females were suddenly cut off from all social networks and left with no help. They faced barriers to contacting essential services for violence victims such as helplines and justice services. **Over 62 percent of female beneficiaries felt at risk of suffering violence due to the crisis.** Moreover, some have claimed that **GBV (emotional or psychological) perpetrated by a partner or a member of the family has increased during the crisis** (Plan International, 2020).

FIGURE 7.17: SHARE OF FEMALE BENEFICIARIES WHO FEEL AT RISK OF SUFFERING VIOLENCE (PHYSICAL OR PSYCHOLOGICAL) DUE TO THE CRISIS AND CONFINEMENT IN JORDAN



Source: Rapid assessment of the impact of COVID-19 on vulnerable woman in Jordan, answers from UN Beneficiary Oasis beneficiaries, Plan International
https://reliefweb.int/sites/reliefweb.int/files/resources/76166.pdf

While many women do report cases of violence and we have some data on them, in the case of children, schools are often the only institutions controlling and feeling responsible for the children's situation. Many schools do inform the relevant authorities about parental negligence or cases of violence and provide psychological support. However, since the onset of the pandemic, distance education has limited the schools' social function by making incidents of abuse more difficult to detect. Registered cases of violence against women reveal, however, that even when children are not the direct object of violence, they are witnesses and passive victims, which often affects their educational performance and can have a long-term impact on other areas of their life.

7.6.2. Social outcomes of education during the lockdown

In Jordan and Lebanon during the pandemic, **children have faced enormous changes in their lives**. With the school lockdowns, many of them **no longer had a sense of motivation and were not stimulated to learn. The isolation often had a negative impact on their emotional state** (Hwang, 2020). Adolescents who earlier have suffered from mental health problems, for example, depression, could have experienced an increase in anxiety and distress during the epidemic (Hwang, 2020). Therefore, it is essential to include children's psychological support among the COVID educational response s. So, as it can be seen beyond the technological issues important in remote education, the social, communicational, and motivational ones turned out to be also crucial, and the responsibility for them usually lies with the teachers. Schools not only are a source of knowledge but also develop children's socio-emotional skills and teach interpersonal relationships (Saavedra, 2020), but because of the pandemic these functions have been restricted because distance education does not provide the sense of community offered by face-to-face classes (McLoughlin and Lee, 2010; LaPadula, 2003).

Summarizing, when social issues are considered, face-to-face classes have an advantage over virtual ones. A lack of a sense of belonging may lead to low engagement, underperformance, and high retention rates (Twinomugisha, 2019). Therefore, during the coronavirus period, the emphasis should be placed not only on the technology but also on students' attitudes and engagement. These issues have been typically overlooked – most remote learning does not include the component of collaboration but is mostly concentrated on covering the required material. This may be due to teachers' inexperience in conducting remote classes, which are very different from in-person classes. Nonetheless, collaboration is possible regardless of the channel employed, and perhaps even more necessary in a distance-learning setting.

> The Lebanese government's Covid-19 response has completely ignored the rights and needs of people with disabilities, who were marginalized long before the virus hit.
>
> ***Aya Majzoub,***
> *Lebanese researcher at Human Rights Watch*

7.6.3. Distance learning as an inadequate form of education for disabled people

According to Gender and Adolescence Global Evidence (Małachowska, 2020) **people with disabilities have been particularly affected by the school lockdowns.** The remote-learning programs have often not been adjusted to their needs. Moreover, they have had problems with access to health services, which has caused even more distress and difficulties with learning. The Human Rights Watch (HRW) has alerted that despite multiple requests from activists, the Lebanese government has not made any arrangements for disabled students yet.

7.6.4. How to recover from COVID-related crises in Jordan and Lebanon

Even before the COVID-19 outbreak, Lebanese and Jordan education systems were in a crisis – a crisis of inequality. The most disadvantaged and vulnerable groups had the worst access to schooling and educational materials, the poorest quality of teaching, and the highest dropout rates. The school lockdowns have undoubtedly increased the already existing inequalities and worsened the circumstances of the most disadvantaged.

Before the pandemic, not many schools extensively relied on educational platforms and distance education, but the current situation has forced them to make a quick transition to online learning, which in other circumstances would not have been done so rapidly and on such short notice.

What this means is that we are dealing with an ongoing, open-ended, unfolding experiment that is testing, in real time, the effectiveness of remote education, its various approaches, and its proposed solutions. During this challenging time, countries needed to implement innovative methods of teaching or develop existing tools. Educational systems must learn from the current situation for the future, which is why it is so important to analyze the effectiveness of various distance- learning methods.

Regardless of the type of school or stage of education, the solutions currently being prepared for remote learning during an epidemic should assume a long-term perspective and take into consideration the long-term impact on education and other sectors. The highest priority should be given to the following five areas:

1. Disadvantaged students
2. Technological support
3. Matching curriculum with the modality of remote teaching and learning
4. Teacher support
5. Mental health support
6. Violence prevention.

7.6.4.1 Disadvantaged Students

Remote education is likely to widen the learning gaps and to impact negatively especially those with learning challenges (students with special needs, disabilities, or lower-income groups). It is related to their financial situation – affecting access to digital devices, the Internet, and computer skills – and also to limited teachers' control. Those who struggled with studying at school are more disadvantaged now even more than before, as their needs and problems would likely pile up. Buheji (2020) emphasizes the necessity of protecting and helping the poorest and the most vulnerable just after implementing health standards because the results of the pandemic will be the most severe for them.

Although in this difficult period, generally, all students require extra attention, the most affected ones are those disadvantaged, including Syrian refugees, whose access to educational materials is limited and who, long before COVID-19, struggled with educational problems. In the case of Lebanon, currently, the Lebanese themselves, affected by multiple crises, are at high level of vulnerability.

Below are a few tips on how to support underperforming students:

- Students should be aware that someone is not only watching over them but also looking out for them, and that they are not alone or anonymous. Therefore, it is of huge importance to develop a relationship with them and **keep in direct contact**.
- Dividing students into smaller groups, conducting **real-time instruction**, and requiring their active participation, as well as giving them regular feedback, are musts.
- **Diagnosing** students' difficulties and approaching them individually by organizing additional classes, as well as offering extra explanations when needed, might have a huge, positive impact on students' education. The causes of low academic performance may be various, including difficulties with concentration, which are even greater when children study at home. Remote education certainly makes it more difficult to identify students who have educational problems, compared to in-class settings, mainly because of a lack of direct teacher-student contact; however, it is not impossible. The grades and assignments provide some information although the independence with which the exercises are completed could be questioned. It is therefore of great importance to organize interactive classes during which the teacher will have the opportunity to get to know the students and their abilities well. Remedial classes could also take the form of remote teaching or, in the case of individuals, face-to-face with health safety standards.
- Setting precise objectives and giving students **step-by-step instructions** – for example, providing students with video explanations of some issues – is needed. Steps should be taken not to overwhelm students with tasks but to adapt exercises to students' current abilities so that they can gradually catch up.
- Implementing a remedy plan to overcome students' weaknesses might help those who are struggling.
- **Cooperation with** the child's **parents**, and informing them about current tasks and requirements as well as the student's results, might help not only the student but also the overwhelmed teacher.
- In the event of prolonged student absences, teachers and schools should explore the reasons and **alert the appropriate agencies** in case contact with the student and his or her parents is not feasible.

To prevent the widening of gaps, minimize remote education's negative impact on further education, and lower the possibility of dropouts, schools and governments should take appropriate actions such as providing students and teachers with educational tools. Moreover, an additional commitment from teachers and parents is required. Home-teaching children (especially those in primary school) will require caregivers' support, but providing this is not always possible, as in the case of disadvantaged children because parents may either be unavailable or unprepared to help. Given the difficult economic situation in both Jordan and Lebanon, a protected education budget to help families with less disposable income should be considered (World Bank, 2020).

7.6.4.2 Technological suport

When choosing tools for remote education, it is worth remembering that sometimes **a tool known to the teacher and students is better than a completely new one, no matter how advanced the new one is or what possibilities it offers**. Both teachers and students need time and support to learn to use new technology effectively. Teachers, overburdened with work, should not be forced to spend too much time learning and adapting to new tools, and students' should focus more on becoming familiar with the educational content, not with the tool. According to research of Education Endowment Foundation (Higgins, 2020), **whether classes were conducted live or recorded beforehand did not have a significant impact on learning. The most important issue was whether the method helped to explain the material clearly and supported the student in learning**. Policies should concentrate on how technology can be used to enhance and support learning rather than replace current teaching methods (Higgins, 2020).

7.6.4.3 Supporting teachers

The pandemic and the school closures are a difficult situation mainly for students, to whom most attention should be paid. However, **the teachers, burdened with great responsibility and often left to fend for themselves, are in an equally difficult situation**. The countries' experiences have shown that not many teachers were prepared to conduct online lessons, as they often lacked both the skills and the equipment. Therefore, **it is vital to provide teachers with access to appropriate skills and materials to help them prepare online** classes (as Jordan has done[28]) but also provide 24/7 help in case of urgent problems.

7.6.4.4 Mental health support

Mental health, which is one of the most vulnerable aspects of a pandemic, is a fundamental issue that has an extremely high impact on the education process. **Children who lost their sense of stability due to the school closures, and observed their parents' worries and stress, could experience anxiety that might affect their attitudes.** The support of parents is very important. While in Jordan and Lebanon, a statistical family has more than 4 people, parents may feel overwhelmed with the number of duties, including taking care of students' education. **Information campaigns** on how to take care of their own and their children's mental health (such as those carried out by WHO Lebanon on Twitter) should be disseminated on a larger scale. It is highly recommended **that a mental health center be created to deal with the problems of isolation, and the stress and anxiety resulting from it. This would also help to lessen undesired behaviors.**

7.6.4.5 Violence prevention

With the rise of violence in households during the pandemic and restrictions in access to some help services, it is crucial to find other ways to help victims to find support and shelter. It is also essential to strengthen the campaign against violence and encourage victims to come forward for help. In the present situation, adequate sources of assistance should also be provided.

7.7. Summary and conclusions

There is no doubt that education has a significant, if not the most important, impact on the quality of life. It is therefore crucial to provide high quality and equal access to education. In Jordan and Lebanon, even before the pandemic, the situation of the educational system was not good, which is partly a result of political issues and the influx of refugees. The current situation may lead to a deterioration of students' achievements and a deepening of existing gaps. It is estimated that **COVID-19 may result in an average loss of 0.6 years of education per student, adjusted for quality, and thereby reduce the effective years of schooling**, which will lead to falling test scores (World Bank, 2020).

It is worth addressing these problems and using the solutions created during the pandemic to help strengthen the level of education in both countries after the return to traditional teaching. It will also be useful to analyze the conclusions of the international assessments so that the curriculum can be adapted to meet students' needs in the best possible way. However, it should be borne in mind that the solutions applied in other countries may not bring the same results. Attention should therefore be paid to adapting the solutions to the current situation and needs of the specific system. It is also worth it to focus on the wellbeing and mental health of students, which also affect attitudes to education and students' performance.

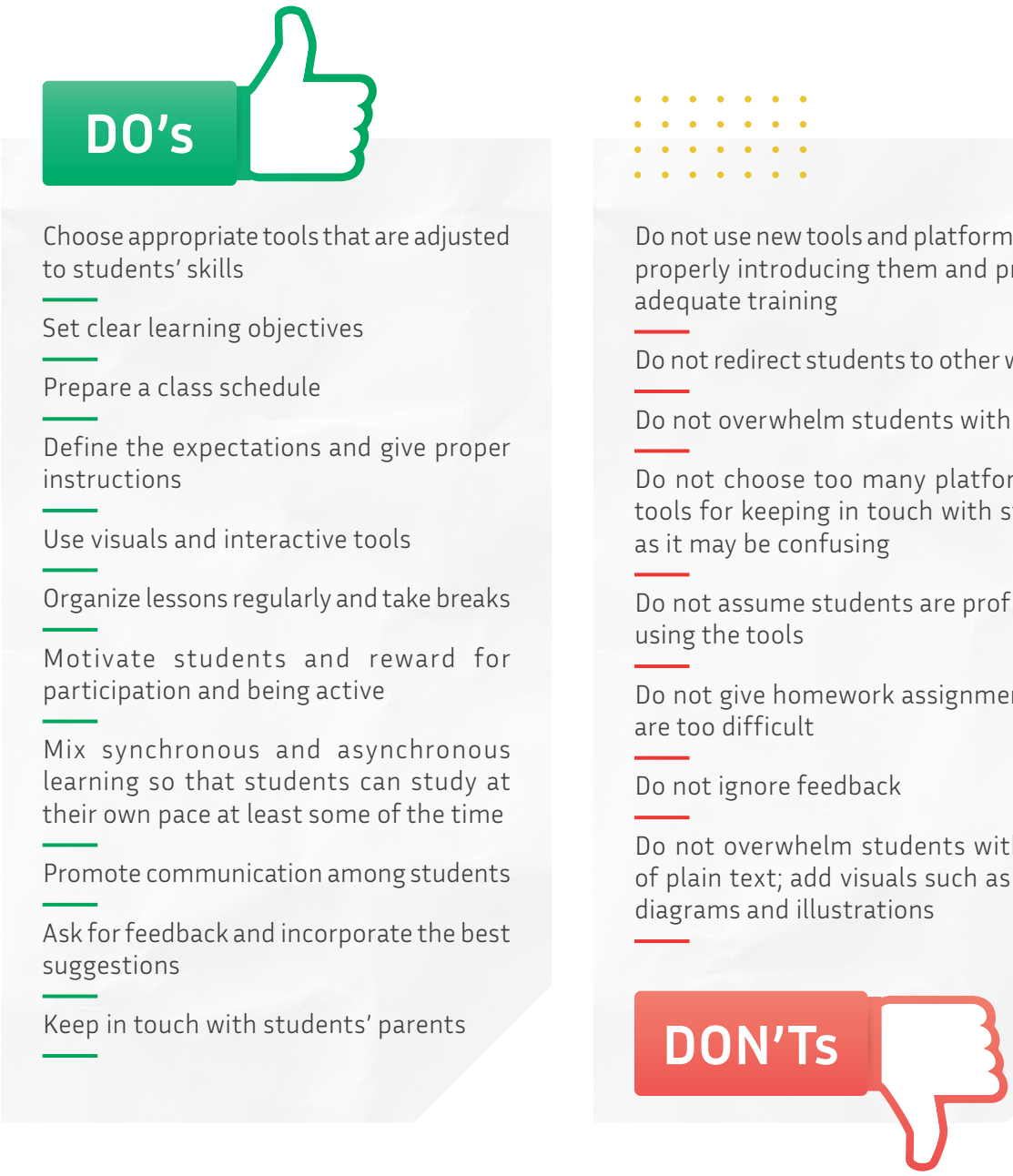
The current crisis has highlighted problems many of which have so far been ignored or gone unnoticed, while at the same time providing an impulse for the development of less widespread methods of education. New solutions have been implemented in teaching, and a few ideas have arisen or become more realistic such as administering high-stakes exams online (World Bank, 2020). It is essential to ensure that everyone has equal and safe access to the new form of learning so that once the pandemic is over, new methods can be incorporated into the current routine without harming any group with limited access to the new form.

7.8. Recommendations

7.8.1. Do's and Don'ts of Online Learning

The literature and the experiences of various countries with the pandemic have made it possible to identify good and bad distance-learning practices. With the outbreak of COVID-19 and quick transition to online education, teachers were not given time to prepare and were lost in technology. A list of do's and don'ts for online teaching may be useful for them, especially when they are not experienced in distance education.

FIGURE 7.18: DO'S AND DON'TS OF ONLINE EDUCATION



Source: Own elaboration on the basis of World Bank (2020)

7.8.2. Effective ways of introducing policies

When choosing methods of distance education at the national level, rather than reinventing the wheel, it is best to first consider solutions implemented in other countries and learn from their mistakes. However, it should be borne in mind that some foreign-country solutions may not be applicable domestically due, for example, to huge technology barriers. Therefore, it is also crucial to understand teachers, parents, and, above all, students' needs and abilities. The most common solutions, and their advantages, are presented below.

- ***TV lessons***

TV, one of the world's most popular media (World Bank, 2010), was employed as a tool for propagating educational lessons in 47 percent of countries worldwide (World Bank, 2020). It is the most appropriate solution for countries where access to the Internet or electronic devices is limited for most citizens. During the pandemic, lessons on TV are recommended for the development of an education strategy prepared for education networks.

The preparation of educational materials requires a group of experts to create online lessons covering all the material specified in the curriculum. The transferred knowledge should be of high quality, otherwise, it will not be considered credible. The initial failure of TV lessons introduced by Polish Public TV (TVP) serves as an example of this. The TVP lessons failed mainly because the presenting teachers were not given enough time to prepare. The paucity of the initially used technological resources also played a role in the poor reception of the lessons. Despite the huge increase in lessons quality in the later weeks, this poor start discouraged many students and parents from using the TVP lessons as a credible medium of instruction.

An interesting alternative solution was offered by BBC Bitesize, which did not directly use TV but made short movies and placed them on the BBC's website. Well-known British actors were brought in to encourage students to use the educational materials (ES, 2020). The use of celebrities and role models can have a positive effect on students' engagement and use of materials.

Another benefit of TV lessons is that, for any given age bracket, the program hours can be adjusted to the hours when research shows that that age group best assimilates information.

It is also recommended that aired material be posted on the Internet so that students can access it multiple times or when it is most convenient for them.

- ***Online platforms***

Online platforms have been used in some countries but not on a large scale. Due to the school closures, institutions developed or created new platforms and applied many new practices, which have already yielded very positive results and will be helpful when schools return to normal schedule.

Jordan's Darsak platform also initiated two interesting solutions, for students and units of the Ministry of Education. Students wishing to watch a lesson can choose that lesson from several companies presenting the same material on the website. Thanks to this, students can listen to that lesson from their favorite teacher on the platform. This allows the student to adjust the way the material is presented to his or her needs or preferences, which increases the student's interest and hence their chances of learning the material better.

Moreover, the platform has a testing section, which enables the Ministry of Education to follow the examination data of many students and identify existing problems and, in the future, adjust the material to students' needs.

The platforms are available as mobile phones app because phones are more common than computers. Thanks to this, the problem of lack of access to a laptop has been significantly reduced.

- ***Technological devices***

In the PISA 2018 data, more than two-thirds of the principals of 15-year-old students in all the various countries reported that the digital devices they have at their school have enough computing capacity. However, the distribution is quite uneven and points to large

socioeconomic gaps among the countries (OECD, 2020). Furthermore, even if only a small number of students lack access to the technology necessary for distance education and are excluded from educational opportunities, they should still be supported by the authorities or offered substitute materials as quickly as possible. Many countries have introduced widespread programs providing families with free access to technology (for example, Poland and the UK) and to educational content in paper form (France).

An interesting improvement concerning giving support was made in Poland: donations of technological equipment to students are tax-exempt.

Another country that introduced a very effective solution is the United Kingdom, where equipment was provided to smaller units of the government so that they could manage it themselves because they have more detailed knowledge of who in the region is at a disadvantage and may need the equipment for learning. Thanks to this, beneficiaries do not have to apply formally in advance for assistance from the government units.

The connectivity approaches taken by Poland and Jordan stands out in terms of Internet access. In Poland, after the government's negotiations with the largest mobile and Internet networks in the country, free or cheap Internet packages were created for everyone, but students were also able to use them for educational purposes. Moreover, a program supporting teachers was created by one of the Internet distributors in Poland, under which they got free Internet for six months so they could conduct online classes without hindrance.

In Jordan, a different but equally interesting approach was implemented: free access to educational materials during "school hours." People are not charged for Internet data used while on the educational website, which is a great support, especially for those with financial problems, which may have worsened as a result of the pandemic crisis.

In the case of Lebanon, it is also necessary to ensure permanent access to electricity. Alternative energy sources should be organized, or the government could consider financial support to private-operated generators, but looking at the country's currently dire economic situation, the second solution does not seem realistic. In the light of huge difficulties in teaching because of constant power shortages, alternative communication channels need to be provided and educational materials adapted to them (for example, in paper form distributed by the schools).

- ***Gamification***

After the school closures in Poland, the government looked for ways to keep students at home and took concrete steps to encourage that. For instance, the government created a website where students could learn skills their school does not currently offer, for example, online presentation techniques or the creation of computer games. A new Minecraft server and a competition that the government organized induced many students to stay at home and go online not because of COVID-related restrictions but because of the introduction of game-like features and other exciting arrangements offered by the government. It would be worthwhile for other countries to employ similar "gamifying" approaches in the future to motivate students to use the system while at the same time offering a compelling educational value.

7.8.3. Assessment

Regarding assessment, a differentiation needs to be made between nationwide examinations that play the role of higher education admission tests, and in-school test and grades. In the first case, four solutions applied by various countries in the previous academic year are possible:

- ***Cancellation of examinations***

The State of Florida cancelled all student assessments, including K-12 examinations. Similarly, Norway cancelled 10th grade examinations and postponed until a later date a decision on whether oral examinations will be held for the final grade of high school. In England, Wales and the Northern Ireland, GCSE, AS and A-level examinations were also cancelled.[29] Above all, the lack of adequate preparation and concern for the health of students influenced these decisions. In the current academic year, schools and institutions already have some experience and will be able to prepare better or propose an alternative form of getting academic credit.

- ***Postponement of examinations***

Italy, Poland, Ireland, Portugal, and China are examples of countries that followed an exam postponement strategy. The exams were later conducted, in compliance with all safety standards, when the pandemic situation improved. This solution resulted in the extension of recruitment deadlines to universities and, in some cases, postponing the inauguration of an academic year.

- ***Continuing examinations with increased safety measures***

Germany and Singapore are examples of countries that continued on with school examinations but instituted increased safety measures to protect students and staff.

- ***Conducting online examinations***

Conducting online examinations requires advanced proctoring software, and because of this, it can be considered an economically discriminatory method. The students access the testing platform from their own home computers upon meeting basic technical requirements. The tests are monitored through special software based on artificial intelligence algorithms, but also live through human proctors Probably because organizing massive national examinations using proctored online tools could be very expensive and would require a highly robust Internet connection, not many countries have introduced it. This option was used only for admission tests for graduate studies in Greece.

Because of the non-traditional form of learning (that is not in-person learning), some countries have decided to change the way they assess and grade students during the school year. An example of this is the Saskatchewan region of Canada, where the local Ministry of Education decided to freeze students' grades based on what they were by March 13, 2020. However, students could do additional work to improve their grades (Brennan, 2021). Such a solution eliminates or greatly reduces the impact that learning inequalities between more and less privileged students have on grades.

Some countries also changed their grading system for this one year because of the pandemic. Many countries have returned to the standard form of teaching, sometimes supported by online tools. In countries where remote education is being continued, it is very important to adapt the materials and forms of credits to the capabilities and constraints of the medium of instruction, and at the same time maximize the involvement of students. Some countries have developed learning management systems to improve remote education. When considering the various ways of assessing knowledge, the methods used most often include project-based assessments, group work, portfolios, oral assessments, online discussions and online tests.

7.8.4. Preparing for post-crisis education

During the pandemic, the main education-sector aim of most governments was to ensure continuity of teaching. Achieving that was a problem in most countries. However, its scale varied with the economic situation, the degree of digitalization of schooling, and the scale of the pandemic. Because of the vast diversity, the applied solutions also varied and there was no one ideal solution that could be applied in all countries.

The actions taken by the governments were generally supportive, and their purpose was to guarantee access to educational materials by providing, among other things, needed equipment, access to the Internet, paper-based materials, and television broadcasts. In most countries, the effects of the actions of ministries and schools were visible in developing existing or creating new educational platforms, which until then had not been so common.

Despite the measures taken to minimize the negative impact of school closures, there has been an increase **in retention and dropout rates, especially among disadvantaged groups**, probably due to the lack of direct contact and control of the teacher, as well as the students' poor financial situation and a decline in the sense of school belonging. Moreover, even if children have access to the educational materials, it is inappropriate to assume they understand the content delivered through remote learning. **There may be wide-ranging differences between the amount of work and engagement that students have put into learning at home, which may result in educational gaps.**

Having the best interest of children and their health condition in mind, countries should consider the gradual reopening of schools with appropriate safety guidelines. There are several aspects to consider when deciding to restore school activities (UNICEF, 2020):

- Travel from and to school
- **Safety standards** – health care capacities, hygiene practices, and community-related risks
- The essentiality of classroom instruction for achieving appropriate learning outcomes
- Possible **staff shortages**
- **How to reduce the educational differences** between students that arose during distance learning.
- The readiness of teachers and educational authorities to adapt to different administrative and learning approaches that would let students catch up, and to implement infection prevention and control measures
- **Adjusting the curriculum** to the actual level of students to ensure continuity of education and to prevent the emergence of educational gaps
- Organizing classes in two shifts in schools where this solution has not been employed so far
- Deciding on what model of learning should be implemented: **hybrid or traditional**
- How to support ill students

World Bank (2020) guidelines for preparing for the reopening schools also indicate the need to form parallel sets of strategies, enabling local authorities and schools to carry out the re-opening plan while at the same time turning the COVID-19 outbreak into an opportunity for establishing a more resilient system.

7.8.5. How to organize a smooth transition to schools without generating educational gaps

The main drawback of online education is unequal access, which mostly affects financially disadvantaged students whose access to educational materials, the Internet, and technology is usually limited. Many countries have tried to overcome this problem, which generates or perpetuates inequalities, by financing equipment or providing paper-based materials (as in Lebanon), but the problem persists.

Moreover, online education does not allow teachers to manage their students and make sure they are actively participating in class. Students with low motivation and who, even before the pandemic, were achieving low educational results during traditional teaching are expected to perform much worse than if they had attended conventional classes. Hence the gap between students is expected to widen.

Remote education not only may lead to differences in students' performance but also may make it more difficult for them to reach the passing level for a given class. **Once schools reopen, students' skills and knowledge should therefore be measured**. Based on the results of the measurements, the areas in which students require revision should be identified and the **curriculum should be adjusted** to minimize the arising differences and gaps in students' knowledge. **Introducing revision classes or additional courses directed especially to children who significantly fall behind the group should be considered, and they should be adjusted to the students' needs**. Because the cumulative character of the curriculum, where later classes build on earlier ones, ignoring educational gaps, especially among young children, may significantly affect their future education because once they fall behind, catching up becomes particularly difficult. Implementing a bridge curriculum that allows students to move smoothly from one stage to the next is therefore a necessity.

Simultaneously, teacher training and remote-education tool development should continue to prepare schools for similar situations in the future.

8. SUMMARY

Education is one of the factors that profoundly influence the career paths of individuals and shape the human capital resources of a country. Certain features of the education system differentiate students and schools from one another, creating unequal educational opportunities that over time can result in substantial gaps in knowledge, competencies, learning, and skills acquisition. Countries also vary from one another in the design and overall effectiveness of their school systems, which affects all students and impacts future economic and social development.

This study aimed to identify the key factors that account for the low academic results of students in Jordan and Lebanon compared to their peers in the OECD countries. A large share of the participating students with the lowest achievement levels and disparities between schools were investigated for both countries. Specific outcomes such as the large gender gap in Jordan, and achievement differences related to language in Lebanon, were investigated more specifically for each country. The quantitative research conducted for the report used large-scale assessments data – specifically PISA and TIMSS. The students' reading, math, and science results were analyzed together with numerous factors associated with them such as .....

The report focused particularly on the choice of language of instruction and assessment, which in Lebanon differs from most students' first language, and the effect that this difference has on comprehension, motivation and learning outcomes. Family background, students' attitudes and perceptions, system-level solutions, and school indices were also discussed. In addition, gender differences in performance on ILSA were identified and analyzed. Taking into account the fact that some schools face diverse challenges (as evidenced by differences in results) and require a different approach, the characteristics of the most vulnerable schools were identified and compared with those of other schools.

In connection with the current problem of the COVID-19 pandemic, which has negatively affected the quality and availability of education worldwide, the report also offers a glance at the main problems encountered and arrangements adopted by various countries, but with specific data provided for Jordan and Lebanon.

The results of the study cannot be interpreted wholesale as proving a causal relationship between particular national policies or school practices and student achievement. However, the descriptive results indicate not only where the gaps are the most significant but also what student, family, teacher, curriculum, and school system characteristics are most closely associated with those gaps. These data can help decision-makers in both countries to identify the critical issues to be considered when discussing policy reforms and fiscal allocations.

Key findings

- The analysis shows that grade repetition is a widespread strategy in Lebanon, despite being financial costly, having almost no benefits, and harming educational results.
- Both in Jordan and Lebanon, students achieve higher educational results in private schools. The private school performance advantage is the largest in Lebanon, where private schools predominate in the educational system. The achievement gap may result from the fact that the public schools are attended primarily by students from lower socioeconomic backgrounds, but it may also indicate the overall lower effectiveness of the public schools. There is also considerable variation in the performance of the private schools themselves, with some achieving results comparable to or even lower than certain public schools.
- In both countries, there is a strong association between computer access, Internet access, and educational outcomes. Students from disadvantaged socioeconomic backgrounds are in a particularly challenging situation when it comes to this. This also means that remote learning may further increase already existing achievement gaps.

- Learners' performance is associated with their parents' emotional support, their own attitude toward learning, and their level of self-confidence, which varies according to gender. The most significant difference is students' self-confidence in mathematics, which is lower for females in Lebanon.
- Teaching in one of the major international foreign languages – especially English or French – is increasingly practiced worldwide because it enhances students' motility and chances of participating in the global labor markets. However, the PISA data show a clear achievement advantage for students for whom the language of the assessment/instruction is also their mother tongue, or at least is the language most often spoken at home, and a disadvantage for students who learn or take tests in a language that is not their first language. These two priorities – preparation for entry into the global workforce, and maximizing a child's ability to comprehend and learn while in school – are at odds with each other in the post-colonial culture of a country such as Lebanon. Policymakers will therefore need to carefully consider the balancing act between the two goals in order to optimize Lebanese students' chances of future success.
- Jordan and Lebanon schools can be divided into three groups: the most vulnerable, those with intermediate results, and high-achieving. Each type requires a different approach. Students with the weakest results mainly reside in rural areas and small towns, they suffer from bullying and absenteeism; the middle-results group is characterized by low educational resources; residents of large towns are those with the best results and require measures addressing this group should focus on fostering positive feelings and motivating students to master tasks.

General recommendations

Lebanon

- Limiting grade repetition. Practicing grade repetition turns out to be not only ineffective and stigmatizing but also an expensive solution. More substantial academic support is needed to help struggling students, for example, in the form of additional instruction in smaller groups and by relying on research-based instructional approaches to ensure that all students fulfill the basic curriculum requirements. A program that identifies student needs and addresses motivational issues would also be helpful. It would require additional resources for schools but also extensive teacher training and support for after-school activities.
- Lenient promotion may seem controversial, as teachers may be concerned about receiving students who are not ready for more advanced instruction and have significant knowledge gaps. Moreover, there may be concerns over students' motivation. However, the research underscores the inefficiency and negative consequences of grade repetition. First, grade repetition increases dropout rates, a hugely negative consequence for the whole system (Glick and Sahn, 2010). Second, grade repetition does not pose an effective threat to students who are at risk of repetition because it does not demonstrate any pro-motivational effects (Belot and Vandenberghe, 2014). Furthermore, grade repeaters show lower educational outcomes than peers with the same skills who have not repeated (Garcia-Perez et al., 2014; Glick and Sahn, 2010). The evidence seems to be quite compelling in showing that grade repetition is not a good strategy. Alternatively, a system of early-on identification and correction of lagging students should be introduced. Furthermore, certain school-level characteristics related to grade repetition and dropping out should be addressed: low teacher-to-student ratio and the poor condition of school facilities (such as water access, heating, and inadequate resources) top of the list (Sunny et al., 2017).

- Additional alternatives to grade repetition include regular in-class assessments and organizing systematic support for students who lag. The first step of such a system should be to increase preschool enrolment, especially for children with disadvantaged backgrounds. Further, a national-level screening test in the first years of education should be employed for pupils. This assessment should be provided as an in-class, low-stakes assessment to gauge students' proficiency level carefully. Pupils already lagging at this stage should be offered remedial actions, such as additional classes or educational materials and equipment. At the end of the first stage of school education (grade 3), a large-scale national assessment should be planned to monitor outcomes and target support for those with a higher risk of underperformance and grade repetition. The role of assessments and research-based approaches to support struggling students should also be explained to teachers and promoted in professional development (Roediger and Karpicke, 2006a; 2006b; William, 2017; Agarwal and Bain, 2019). In-class assessment awareness, and knowledge about educational and psychological measurement, including psychometrics, should become a mandatory and essential part of teacher-training curricula. Finally, challenging teacher stereotypes about grade repetition and effective teaching methods is necessary to improve support for struggling students.
- Financial support for students and ensuring equal access to educational equipment. The socioeconomic situation of students is positively correlated with their educational outcomes. Not everyone has equal access to educational resources and materials, which is especially significant in distance learning and may lead to a widening of the academic gap.
- Improving students' language proficiency. Lebanon's multilingual culture and education system offer potential advantages because, in principle, it could open up a student's future career options. But as the literature indicates, in practice, students often never develop sufficient proficiency in the languages they are studying. Starting language education earlier could help students acquire better language proficiency by the time they enter higher grades. Moreover, controlling for students' language proficiency on a national level should be introduced in order to maintain set standards and, secondly, to identify students to whom additional remedial language classes need to be given. Not everyone is cut out to learn several languages. In the case of severe difficulty in understanding a second language, certain students should be absolved from the requirement to do so. A complementary strategy should be directed at introducing foreign language instruction at the preschool level. Informal language learning should be strongly promoted in order to raise language skills among students and pupils. Broadcasting educational programs for children (for example, on TV) is one such method and a very cost-effective one because it encourages children to pick up language skills in a relaxed, fun atmosphere that requires virtually no effort from them. They learn without knowing that they are learning.
- Controlling for the qualifications and employment procedures of teachers. Teachers teaching in a foreign language often lack appropriate qualifications; therefore, it is worth considering introducing a university-level subject in preparing for teaching a foreign language if such does not exist yet. Moreover, second-language proficiency should be certified before job entrance. In-job training in second-language teaching is also recommended.
- Adapting policy interventions to school needs. Critical in lower-quality schools is the need to adapt the curriculum and carefully monitor students' needs. It is also worth thinking about courses and motivation measures for teachers to ensure that their competencies and desire to teach are high. Moreover, the inequitable distribution of school resources in smaller towns and villages, and a smaller range of extracurricular activities, should be given attention. In schools with average or below-average results, some forms of material support should be considered. In addition, campaigns encouraging parents to become involved in their children's education should be organized.

Jordan

- **Financial support for students and ensuring equal access to educational equipment.** In Jordan, the data show that people's socioeconomic situation is positively correlated with their educational outcomes and that access to computers is correlated with both outcomes and home resources. Because of the challenges of COVID-era remote learning, varying socioeconomic backgrounds and access to computer technology may very well result in a further widening in achievement gaps.
- **Improving school standards.** In Jordan, the difference in performance between students in public and private schools is significant. Even after accounting for socioeconomic background and other indicators, students attending private schools achieve higher scores. This result indicates that public schools need improvement basically across the board. A dedicated research program to pinpoint the main differences between public and private schools is recommended before any interventions are undertaken.
- **Adapting policy interventions to school needs**. Low-achieving schools require a revised curriculum and greater reliance on research-based teaching approaches that are adapted to the special needs of low-achieving students. Attention should also be paid to teachers' and students' absences and to teachers' working conditions. In middle-performing schools, the focus should be mainly on parental support when dealing with students' absences. Good school-parent relations are vital in reducing absenteeism, especially when there are no deep causes, such as domestic violence or extreme poverty. Students in high-performing schools need additional social support and would benefit from competing more (various competitions can be used as a motivational element).
- **Implementing and enforcing anti-bullying policies** is an essential challenge that faces the educational system in Jordan (and in Lebanon as well). In designing these policies, students need to be brought in, consulted, listened to, and made to feel that they are at the very center of any anti-bullying program because giving them a sense of solidarity and self-worth, and a foundational understanding of their undeniable rights, is one of the critical empowerment steps in the fight against school violence. Raising national awareness about the detrimental effects of bullying is also of paramount importance. Mass media campaigns should be designed and used to accomplish this aim. To achieve maximal coverage and reception, the campaigns should involve not only national authorities but also well-known individuals who have the ear of the public. In-school actions should be directed at the class level since this is the level where most bullying behavior occurs.

Through quantitative research using PISA and TIMSS data, this study has identified many of the critical problems in the Lebanese and Jordanian educational systems. Appropriate measures should be implemented to resolve the issues identified. The specific differences between the two focus countries – for example, in the language of instruction and the organization of their schools – requires the development of a separate set of policies for each national setting.

Finally, although the international large-scale assessment data provide extensive insights into the challenges and opportunities of the education systems of both countries, the same data also reveal research gaps that limit the scope of our understanding of the core issues underlying the observed achievement gaps. To deepen our understanding of the issues, student assessment and monitoring systems need to be strengthened by launching assessments at earlier grades, guiding teachers on using assessments to improve teaching and learning, and establishing targeted research studies to better explain the most significant achievement gaps. Improving the overall effectiveness of the school systems in both countries will also require developing an evidence base to promote research-based teaching methods and to include them in teacher professional development.

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ANNEX: DETAILED RESULTS FOR REGRESSION AND DECOMPOSITION ANALYSES

TABLE A1: A COMPARISON OF REGRESSION MODELS FOR JORDAN, LEBANON, AND THE OECD AVERAGE

Variable		Jordan	Lebanon	OECD Average	Jordan	Lebanon	OECD Average
ESCS	Coef.	**12.59**	**17.52**	**30.14**	**12.13**	**17.11**	**29.11**
	S.E.	1.42	2.31	0.42	1.57	2.57	0.43
emosups	Coef.	**9.63**	**15.76**	**6.97**	**6.80**	**7.45**	**4.94**
	S.E.	1.38	2.55	0.26	1.46	2.91	0.27
compete	Coef.	**4.62**	-0.31	0.37	**4.67**	0.60	**1.86**
	S.E.	1.34	2.00	0.32	1.54	2.02	0.33
gfofail	Coef.	**-5.88**	-1.45	**7.20**	**-7.04**	1.26	**4.41**
	S.E.	0.95	2.15	0.29	0.99	2.34	0.30
workmast	Coef.	**15.19**	**9.48**	**6.30**	**13.28**	**7.65**	**4.09**
	S.E.	1.32	2.38	0.33	1.34	2.71	0.33
percomp	Coef.	**-2.76**	**-5.73**	**-2.44**	**-3.27**	**-5.02**	**-1.18**
	S.E.	1.21	2.10	0.30	1.50	2.41	0.29
resilience	Coef.	1.32	**12.22**	0.31	0.59	**11.31**	0.10
	S.E.	1.22	2.95	0.36	1.37	3.42	0.34
attlnact	Coef.	**3.58**	**6.25**	**4.03**	2.28	**6.50**	**2.01**
	S.E.	1.28	2.09	0.32	1.25	2.01	0.34
repeat	Coef.	**-45.48**	**-98.09**	**-67.11**	**-37.15**	**-73.22**	**-47.02**
	S.E.	4.73	6.09	1.13	6.93	8.46	1.30
private	Coef.	**14.77**	**27.79**	**8.24**	**16.89**	**38.90**	**7.39**
	S.E.	5.06	6.39	1.33	5.27	6.81	1.27
staffshort	Coef.	1.50	-6.19	**-1.48**	1.75	-3.67	**-1.38**
	S.E.	1.89	3.17	0.47	1.65	3.52	0.48
teachbeha	Coef.	**-5.06**	-1.40	0.73	**-5.13**	-0.80	1.07
	S.E.	1.85	2.88	0.60	1.55	3.33	0.58
female					**26.05**	**15.47**	**18.24**
					4.10	3.84	0.64
firstgen					-3.69	14.70	**12.97**
					5.57	15.46	1.82
secondgen					-5.08	**28.46**	**21.75**
					3.85	7.51	1.35
grade_below					-4.98	**-29.30**	**-20.85**
					6.26	8.41	1.20
grade_above					0.00	10.70	**25.73**
					0.00	6.60	1.21
effort2					**5.15**	**8.08**	**8.55**
					0.97	1.11	0.26
r2		0.27	0.46	0.19	0.28	0.51	0.23

Source: Own analysis using PISA 2018 microdata. Notes: ESCS - economic, social and cultural status; emosups - emotional support; compete - attitudes toward competition; gfofail - fear of failure; workmast - motivation to master tasks; resilience - self-efficacy; repeat - grade repetition; teachbeha - teacher behavior hindering learning; effort2 – effort to complete the test.

TABLE A2: A COMPARISON OF THE REGRESSION MODELS WITH SELECTED VARIABLES FOR JORDAN, LEBANON, AND THE OECD AVERAGE

Variable		Jordan	Lebanon	OECD Average	Jordan	Lebanon	OECD Average
ESCS	Coef.	**12.25**	**17.79**	**30.20**	**11.78**	**17.48**	**29.09**
	S.E.	1.39	2.35	0.41	1.57	2.56	0.41
emosups	Coef.	**8.91**	**15.86**	**7.46**	**5.64**	**8.49**	**5.16**
	S.E.	1.28	2.44	0.27	1.31	2.80	0.27
compete	Coef.	**4.94**	-0.46	0.08	**5.27**	0.23	**1.85**
	S.E.	1.41	2.00	0.31	1.61	2.05	0.32
gfofail	Coef.	**-6.32**	-1.63	**7.20**	**-7.45**	0.89	**4.40**
	S.E.	0.89	1.97	0.28	0.95	2.25	0.29
workmast	Coef.	**15.33**	**10.08**	**6.81**	**13.02**	**7.84**	**4.30**
	S.E.	1.26	2.28	0.32	1.27	2.61	0.32
resilience	Coef.	1.97	**11.74**	0.29	0.66	**11.00**	0.09
	S.E.	1.21	2.77	0.35	1.30	3.25	0.33
repeat	Coef.	**-45.11**	**-98.83**	**-67.86**	**-37.97**	**-71.54**	**-47.48**
	S.E.	4.71	5.82	1.12	6.47	8.20	1.28
private	Coef.	**13.67**	**28.06**	**9.53**	**15.70**	**37.74**	**8.40**
	S.E.	5.13	6.28	1.36	5.26	6.76	1.28
teachbeha	Coef.	**-4.48**	-1.80	0.48	**-4.52**	-1.03	0.78
	S.E.	1.54	2.66	0.56	1.45	2.72	0.54
female	Coef.				**25.68**	**14.87**	**18.83**
	S.E.				4.15	3.68	0.62
firstgen	Coef.				-0.69	15.38	**13.83**
	S.E.				5.40	15.88	1.78
secondgen	Coef.				-4.55	**30.06**	**22.33**
	S.E.				3.63	7.44	1.28
grade_below	Coef.				-3.45	**-33.42**	**-21.08**
	S.E.				5.99	9.30	1.15
grade_above	Coef.				0.00	8.98	**26.02**
	S.E.				0.00	6.45	1.22
effort2	Coef.				**5.20**	**8.03**	**8.72**
	S.E.				0.97	1.12	0.24
r2		0.26	0.45	0.19	0.28	0.50	0.23

Source: Own analysis using PISA 2018 microdata. Notes: ESCS - economic, social and cultural status; emosups - emotional support; compete - attitudes toward competition; gfofail - fear of failure; workmast - motivation to master tasks; resilience - self-efficacy; repeat - grade repetition; teachbeha - teacher behavior hindering learning; effort2 – effort to complete the test

TABLE A3: THE OAXACA-BLINDER DECOMPOSITION FOR JORDAN AND LEBANON

	Variable		Jordan		Lebanon	
Endowments	female	Coef.	**-0.90**	-0.69	-0.35	-0.18
		S.E.	0.39	0.42	0.21	0.21
	ESCS	Coef.	**7.46**	**6.79**	**7.04**	**6.08**
		S.E.	0.84	0.82	1.04	1.08
	emosups	Coef.	**0.72**	**0.42**	1.06	-0.06
		S.E.	0.18	0.15	0.57	0.30
	compete	Coef.	**-2.68**	**-2.60**	-0.14	-0.04
		S.E.	0.68	0.79	0.58	0.65
	gfofail	Coef.	**-1.16**	**-1.39**	-0.32	0.18
		S.E.	0.19	0.22	0.36	0.42
	workmast	Coef.	**-5.43**	**-5.86**	**-0.96**	**-1.29**
		S.E.	0.53	0.65	0.38	0.51
	resilience	Coef.	-0.43	-0.19	**1.06**	0.26
		S.E.	0.32	0.39	0.49	0.43
	repeat	Coef.	0.21	0.07	**22.04**	**16.81**
		S.E.	0.3	0.28	2.82	2.52
	private	Coef.	-0.59	-0.74	**-11.14**	**-15.28**
		S.E.	0.35	0.42	2.49	2.84
	teachbeha	Coef.	**1.39**	**1.62**	-0.06	-0.10
		S.E.	0.60	0.72	0.21	0.29
	effort2	Coef.	-	**-0.79**	-	**9.96**
		S.E.	-	0.23	-	1.58
	total	Coef.	-1.42	**-3.36**	**18.24**	**16.33**
		S.E.	1.42	1.57	5.55	5.74

	Variable		Jordan		Lebanon	
Coefficients	female	Coef.	-4.16	-3.12	2.22	2.28
		S.E.	2.21	2.25	1.72	2.02
	ESCS	Coef.	**-11.22**	**-10.43**	**-5.02**	**-3.26**
		S.E.	1.18	1.35	1.14	1
	emosups	Coef.	0.06	0.03	0.52	-0.09
		S.E.	0.12	0.08	0.35	0.14
	compete	Coef.	**-1.69**	**-1.74**	0.53	0.62
		S.E.	0.74	0.86	0.62	0.73
	gfofail	Coef.	**-2.20**	**-2.33**	**-1.29**	-0.64
		S.E.	0.26	0.29	0.41	0.45
	workmast	Coef.	**-3.01**	**-3.99**	-0.35	-0.61
		S.E.	0.47	0.62	0.25	0.45
	resilience	Coef.	-0.35	-0.18	0.70	-0.14
		S.E.	0.37	0.46	0.43	0.43
	repeat	Coef.	**-1.82**	**-1.96**	**9.80**	**7.27**
		S.E.	0.49	0.51	2.21	2.02
	private	Coef.	-1.6	-1.71	**-11.29**	**-17.31**
		S.E.	1.15	1.26	3.71	4.10
	teachbeha	Coef.	**1.9**	**2.15**	0.10	-0.04
		S.E.	0.74	0.83	0.28	0.20
	effort2	Coef.	-	**33.75**	-	4.82
		S.E.	-	9.36	-	9.08
	constant	Coef.	**74.31**	**39.23**	**105.75**	**88.95**
		S.E.	4.05	11.23	5.35	11.47
	total	Coef.	**50.22**	**49.7**	**101.67**	**81.85**
		S.E.	2.27	2.36	3.48	3.18

	Variable		Jordan		Lebanon	
Interaction	**female**	Coef.	0.24	0.16	-0.09	-0.05
		S.E.	0.17	0.16	0.08	0.08
	ESCS	Coef.	**10.76**	**10.34**	**4.71**	**3.20**
		S.E.	1.16	1.36	1.09	1
	emosups	Coef.	-0.07	-0.03	-0.59	0.03
		S.E.	0.13	0.1	0.37	0.13
	compete	Coef.	**1.62**	**1.65**	-0.5	-0.57
		S.E.	0.7	0.81	0.58	0.67
	gfofail	Coef.	**2.06**	**2.22**	**1.21**	0.60
		S.E.	0.25	0.29	0.39	0.42
	workmast	Coef.	**3.05**	**3.95**	0.37	0.60
		S.E.	0.48	0.62	0.26	0.44
	resilience	Coef.	0.32	0.16	**-1.02**	-0.26
		S.E.	0.33	0.41	0.47	0.43
	repeat	Coef.	0.09	0.04	**-7.06**	**-5.04**
		S.E.	0.13	0.16	1.72	1.51
	private	Coef.	0.26	0.34	**7.61**	**11.84**
		S.E.	0.24	0.31	2.53	2.85
	teachbeha	Coef.	**-1.58**	**-1.80**	0.07	0.15
		S.E.	0.65	0.75	0.25	0.29
	effort2	Coef.	-	**-0.55**	-	0.73
		S.E.	-	0.17	-	1.38
	total	Coef.	**16.75**	**16.48**	4.72	**11.24**
		S.E.	1.60	1.90	4.41	4.24

Source: Own analysis using PISA 2018 microdata. Notes: ESCS - economic, social and cultural status; emosups - emotional support; compete - attitudes toward competition; gfofail - fear of failure; workmast - motivation to master tasks; resilience - self-efficacy; repeat - grade repetition; teachbeha - teacher behavior hindering learning; effort2 – effort to complete the test.

TABLE A4: DECOMPOSITION ANALYSIS COMPARING JORDAN AND LEBANON

	Variable		model1	model2
Endowments	female	Coef.	0.24	0.18
		S.E.	0.30	0.26
	escs	Coef.	**-5.14**	**-3.88**
		S.E.	1.29	1.01
	emosups	Coef.	-0.75	-0.41
		S.E.	0.43	0.56
	compete	Coef.	0.02	0.1
		S.E.	0.36	0.38
	gfofail	Coef.	-0.01	0.00
		S.E.	0.05	0.06
	workmast	Coef.	**2.26**	**2.95**
		S.E.	0.85	0.83
	resilience	Coef.	**3.66**	**4.16**
		S.E.	1.20	1.10
	repeat	Coef.	**16.66**	**21.6**
		S.E.	2.6	2.87
	private	Coef.	**-13.51**	**-10.1**
		S.E.	2.68	2.31
	teachbeha	Coef.	-0.48	-0.71
		S.E.	1.18	0.97
	effort2	Coef.	**11.2**	
		S.E.	1.76	
	total	Coef.	**14.17**	**13.89**
		S.E.	5.98	5.58

	Variable		model1	model2
Coefficients	female	Coef.	5.31	**6.30**
		S.E.	3.04	2.88
	escs	Coef.	**2.44**	**2.38**
		S.E.	0.92	1.03
	emosups	Coef.	-0.08	0.48
		S.E.	0.14	0.34
	compete	Coef.	1.77	**1.58**
		S.E.	0.92	0.78
	gfofail	Coef.	**1.56**	**0.87**
		S.E.	0.54	0.43
	workmast	Coef.	0.85	0.35
		S.E.	0.53	0.27
	resilience	Coef.	-0.13	0.63
		S.E.	0.40	0.40
	repeat	Coef.	**13.52**	**16.01**
		S.E.	2.74	2.87
	private	Coef.	**-12.98**	-7.17
		S.E.	4.85	4.46
	teachbeha	Coef.	0.09	-0.08
		S.E.	0.36	0.22
	effort2	Coef.	**-23.99**	
		S.E.	11.15	
	cons	Coef.	**49.71**	**31.44**
		S.E.	15.22	6.76
	total	Coef.	**38.07**	**52.79**
		S.E.	5.06	4.27

	Variable		model1	model2
Interaction	female	Coef.	0.16	0.12
		S.E.	0.23	0.19
	escs	Coef.	**2.03**	1.23
		S.E.	0.94	0.64
	emosups	Coef.	0.29	0.21
		S.E.	0.31	0.30
	compete	Coef.	0.91	**0.98**
		S.E.	0.51	0.5
	gfofail	Coef.	0.10	0.01
		S.E.	0.27	0.13
	workmast	Coef.	1.46	1.15
		S.E.	0.93	0.83
	resilience	Coef.	**-3.46**	**-3.59**
		S.E.	1.28	1.14
	repeat	Coef.	**-9.28**	**-11.31**
		S.E.	2.13	2.25
	private	Coef.	**7.84**	4.38
		S.E.	3.07	2.76
	teachbeha	Coef.	-1.57	-0.80
		S.E.	1.53	1.18
	effort2	Coef.	**-4.12**	
		S.E.	1.94	
	total	Coef.	-5.63	-7.60
		S.E.	5.08	4.44

Source: Own analysis using PISA 2018 microdata

Notes: ESCS - economic, social and cultural status; emosups - emotional support; compete - attitudes toward competition; gfofail - fear of failure; workmast - Motivation to master tasks; resilience - Self-efficacy; repeat - Grade repetition; teachbeha - teacher behavior hindering learning; effort2 – effort to complete the test

TABLE A5: REGRESSION OF STUDENTS' MATHEMATICS PERFORMANCE IN LEBANON, TIMSS 2015

	Males		Females	
	Coef.	*S.E.*	*Coef.*	*S.E.*
Home educational resources	**6.71**	**1.50**	**8.64**	**1.47**
Sense of school belonging	-0.89	1.40	-2.95	1.20
Access to computer	**33.46**	**8.82**	10.45	10.08
Less student bullying	**2.95**	**1.06**	2.16	1.21
Absent	**-33.07**	**7.33**	**-34.23**	**6.54**
No breakfast	-10.92	7.60	-3.84	5.13
No homework	-4.88	5.59	-8.38	4.21
Like learning mathematics	-0.02	1.81	-1.88	1.84
Engaging math teaching	-1.56	1.48	-0.65	1.42
Confident in mathematics	**11.38**	**2.07**	**12.20**	**1.50**
Value mathematics	-0.74	1.96	0.95	1.23
Constant	252.57	25.75	263.22	23.28

Source: Own calculations using TIMSS 2015 microdata

TABLE A6: REGRESSION OF STUDENTS' SCIENCE PERFORMANCE IN LEBANON, TIMSS 2015

	Males		Females	
	Coef.	*S.E.*	*Coef.*	*S.E.*
Home educational resources	**9.01**	**2.45**	**9.59**	**1.95**
Sense of school belonging	-2.35	1.81	-4.70	1.94
Access to computer	33.27	20.57	20.98	12.30
Less Student bullying	**3.43**	**1.71**	**4.00**	**1.83**
Absent	**-52.12**	**9.20**	**-42.90**	**8.30**
No breakfast	-11.53	10.38	-6.74	7.55
No homework	5.49	6.59	4.02	6.10
Like learning science	3.56	4.34	4.33	3.27
Engaging science teaching	-4.67	3.62	-3.04	3.44
Confident in science	**21.25**	**3.08**	**17.82**	**2.63**
Value science	1.83	2.54	1.55	2.15
Constant	58.15	45.40	101.64	33.47

Source: Own calculations using TIMSS 2015 microdata

TABLE A7: REGRESSION OF STUDENTS' MATHEMATICS PERFORMANCE IN JORDAN, TIMSS 2015

	Males		Females	
	Coef.	*S.E.*	*Coef.*	*S.E.*
Home educational resources	**9.42**	**1.86**	**10.22**	**1.53**
Sense of school belonging	-3.03	1.36	-4.16	1.31
Access to computer	**22.57**	**7.75**	**24.02**	**5.34**
Student bullying	**2.56**	**1.01**	2.20	1.18
Absent	**-38.78**	**6.61**	**-32.70**	**4.68**
No breakfast	4.75	5.35	2.45	3.91
No homework	-2.05	4.88	-1.72	2.84
Like learning mathematics	-1.69	1.66	**-4.56**	**1.64**
Engaging math teaching	-2.40	1.49	-0.98	1.55
Confident in mathematics	**15.81**	**1.36**	**19.61**	**1.35**
Value mathematics	3.09	1.54	0.40	1.01
Constant	135.62	25.86	157.90	21.98

Source: Own calculations using TIMSS 2015 microdata

TABLE A8: REGRESSION OF STUDENTS' SCIENCE PERFORMANCE IN JORDAN, TIMSS 2015

	Males		Females	
	Coef.	*S.E.*	*Coef.*	*S.E.*
Home educational resources	**13.54**	**1.59**	**13.01**	**1.29**
Sense of school belonging	**-3.06**	**1.02**	**-4.63**	**1.16**
Access to computer	**22.83**	**8.02**	**30.01**	**5.59**
Student bullying	**5.25**	**0.88**	**5.07**	**0.91**
Absent	**-42.74**	**6.29**	**-40.83**	**5.13**
No breakfast	**9.39**	**4.23**	4.81	3.92
No homework	-7.10	4.27	-0.34	2.83
Like learning science	**4.22**	**1.52**	0.08	1.26
Engaging science teaching	**-4.38**	**1.56**	-2.14	1.32
Confident in science	**14.34**	**1.30**	**13.90**	**1.29**
Value science	1.66	1.23	-0.91	1.24
Constant	94.85	26.23	186.16	19.45

Source: Own calculations using TIMSS 2015 microdata

ENDNOTES

1 The low values of PISA coverage index 3 can be attributed to 15-year-olds no longer enrolled in schools, being held back in primary schools, or excluded from the test because of a lack of proficiency in the test language, intellectual or physical disability, or remoteness and inaccessibility of their school. As evidenced by the OECD PISA 2018 report (OECD, 2019, p. 171) only 44 students were excluded in Jordan and only one in Lebanon.

2 An anchored test is a test that is linked to the scale of another (reference) test to ensure their comparability.

3 Countries included in the benchmark to scale TIMSS 2011 are Australia, Chile, Chinese Taipei, Finland, Hong Kong, Hungary, Indonesia, Israel, Italy, Japan, Jordan, Kazakhstan, the Republic of Korea, Lithuania, Malaysia, New Zealand, Norway, Qatar, Romania, Russia, Singapore, Slovenia, Sweden, Thailand, Turkey, United Arab Emirates, and the United States.

Countries included in the benchmark to scale TIMSS 2015 are Australia, Canada, Chile, Chinese Taipei, Georgia, Hong Kong, Hungary, Ireland, Israel, Italy, Japan, Jordan, the Republic of Korea, Lebanon, Lithuania, Malta, New Zealand, Norway, Qatar, Russia, Singapore, Slovenia, Sweden, Thailand, Turkey, United Arab Emirates, and the United States.

4 One year of instruction is roughly equivalent to 25–30 points on the PISA scale. This rule should be treated as a broad generalization that can be used only to assist understanding but not to draw firm conclusions (Woessmann, 2016).

5 An extremely detailed account of the methodology of calculating the HCI and LAYS indices is available in a report by Kraay (2018): *http://documents1.worldbank.org/curated/en/300071537907028892/pdf/WPS8593.pdf.*

6 PISA sampling design. See *https://www.oecd-ilibrary.org/docserver/58eda1bc-en.pdf?expires=1588336974&id=id&accname=guest&checksum=F3C65FE271AE05450F9E3578466E96E2*; and *https://www.oecd.org/pisa/data/pisa2018technicalreport/PISA2018%20TecReport-Ch-04-Sample-Design.pdf.*

7 TIMSS sampling procedure. See *https://timssandpirls.bc.edu/publications/timss/2015-methods/T15_MP_Chap3_Sample_Design.pdf.*

8 The demographic shifts (proportion of immigrants, gender, and age of student population) may lead to an overestimation or an underestimation of the outcomes and make it impossible to compare the results across the cycles of the assessments. Adjustment makes it possible to see the performance trend, assuming that the target population is the same each year (equalization up to 2018 is used).

9 Variables omitted: **percomp**, **attlnact**, and **staffshort**.

10 *https://educationendowmentfoundation.org.uk/evidence-summaries/teaching-learning-toolkit/repeating-a-year.*

11 *https://unesdoc.unesco.org/ark:/48223/pf0000243713.*

12 Previous PISA reports used a score-point difference equivalent to "years of schooling," which was estimated to be about 30 points on the PISA scale. However, the evidence from different countries shows that such estimates can vary from 10 to above 40 points on the PISA scale, and none of them is estimated in a way that assures a fully causal relationship between schooling and test results. Thus, in the PISA 2018 report, this equivalent is no longer used becauses there are "many difficulties involved in estimating the 'typical' progress of a 15-year-old student from one year to the next or from one grade to the next in an international study such as PISA" (OECD, 2019a, page 44).

13 Ibid.

14 Half of the examined schools were private.

15 This piece of research was a secondary analysis of the representative data collected in UNICEF's Multiple Indicator Cluster Surveys (MICS) and the national Demographic and Health Surveys (DHS). The sample was comprised of 178,393 children from 55 low- and middle-income countries.

16 The composite score for ECDI is created by summing the number of positive responses to yes/no questions given by caregivers. It thus ranges from 0 (the least optimal) to 10 (the most optimal) since there are 10 items on the scale.

17 According to the UNESCO Institute for Statistics, in 2016 the student-teacher ratio in Jordan ianwas 17.56. See *http://data.uis.unesco.org/Index.aspx?DataSetCode=EDULIT_DS&popupcustomise=true&lang=en.*

18 Public nurseries in most cases do not provide foreign language education.

19 *http://search.shamaa.org/PDF/Articles/KUJac/JacVol13No49Y2011/2JacVol13No49Y2011.pdf*.

20 It is a questionnaire completed by kindergarten teachers covering children's **physical health, well-being, social competence, knowledge, emotional maturity, language, cognitive development**, communication skills, and general knowledge, assessing children's developmental health as they enter grade 1.

21 *https://ourworldindata.org/coronavirus*.

22 Data for September 23, 2020 retrieved from *https://www.worldometers.info/coronavirus/country/lebanon*.

23 *www.drm.pcm.gov.lb*.

24 Fragment from a speech by the Minister of Education and Higher Education on cancelling the Brevet exam, Tele Liban, May 7, 2020. *https://twitter.com/TarekMMajzoub/status/1258428754390638592?ref_src=twsrc%5Etfw%7Ctwcamp%5Etweetembed%7Ctwterm%5E1258428754390638592%7Ctwgr%5E&ref_url=https%3A%2F%2Fwww.the961.com%2Flebanon-canceled-brevet-exams%2F*.

25 *https://teachers.gov.jo*.

26 *https://www.un.org.lb/library/assets/Energy.pdf*.

27 *https://www.arabnews.jp/en/middle-east/article_18387*.

28 *https://teachers.gov.jo*.

29 *https://www.gov.uk/government/publications/coronavirus-covid-19-cancellation-of-gcses-as-and-a-levels-in-2020/coronavirus-covid-19-cancellation-of-gcses-as-and-a-levels-in-2020*.