Bank of Israel
Research Department

Research and Policy Analysis Notes

Skills of Israel's Population by International Comparison: Initial Findings of the 2022–2023 PIAAC Survey

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Skills of Israel's population by international comparison:
Initial findings of the 2022–2023 PIAAC survey[1]

- The basic skills level of the Israeli population in 2022 was about 0.3 standard deviations lower than the OECD average in all skill domains—literacy, numeracy, and adaptive problem solving. The gap was particularly prominent in Arab society—roughly one full standard deviation relative to the OECD average.
- The skills gap between Israel and the OECD is marked, even though the composition of the Israeli population is young, educated, and oriented toward academic occupations—characteristics that are correlated with relatively high skill levels.
- Alongside the general decline in reading achievements globally in the past decade, the literacy gaps between Israel and the OECD average widened due to a marked decline in literacy skills among the Arab population. Numeracy skills remained virtually unchanged, and the gaps between Israel and the OECD average remained steady.
- A significant part of the skills differences between Israel and the OECD average are due to large gaps during childhood and adolescence, as shown by PISA test scores in secondary school. The high rate of those with post-secondary education in Israel is not reflected in closing the skills gaps relative to the OECD average.
- The skills of Israeli workers are lower than the OECD average, particularly in low-skill industries and occupations.

1. The PIAAC survey and its importance for economic analysis

The PIAAC (Programme for the International Assessment of Adult Competencies) survey is a large-scale and unique international project aimed at assessing the skills of adults (aged 16–65). It provides a uniform benchmark for international comparison of skills in various skill domains. In addition to enabling comparisons between countries, the periodic repetition of the survey every few years offers unique insights into the development of the skill levels of the national population over time. The assessments are conducted digitally and evaluate skills in a representative sample of the population. The test examines basic skills such as literacy (understanding texts and interpreting written information), numeracy (using and drawing conclusions from quantitative information), and adaptive problem-

[1] **Written by:** Sefi Bahar and Elad DeMalach.
The authors thank the staff of the senior division of education and society at the Central Bureau of Statistics for their assistance in accessing the data. Most of the analyses were made using the PIAAC Data Explorer, and the analyses that examined the population groups in Israel were conducted in the Central Bureau of Statistics research room.

solving (the ability to use technology to solve problems and the ability to perform complex tasks). The first cycle of the survey was conducted in OECD countries from 2011 to 2015.[2] Israel was surveyed from 2014 to 2015. The findings for Israel and their international comparisons were extensively analyzed in previous studies and policy papers by the Bank of Israel.[3] Recently, from 2022 to 2023, the second cycle of the survey was conducted in Israel and other OECD countries. This document presents preliminary analyses of the collected data.[4]

A prominent finding from the survey, highlighting the importance of improving the population's skills, is the strong correlation between the population's skills and labor productivity and the standard of living in the country (Figure 1).[5] Thus, the survey data provide policymakers with insights into the level of human capital in Israel relative to other countries, its development over time, and its potential for improvement. This information is crucial, since raising the level of human capital is one of the key means to improve labor productivity and the standard of living.

[2] A few countries that are not OECD members were examined in the first cycle in 2018.

[3] The following Bank of Israel publications made extensive use of the first cycle of the PIAAC survey: Bank of Israel (2016). "Estimating the Return on Skills of Workers in the Business Sector and in the Public Sector," *Fiscal Survey and Selected Research Analyses*; Bank of Israel (2016). "Basic Skills of Workers in Israel and Productivity in Economic Sectors," *Selected Research and Policy Analysis Notes*, No. 141; Bank of Israel (2017). "Is There a Gender Difference in the Basic Skills of Workers and in the Return on Those Skills in Israel?" *Selected Research and Policy Analysis Notes*, September; Yuval Mazar (2018). "Differences in Skill Levels of Educated Workers Between the Public and Private Sectors, the Return to Skills, and the Connection Between the Them: Evidence from the PIAAC Surveys," Discussion Paper Series 2018.01; Bank of Israel (2019). "Research Department Special Report: Raising the Standard of Living in Israel by Increasing Labor Productivity"; Bank of Israel (2019), "Differences in Worker Characteristics between Israel and Other OECD Countries Along the Wage and Skills Distribution, and an Examination of the Wage Premium on Human Capital," *Selected Research and Policy Analysis Notes*, September; Bank of Israel (2019), "Chapter 5: Productivity and Cognitive Skills of Israeli Workers: An International Comparison," Bank of Israel *Annual Report* for 2018; Mazar (2023), "Analyzing Wage Variance in Israel Relative to the OECD, Focusing on the Lower Part of the Wage Distribution," Discussion Paper Series 2023.18.

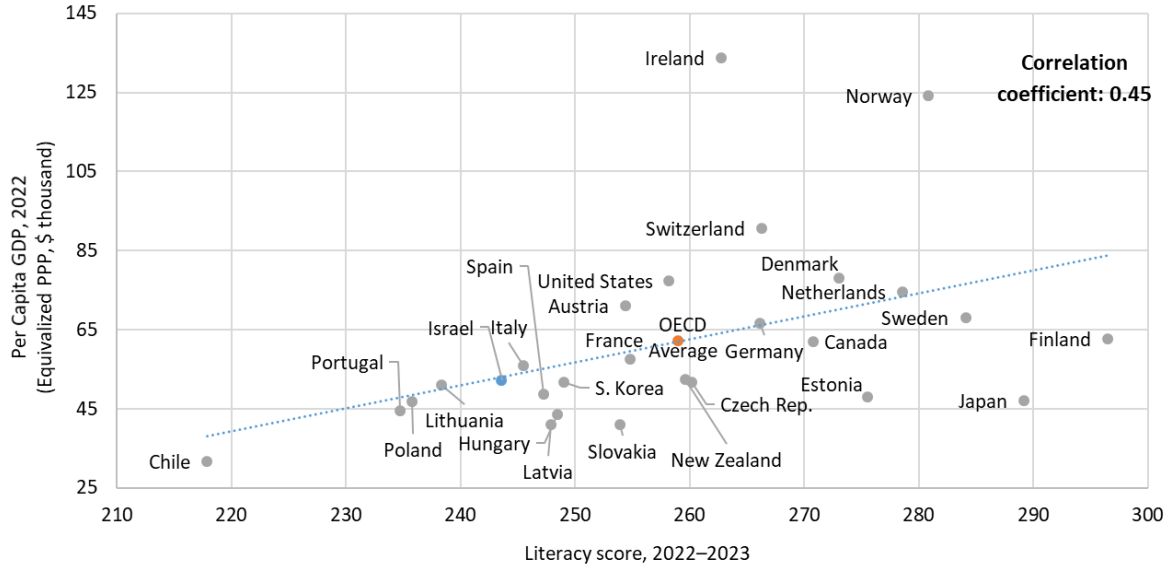
[4] In addition to the findings of the national report by the Central Bureau of Statistics (2024).

[5] This link is discussed extensively in the Bank of Israel's Productivity Report (2019), "Research Department Special Report: Raising the Standard of Living in Israel by Increasing Labor Productivity".

The test scores in the PIAAC survey in each field of knowledge ranges from 0 to 500. In some of the analyses, we chose to move from the original PIAAC grade scale to a **standard score** (Z-Score) scale and to present the differences in terms of standard deviations. The objective is to present the differences using a universal scale with a uniform measurement. The **average Z-Score** is the simple average of the Z-Scores in each field of knowledge, and it creates a general index of the individual's combined abilities in all three areas.

The international comparisons are in relation to the 28 OECD countries that were surveyed in the second cycle. Comparisons over time were made in relation to a sample of 24 OECD countries that, similar to Israel, were surveyed in both test cycles. More information is available in the technical appendix.

Figure 1 | Relationship Between the Country's Average Literacy Score and Per Capita GDP, OECD Countries, 2022–2023



Note: In the second cycle of the survey (2022–2023), the average literacy score was 260, and the standard deviation was 55 in the OECD.
SOURCE: Based on PIAAC.

2. Basic skills in Israel and in the OECD

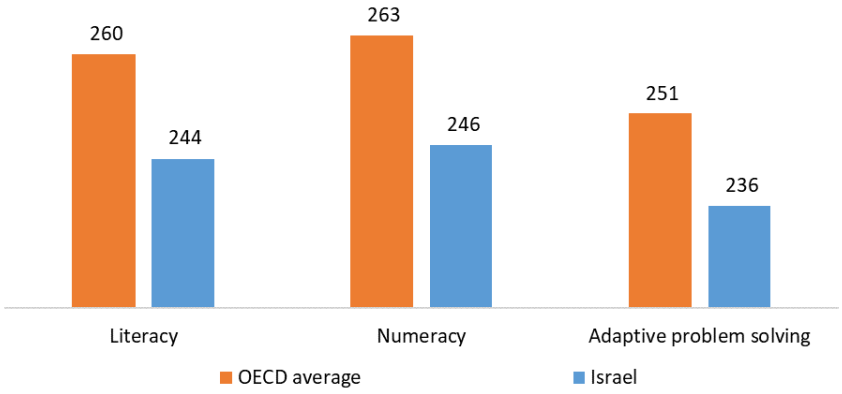
This chapter analyzes the gaps in basic skills between the adult population in Israel (ages 16–65) and the OECD average, and examines their development over the past decade. Figure 2 presents the scores of Israel and the average of 28 OECD countries in the three areas assessed by the PIAAC survey. Israel's scores are lower than the OECD average, with gaps of about 15 points (approximately 0.3 standard deviations) in all three areas. However, there is significant variation between different population groups. The skills scores in the Arab community are significantly lower than in the other population groups, with a gap of 45–60 points (about one standard deviation) from the OECD average. The scores in the *Haredi* (ultra-Orthodox) community are about ten points (0.2 standard deviations) lower than the OECD average, with smaller gaps in reading than in other domains. The scores of non-*Haredi* Jews are similar to the OECD average. This does not imply that the skill levels among non-*Haredi* Jews are satisfactory, especially since OECD countries also have distinct population groups (such as migrants, minority groups, and residents of peripheral areas) whose exclusion from the average calculation would likely raise it.

To deepen the analysis of the score gaps between Israel and the OECD, we compared the aggregate weighted score gaps, in terms of standard deviations, across different score percentiles in the assessment (Figure 3). The figure indicates gaps between Israel and the OECD at all score percentiles, with larger gaps for the population with lower scores.

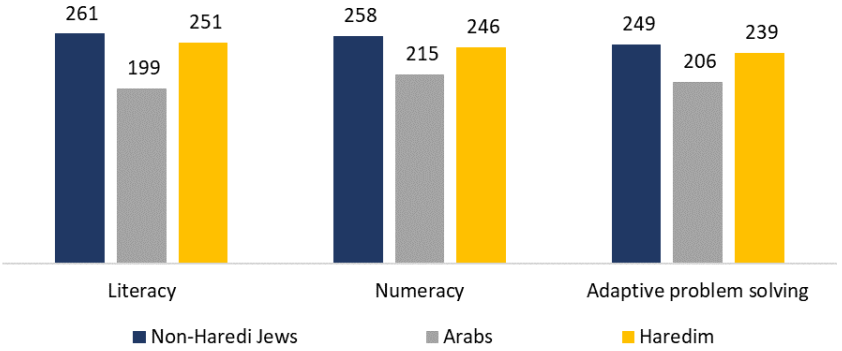
Figure 2 | Average Score in the Different Skill Domains

a. Israel compared to the OECD average, 2022–2023

Lines in the OECD columns represent the 25th–75th percentiles among the countries



b. Population groups within Israel, 2022–2023

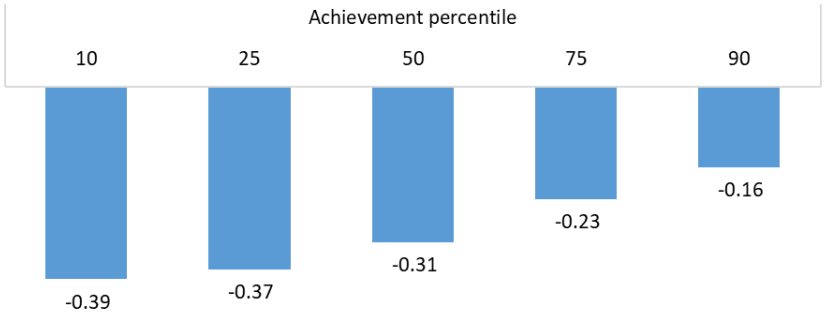


Note: In the OECD countries in the second cycle of the survey (2022–2023), one standard deviation is 55 points in literacy, 58 points in numeracy, and 47 points in adaptive problem solving.

SOURCE: Based on PIAAC.

Figure 3 | Gap Between Israel and the OECD in the Aggregate Average Weighted Skill Score by Achievement Percentiles, 2022–2023

In standard deviation terms



Note: The figure shows the gaps in literacy and numeracy. The gaps were equivalized in accordance with the standard deviation in the various fields of knowledge in the OECD, and are presented as the average between them. For more information on the method of calculating the aggregate weighted skill level and the standard deviation see the technical appendix.

SOURCE: Based on PIAAC.

Another comparison to the OECD average was based on the background characteristics of the population, divided into the following groups: gender, age group, education level of the examinees, and their parents' education level. The composition of the population in Israel differs from the OECD average: Israel has a younger, more educated population, and a higher proportion of second-generation individuals with higher education—characteristics correlated with higher PIAAC scores (Figure 4a). As a result, the actual achievement gaps between Israel and the OECD are smaller than the gaps that would have been observed if Israel's population composition were identical to that of the OECD (Figure 4b). Therefore, in analyzing the skill gaps based on individuals' background characteristics, we calculated the average gap between Israel and the OECD, adjusted for the aforementioned differences in population composition. Figure 5 highlights that **in all the segments examined, Israel's achievements are lower than the average of the corresponding group in the OECD, without significant heterogeneity**. Slightly larger gaps than the average were found among men, older adults, and those with secondary education.[6]

Figure 4a | Selected Characteristics as a Share of the Population

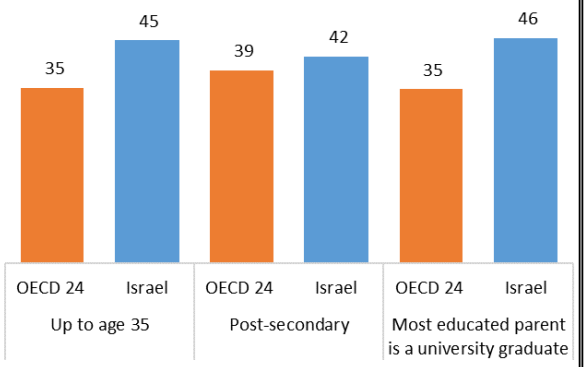
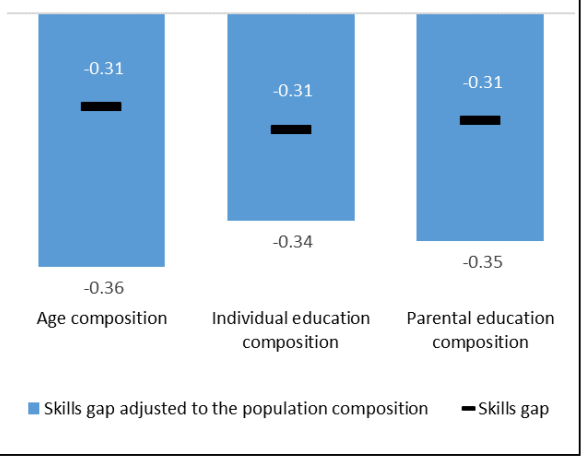


Figure 4b | Gap in the Aggregate Weighted Skill Score between Israel and the OECD, Regular and Adjusted to the Population Composition



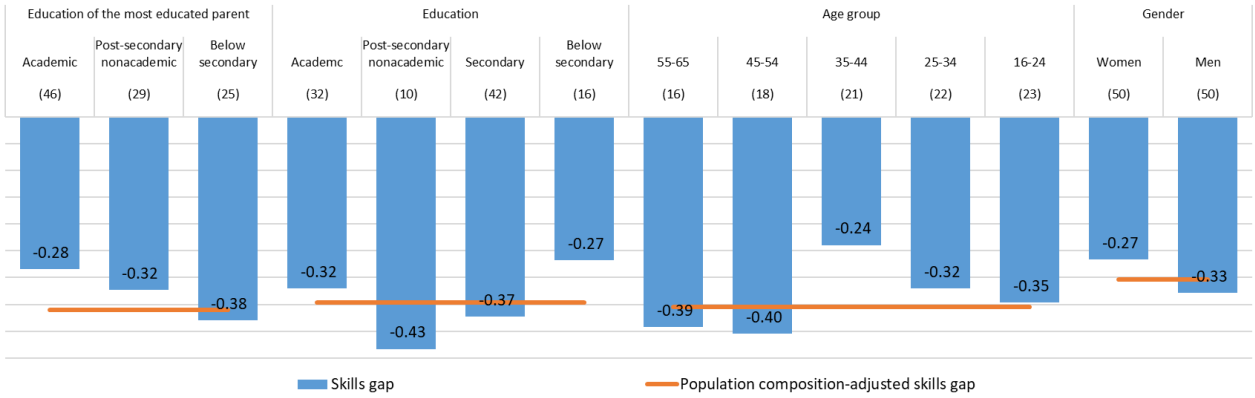
Notes: The graphs present the simple average of the gaps in scores in each of the three examined skill domains. The gap in each domain is in terms of the standard deviation of that domain among participants of the second cycle (2022–2023). Composition-adjusted gaps between Israel and the OECD are calculated with the literacy scores in Israel as the weighted average of the age, education, or parental education groups, assuming that the weight of each group is equal to its weight in the OECD. The average gap between Israel and the OECD changes slightly when it is examined relative to the 24 countries that participated in both cycles, and when the number of respondents changes since not all of them answered regarding the background variable. For more information on the method of calculating the aggregate weighted skill level and the standard deviation see the technical appendix.

SOURCE: Based on PIAAC.

[6] There was no significant change in the gaps relative to the OECD between the **post-secondary** education segment (as presented in Figure 5, including nonacademic frameworks) and the **academic** education segment.

Figure 5 | Average Gap between Israel and the OECD in the Aggregate Weighted Skill Score by Population Background Characteristics, 2022–2023

In standard deviation terms, group weight in parentheses, percent



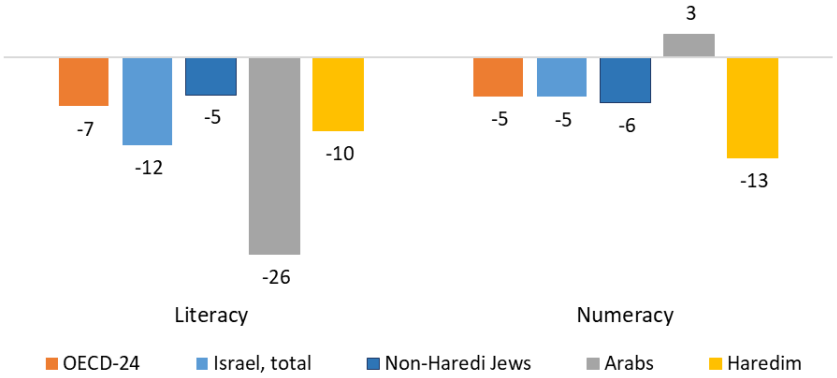
Note: The figure shows the gaps in relation to various population background characteristics. The orange line is the composition-adjusted gap, meaning that the scores in Israel are calculated as the weighted average for each age, gender, education, or parental education group, assuming that the weight of each group in the population is identical to its weight in the OECD. For more information on the method of calculating the aggregate weighted skill score and the standard deviation see the technical appendix.

SOURCE: Based on PIAAC.

The periodic repetition of the PIAAC survey allows for the identification of trends in skill development over time in the skill domains included in both cycles of the assessment (literacy and numeracy). Figure 6 presents these trends. In literacy, the gap in points between Israel and the OECD has widened, particularly due to a significant decline in reading skills within the Arab population (a decline of 26 points, which is about half a standard deviation). There was also a decline in the *Haredi* community, while the change in scores among non-*Haredi* Jews was similar to the change in the fixed sample of OECD countries. The decline in reading achievements in the Arab community has also been documented since the end of the previous decade in PISA tests among 15-year-old students.[7] In numeracy, the decline in Israel's achievements was noticeable only in the *Haredi* community, while the achievements of non-*Haredi* Jews decreased only slightly, similar to the decline in the OECD average.

[7] Reading achievements among Arabic speakers in the PISA tests were 400 points in 2012 and 391 points in 2015. In contrast, the reading scores in 2018 and 2022 were much lower: 362 and 366 points respectively—a decline on the order of about 0.3 standard deviations. For more details, see RAMA (2019), "Results of the International Study—PISA 2018", and RAMA (2023), "PISA study 2022 (PISA), Numeracy, Sciences and ReadingL Situation of 15-year-old Students".

Figure 6 | Change in Literacy and Numeracy Scores between the First (2011–2015) and Second (2022–2023) Cycles
Population groups in Israel and OECD average, in points

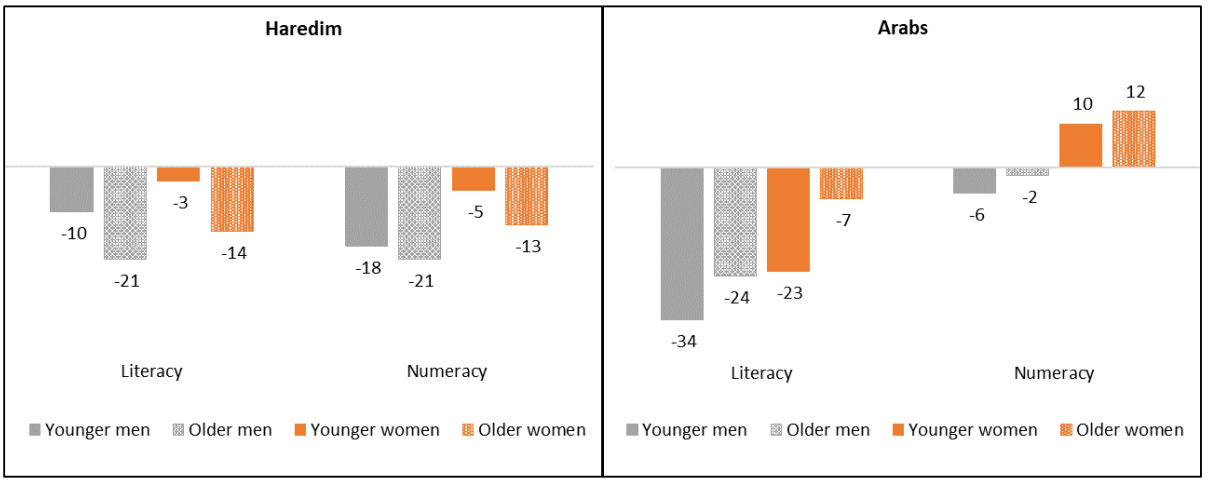


Note: OECD-24 includes the 24 countries that participated in both cycles of the survey. The difference between the first and second cycles is presented in point terms of the score in the examined subject. In the first cycle, the "adaptive problem solving" skill domain was not included. One standard deviation equals 55 points in literacy and 58 points in numeracy in the OECD countries in the second cycle of the survey (2022–2023).
SOURCE: Based on PIAAC.

To deepen the understanding of the changes in scores within the Arab and *Haredi* communities, Figure 7 shows the changes in scores between the survey waves, divided by gender and age groups (16–44 and 45–64). In both the *Haredi* and Arab communities, literacy declined for both genders, with a more significant decline among men. In the *Haredi* community, the decline in literacy was particularly notable in the older age group, while in the Arab community, it declined mainly in the younger age group. In numeracy, there was a noticeable decline in the *Haredi* community, while the increase in scores in the Arab community was primarily among women. Among young men in the Arab community, there was a very slight decline, similar to the decline observed among non-*Haredi* Jews.

Figure 7 | Change in Literacy and Numeracy Scores between the First (2011–2015) and Second (2022–2023) Cycles

By population, gender, and age groups in Israel, in points



Note: The difference between the first and second cycles is presented in point terms of the scores in the examined skill domain. Adaptive problem solving was not included in the first cycle. "Younger" is aged 16–44, and "Older" is aged 45–65. One standard deviation is 55 points in literacy and 58 points in numeracy in the OECD in the second cycle of the survey (2022–2023).

SOURCE: Based on PIAAC.

The analyses reveal significant score gaps between Israel and the OECD. An important policy question is: at what ages or life stages do these human capital gaps between Israel and the OECD emerge?

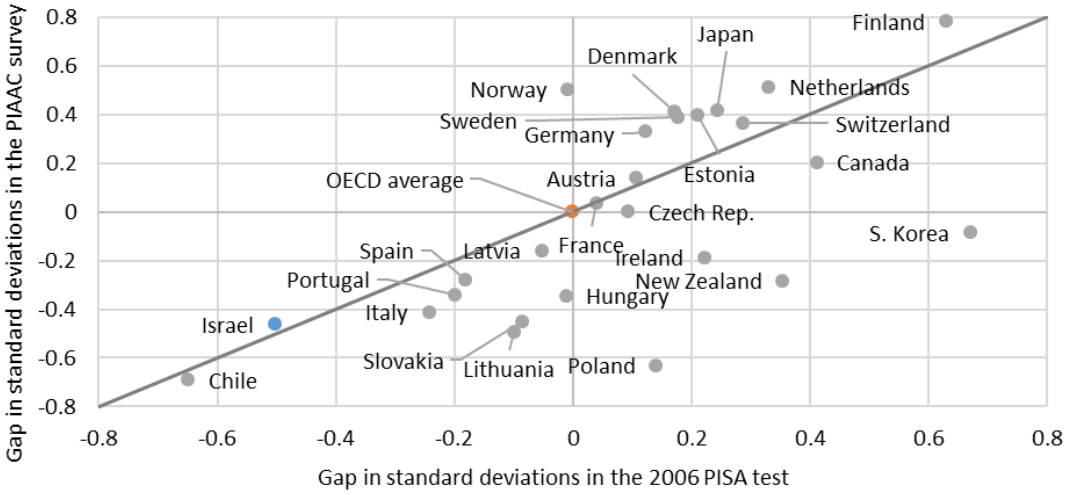
Figure 8 presents a scatter plot of the score gap between various countries and the OECD average in PISA tests compared to the skill gap in PIAAC for those born in the 1990s at age 15 (in PISA) and ages 25–34 (in PIAAC).[8] The figure shows a strong correlation between the score gaps of young people and those of adults across countries. The achievement gap between Israeli students and the OECD was significant at age 15 and remained high at ages 25–34 (the blue dot), with a magnitude of 0.4–0.5 standard deviations. This finding suggests that a significant portion of the gaps originates from early education stages. In a future Bank of Israel publication, we intend to address the gaps related to the education system between Israel and OECD countries, particularly the gaps in teacher skills.

[8] PISA tests are conducted in a large sample of countries, and examine the native-language literacy, numeracy, and science knowledge levels of 15-year-old students. In this chapter, the comparison is in relation to the average score gap in the OECD in literacy and numeracy levels compared with literacy and numeracy in the PIAAC. The test relies on PISA 2006 data, and includes countries that participated in both the PISA test and the most recent PIAAC survey. Limiting the PIAAC survey to those born in the country is intended to minimize deviations due to migration at older ages.

The skill gaps between Israel and the OECD are also evident among those with higher education (Figure 9a), with a high proportion of post-secondary graduates performing at low proficiency according to the OECD definition (level 1 and below). This high proportion does not necessarily indicate that the higher education system is ineffective or insufficiently selective in awarding degrees, as Figure 9b shows that among young people with higher education, the skill gaps relative to the OECD are smaller than the skill gaps among young people with secondary education. Another interesting finding is that in Israel, the percentage of graduates obtaining post-secondary education is relatively high, but the gap compared to OECD countries—which was about 10% in the first assessment cycle (2011–2015)—has significantly narrowed between the cycles, to only 3% in the second cycle (2022–2023).[9]

[9] A comparison relative to academic education only shows similar findings, with a positive gap of 2 percent in the rate of those with academic education in Israel in the second cycle, compared to 7 percent in the first cycle.

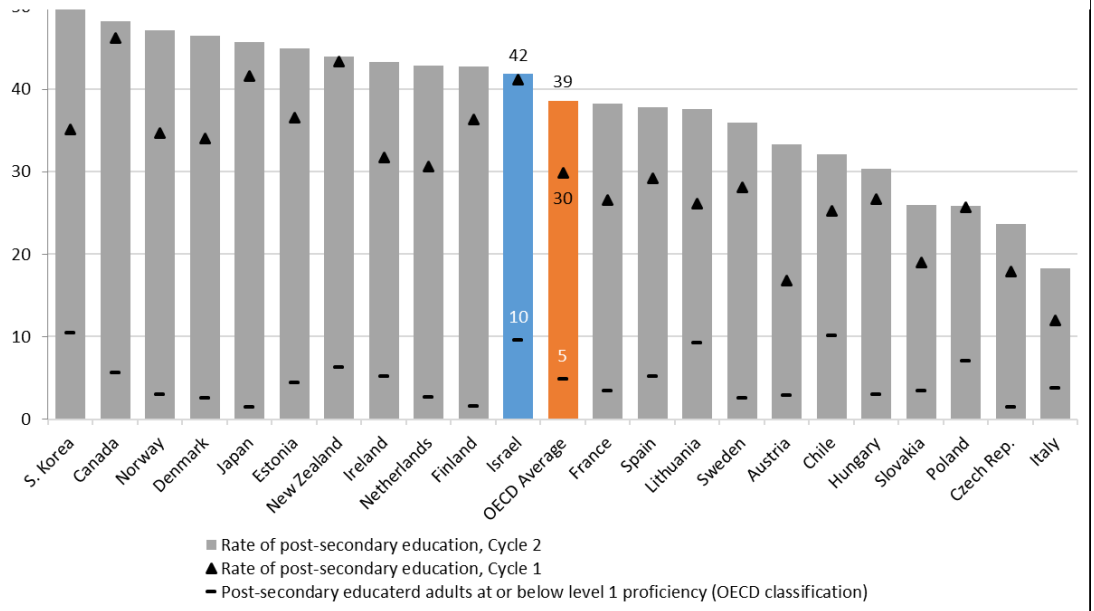
Figure 8 | Scores Gap Relative to the OECD Average for the 1990s Birth Cohort: At Age 15 on the PISA Test and at Age 25–34 in the PIAAC Survey



Note: OECD-24 includes the 24 countries that participated in both cycles of the survey. The difference between the first and second cycles is presented in point terms of the score in the examined skill domain. In the first cycle, the "adaptive problem solving" knowledge area was not included. One standard deviation equals 55 points in literacy and 58 points in numeracy in the OECD countries in the second cycle of the survey (2022–2023).

SOURCE: Based on PIAAC.

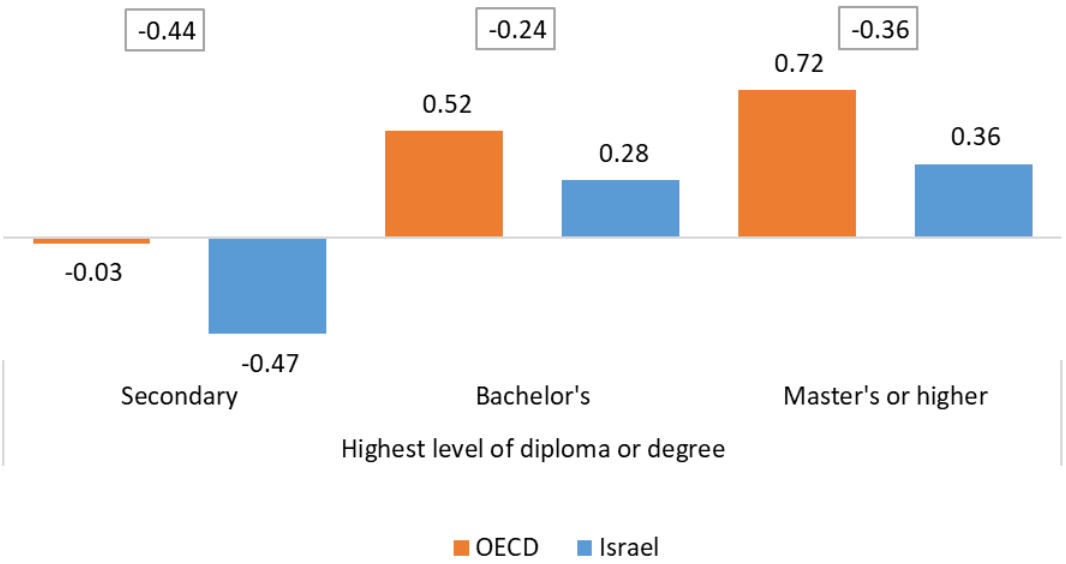
Figure 9a | Rate of Post-Secondary Education in Israel and the OECD in the First (2011–2015) and Second (2022–2023) Cycles



Note: The figure shows the rate of those with a post-secondary education at the ISCED 5 level or higher. The basic skills benchmark is defined by the OECD at a skill level of 2 or higher, and represents the required minimal knowledge level for an adult. Those who achieve less than this level are defined as at level 1 proficiency or below. The countries shown in the figure are those that had available education data in both survey cycles. The OECD average is calculated on the basis of these countries.

SOURCE: Based on PIAAC.

Figure 9b | Agregate Weighted Skills Score in Israel and the OECD by Highest Diploma, Aged 25–44, 2022–2023



Note: The numbers in the boxes are the gap in standard deviations between the Israeli average and the OECD average. The aggregate weighted skills score has an average value of zero and a standard deviation of 1 in all OECD countries, and aggregates three skill domains: literacy, numeracy, and adaptive problem solving. For more information on the method of calculating the aggregate weighted skill level and the standard deviation see the technical appendix.

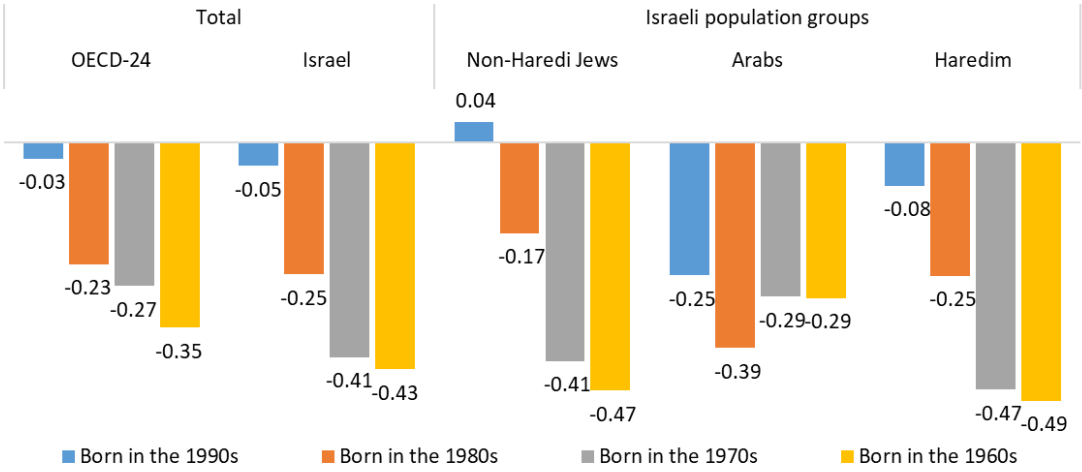
SOURCE: Based on PIAAC.

Another factor that may explain the skill gaps between Israel and the OECD is the greater erosion of adults' skills as they age. Combining the first and second cycles of the survey allows for examining the changes in achievements among birth cohorts over age and time (10 years in the OECD and 8 years in Israel). Figure 10 shows that in both Israel and the OECD, the skills of cohorts deteriorate with age. Among the younger cohorts (born in the 1990s), the trajectory of skills between the two survey waves in Israel was similar to their trajectory in the OECD. However, in the older cohorts (born in the 1960s, 1970s, and 1980s), skills in Israel declined more sharply than in the OECD (about 0.4 standard deviations compared to about 0.3 standard deviations, respectively). In the Arab population, unlike other populations, skill erosion over time is also noticeable in the youngest cohorts. This may be due to their relatively high representation in low-skill occupations, where skill erosion is relatively high.

In conclusion, the achievement gaps between Israel and OECD countries highlight major policy challenges in the field of human capital. The gaps that already emerge in the Israeli

education system at age 15 persist and are reflected in adult performance, while the high rate of higher education attainment in Israel is not reflected in closing the gaps between Israel and the OECD. These findings indicate the need to improve the Israeli education system and its ability to impart basic skills to its students. Additionally, the higher erosion of skills in the older population in Israel highlights the need to invest in lifelong learning and skill improvement, particularly through professional training at older ages, to equip individuals with relevant skills for the changing labor market.

Figure 10 | Changes Between the Survey Cycles (2011–2015 vs 2022–2023) in the Aggregate Weighted Skills Score in Standard Deviation Terms, for Fixed Age Cohorts, Israel and OECD



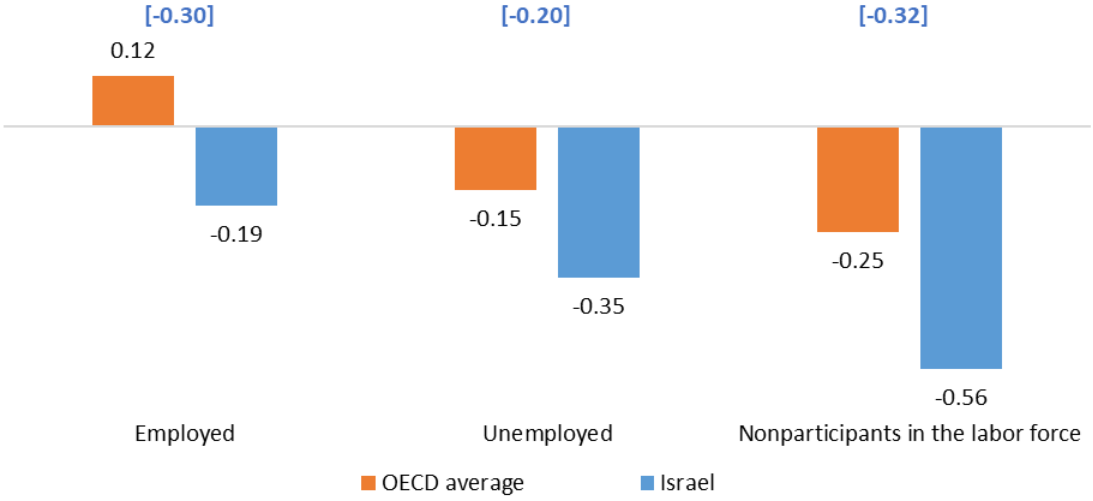
Note: The figure shows the difference in the aggregate weighted skills scores between the survey cycles in the domains of literacy and numeracy for those born in a fixed cohort. Due to data limitations, the calculation of the cohorts was proximate. For comparison purposes, those born in the 1980s were defined in the first wave as born between 1980 and 1989, and in the second wave as those born between 1978 and 1987. For more information on the method of calculating the aggregate weighted skill level and the standard deviation see the technical appendix.

SOURCE: Based on PIAAC.

3. Skill gaps in the labor market

This section analyzes the differences between Israel and other OECD countries in the skills of various labor market groups. To account for each skill domain, an aggregate weighted score is presented, which is the average of the standard scores (Z-score) in each field. (For details, see the technical appendix.) Figure 11 compares the skill levels of three different groups: the employed, the unemployed, and individuals not participating in the labor force. As expected, both in Israel and in the OECD, the employed group has the highest skill level, the unemployed have a lower skill level, and those not participating in the labor force have the lowest skill level. Interestingly, the smallest gaps between Israel and the OECD are found among the unemployed (0.2 standard deviations, compared to about 0.3 standard deviations in other groups), which may indicate that unemployment in Israel is mostly "frictional" and related to job transitions, as opposed to structural unemployment, which results from a mismatch between the skills of the unemployed and the jobs offered to them. This latter description likely characterizes only a small portion of the unemployed. This finding is consistent with the low unemployment rate in Israel, which stood at about 3% in the survey year (2022), compared to 4% in the OECD.

Figure 11 | Aggregate Weighted Skills Score by Labor Force Characteristics

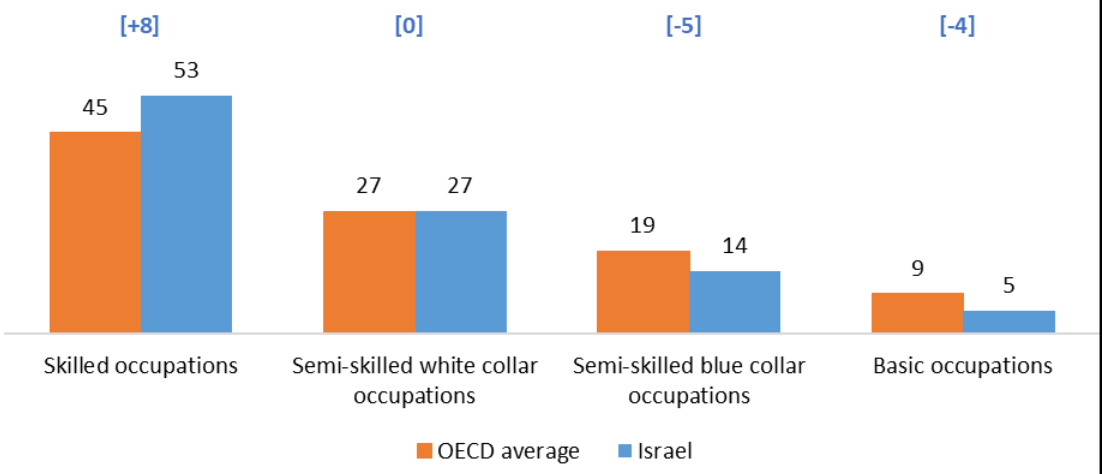


Note: The numbers in the brackets are the gap in standard deviations between the Israeli average and the OECD average. The aggregate weighted skills score has an average value of zero and a standard deviation of 1 in all OECD countries, and aggregates three skill domains: literacy, numeracy, and adaptive problem solving. For more information on the method of calculating the aggregate weighted skill level and the standard deviation see the technical appendix.

SOURCE: Based on PIAAC.

Skill differences in Israel were also examined across various occupational levels. Figure 12a shows that Israel has a high percentage of employees in high-skill occupations (53% compared to 45% in the OECD), which should give it an advantage in skill levels over other countries. However, a comparison of skills within occupational levels (Figure 12b) reveals significant skill gaps to Israel's disadvantage, particularly among "blue-collar" workers, with a gap of about half a standard deviation. The smallest gap, although still significant, is found among those in high-skill occupations (about 0.3 standard deviations). A more detailed look at occupations (Figure 12c) shows a strong negative correlation between the average skill level among those in the occupation (in the OECD) and the skill gap between Israel and the OECD (in absolute terms). This means that the largest skill differences between Israel and the OECD are in low-skill occupations.

Figure 12a | Occupation Level of Workers in Israel and in the OECD
Percent



Note: Occupation level as defined by the OECD, based on the international classification of occupations (ISCO-08). Skilled occupations include academic, free professions, and technical and administrative. Semi-skilled white collar occupations include clerks, sales, and services. Semi-skilled blue-collar occupations include professional workers in agriculture, construction, and manufacturing. Basic occupations include nonprofessional workers. The aggregate weighted skills score has an average value of zero and a standard deviation of 1 in all OECD countries, and aggregates three skill domains: literacy, numeracy, and adaptive problem solving. For more information on the method of calculating the aggregate weighted skill level and the standard deviation see the technical appendix.

SOURCE: Based on PIAAC.

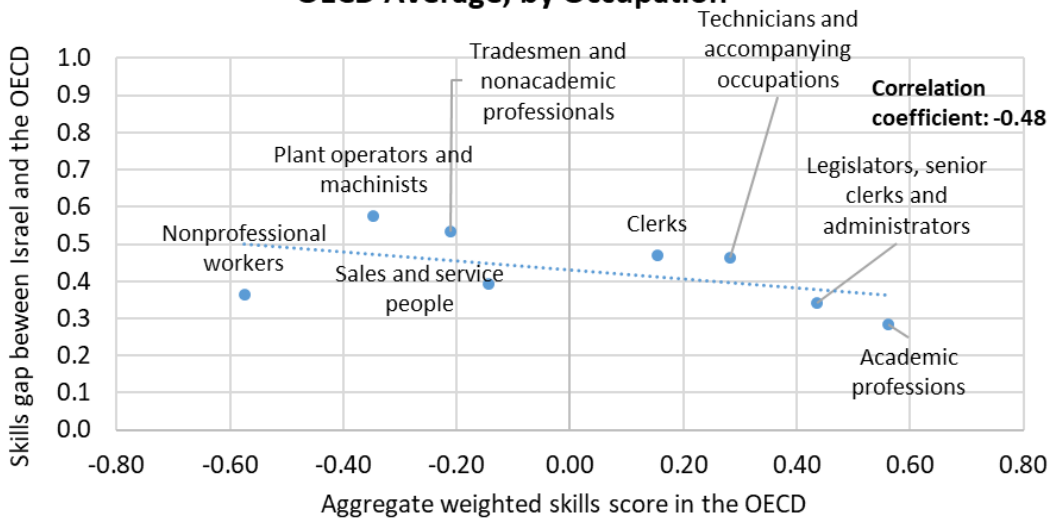
Figure 12b | Gap in the Aggregate Weighted Skills Scores between Israel and the OECD Average by Occupation

In standard deviation terms

Note: The aggregate weighted skills score has an average value of zero and a standard deviation of 1 in all OECD countries, and aggregates three skill domains: literacy, numeracy, and adaptive problem solving. For more information on the method of calculating the aggregate weighted skill level and the standard deviation see the technical appendix. Most of the gaps in the figure are larger (in absolute terms) than the average skills gap between israel and the OECD (0.3 standard deviations), since the composition of occupations in Israel tends toward the academic occupations (see Figure 12a). By a rough calculation, if the composition in israel were the same as in the OECD, the skills in Israel would be about 0.4 standard deviations lower than in the OECD.

SOURCE: Based on PIAAC.

Figure 12c | Correlation between the Aggregate Weighted Skills Score of Workers in the Occupation and the Points Gap between Israel and the OECD Average, by Occupation



Note: The aggregate weighted skills score has an average value of zero and a standard deviation of 1 in all OECD countries, and aggregates three skill domains: literacy, numeracy, and adaptive problem solving. The scores gap on the vertical scale is shown in absolute terms. For more information on the method of calculating the aggregate weighted skill level and the standard deviation see the technical appendix.

SOURCE: Based on PIAAC.

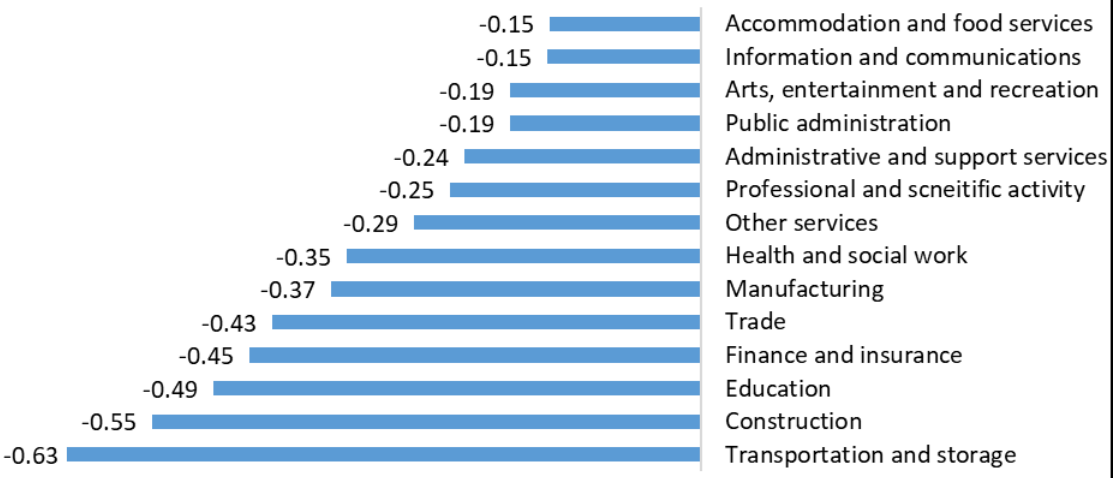
An examination of skill gaps by different industries (Figure 13a) shows that the high skill gaps between Israel and the OECD are primarily typical of employees in transportation, construction, trade, and education, while the skill gaps among employees in the information and communications industry are the lowest. These findings are consistent with those of the Bank of Israel (2016) based on the previous cycle of the PIAAC survey, which indicated that the proportion of unskilled workers is particularly high in nontradable industries with low productivity and a high reliance on cheap labor.

The significant skill gaps between the high-tech sector and the rest of the economy were also documented in the previous PIAAC cycle and extensively reviewed in Brand's (2018) study. Figure 13b indicates a negative correlation between the average skill level in an industry in the OECD (an approximation of the industry's prestige) and the gaps. This means that the skill gaps between Israel and the OECD are particularly high in low-prestige industries. However, an anomaly to this pattern is found in the education and financial services industries, which are typically held in high prestige globally and attract highly skilled individuals, yet the skill gaps in these industries between Israel and the OECD are significant—about one-third of a standard deviation. This finding aligns with previous PIAAC survey results on Israel's relatively low ranking in teacher skills.

No differences were found between the private and public sectors in the skill gaps between Israel and the OECD, as shown in Figure 14. In both sectors, the gap from the OECD average is about one-third of a standard deviation, similar to the gap in the overall population.

Figure 13a | Gap in the Aggregate Weighted Skills Score between Israel and the OECD Average, by Industry

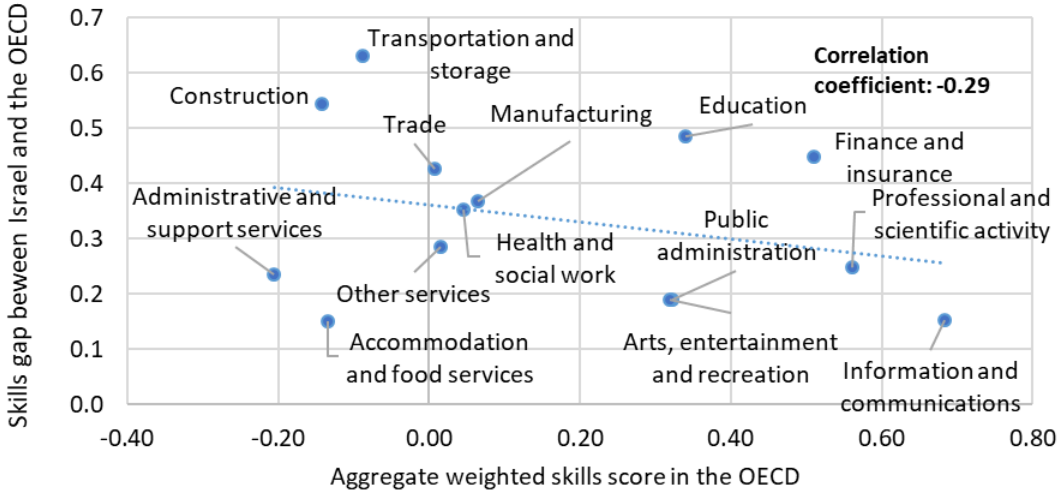
In standard deviation terms



Note: Based on the ISIC Revision 4 (2008) international industry classification. The aggregate weighted skills score has an average value of zero and a standard deviation of 1 in all OECD countries, and aggregates three skill domains: literacy, numeracy, and adaptive problem solving. For more information on the method of calculating the aggregate weighted skill level and the standard deviation see the technical appendix.

SOURCE: Based on PIAAC.

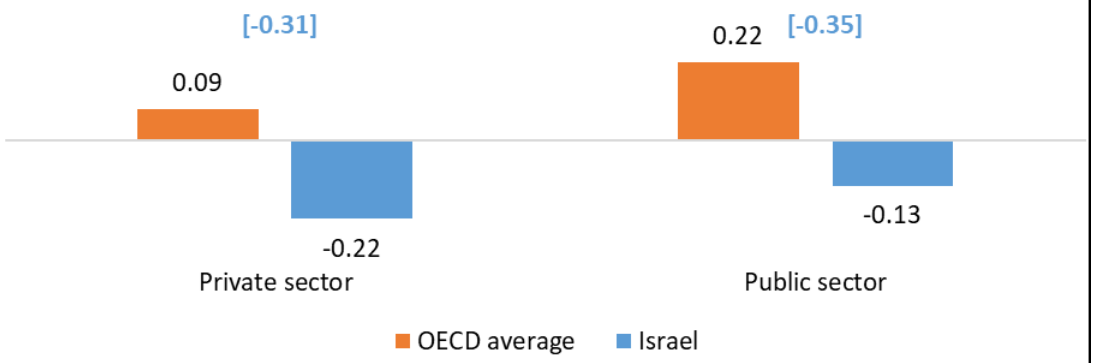
Figure 13b | Correlation between the Aggregate Weighted Skills Score of the Occupation and the Points Gap between Israel and the OECD Average, by Industry



Note: Based on the ISIC Revision 4 (2008) international industry classification. The aggregate weighted skills score has an average value of zero and a standard deviation of 1 in all OECD countries, and aggregates three skill domains: literacy, numeracy, and adaptive problem solving. The scores gap on the vertical scale is shown in absolute terms. For more information on the method of calculating the aggregate weighted skill level and the standard deviation see the technical appendix.

SOURCE: Based on PIAAC.

Figure 14 | Aggregate Weighted Skills Score by Sector, Israel and the OECD



Note: The numbers in the brackets are the gap in standard deviations between Israel and the OECD average. The aggregate weighted skills score has an average value of zero and a standard deviation of 1 in all OECD countries, and aggregates three skill domains: literacy, numeracy, and adaptive problem solving. For more information on the method of calculating the aggregate weighted skill level and the standard deviation see the technical appendix.

SOURCE: Based on PIAAC.

In conclusion, the skill gaps between Israeli workers and their counterparts worldwide are similar to the general skill gaps in the population, despite Israel having a higher proportion of individuals in academic professions. These skill gaps are widespread and significant across all labor market groups, but they are particularly pronounced in lower-prestige occupations ("blue-collar") and low-skill industries. This finding highlights the need to improve human capital and strengthen vocational training in these groups.

4. Technical appendix: Standard score and standard deviations in the PIAAC survey

The test scores in the PIAAC survey in each field of knowledge ranges from 0 to 500. In some of the analyses, we chose to move from the original PIAAC grade scale to a **standard score (Z-Score)** scale. The standard score reflects the gap between the score and the OECD average in terms of standard deviations. A positive value means that the score is higher than the OECD average, and a negative value means that the score is lower than the average.

The formula for calculating the standard score Z_{si} in knowledge field s for group i is:

$$Z_{si} = \frac{X_{si} - \mu_s}{\sigma_s}$$

The standard score makes it possible to examine skill differences between various groups based on the differences in the standard deviations. As such, it serves as a universal benchmark that does not depend on the original score scale. The standard scores also make it possible to average out scores in various skill domains and to move to an aggregate weighted score.

The aggregate weighted score (average Z-Score) is the simple average of the standard scores in each field of knowledge. It creates a general index of the individual's combined abilities in all three areas, and takes into account that the indices are adjusted to the average and the standard deviation in each field. Table A1 shows the raw scores and the standard scores in Israel and in the OECD.

$$\boldsymbol{Z_{Weighted} = \frac{Z_{Literacy} + Z_{Numeracy} + Z_{Problem\ Solving}}{3}}$$

	Literacy	Numeracy	Adaptive problem solving
Average score in Israel	244	246	236
Average score in the OECD	260	263	251
Standard deviation in the OECD	55	58	47
Average standard score (Z-score) in Israel	-0.30	-0.30	-0.31
Average standard score (Z-score) in the OECD	0	0	0
Gap between Israel and OECD in points	-16.4	-17.3	-14.5
Gap between Israel and OECD in standard deviations	-0.30	-0.30	-0.31
Average aggregate weighted Z-score in Israel	-0.30		
Average aggregate weighted Z-score in the OECD	0		