

Report card on Israel's education system

by Prof. Dan Ben-David

selected pages from forthcoming

Shoresh Handbook 2017

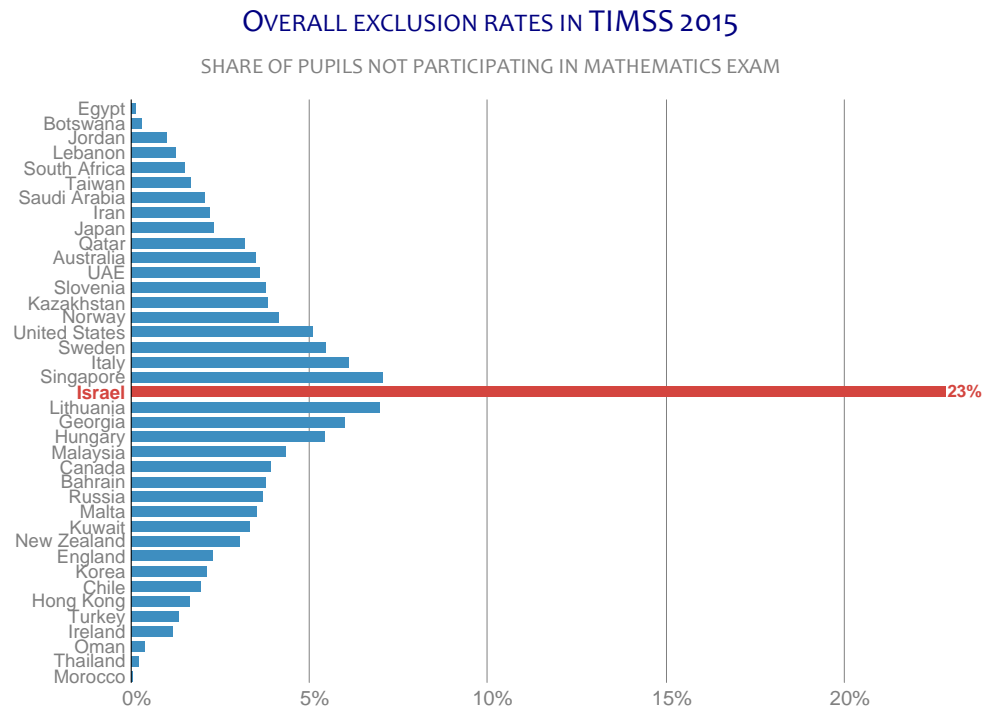
An outlier among nations – Israel excludes a huge share of its children

Completing 12 years of schooling is insufficient for graduating from high school in Israel. Graduation requires successfully passing matriculation examinations (*bagrut*, in Hebrew) in a host of subjects.

Israel's education system has required generations of 12th graders to take these matriculation exams – but it has never determined exam levels that are comparable over time. Thus, it is impossible to learn from the matriculation exams if the Israeli high schoolers' level of knowledge in required subjects is improving or deteriorating over time. The only way to attain any useful benchmarks is via international exams and the domestic Meitsav exams – though both provide incomplete information.

One major reason for the incomplete information – though not the only reason – is that these exams do not cover all of Israel's pupils and are therefore only partially representative. For example, Haredi boys – most of whom do not study the required material – are excluded from the exams.

The magnitude of the distortion in Israeli test scores can be intuited by the degree of disregard that the country has for international norms on exam coverage. In the TIMSS math and science exams, countries are allowed to exclude up to 5% of their pupils (such as special education pupils, or those living in far-flung rural areas). Nearly all participating countries abide by the rules. The huge outlier is Israel, excluding nearly a quarter of its children. Therefore, in the international comparisons that follow, there is a need to be aware of the misrepresentative Israeli samples that apparently provide better outcomes than would have been achieved otherwise, had a truly representative sample of children been tested.



Source: Dan Ben-David, Shoresh Institution and Tel-Aviv University

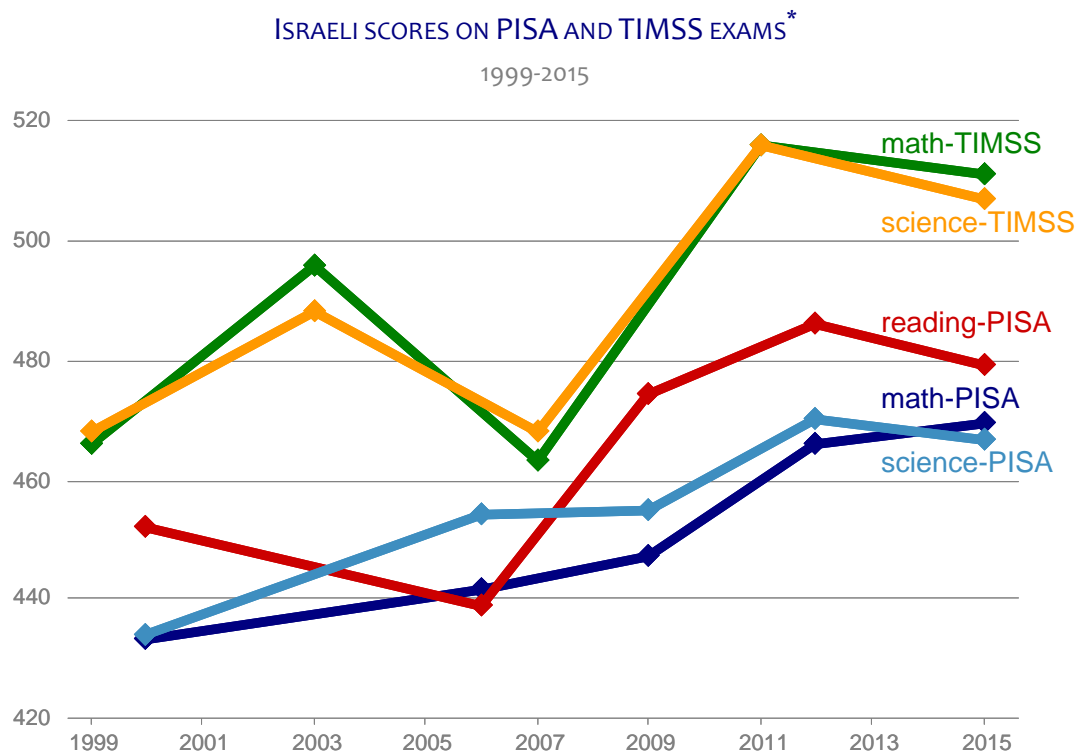
Data: TIMSS 2015

Relative improvement in scores compared to international means since late 1990s ...

Since the 1999 TIMSS exams, Arab Israeli pupils have been included in the national samples – though there is still a huge bias because of the exclusion of the large, and growing, share of Haredi pupils.

The two primary international exams administered since 1999 have been the TIMSS and PISA exams. Though Israel's TIMSS results tend to be consistently higher than the country's PISA results, both appear to indicate improvements over time.

While this is clearly a better outcome than the alternative, these two exams are not calibrated over time. Hence, all changes are relative to the overall means of 500 each year. There is no way of ascertaining from these results if there has been an absolute improvement in Israeli achievement over the past two decades – especially since the number of countries has grown from exam to exam, thereby affecting the value of the mean score (500) that all countries are compared to.



* PISA (15 year olds) and TIMSS (8th grade).

Source: Dan Ben-David, Shores Institution and Tel-Aviv University

Data: PISA and TIMSS

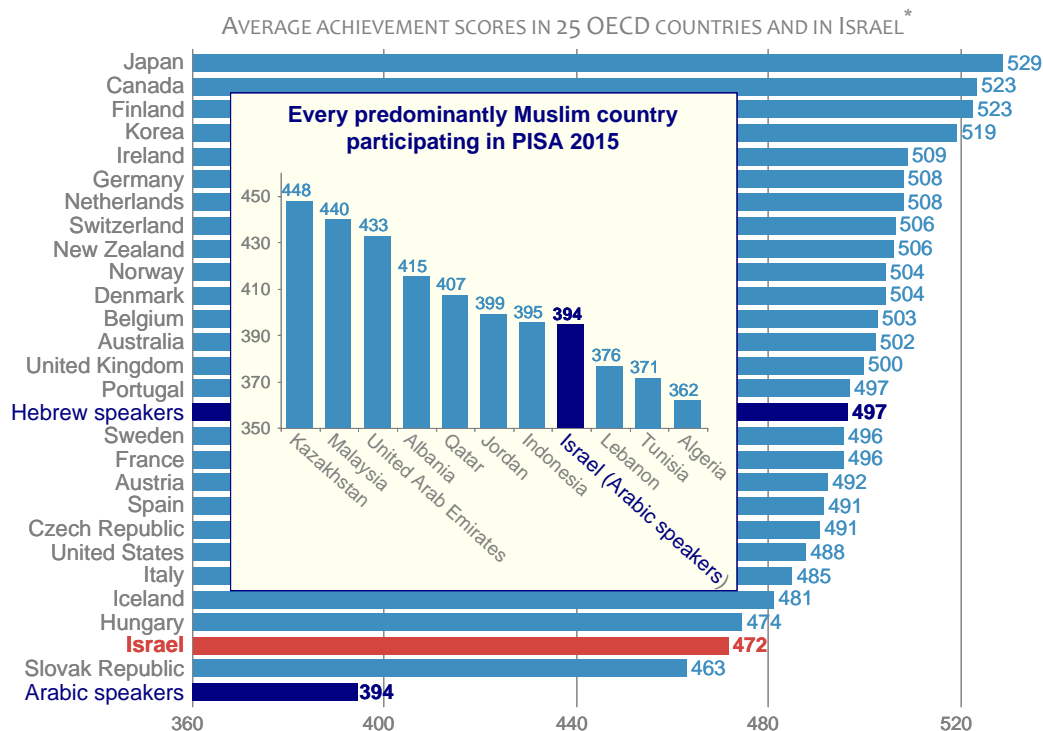
... and yet, still doing very poorly compared to developed world

While Israel's scores on the international exams have improved over the past two decades, they are still below those of 24 of 25 relevant developed countries. Since the Israeli sample does not include Haredi boys, who do not study the material, the actual national average – had it been measured – would probably be much lower.

In some respects, this comparison provides a glimpse of the future since these children from the various countries will one day have to compete with each other in the global marketplace, as adults – and this is how their nations are preparing them for that future. For small countries like Israel, who do not have the economies of scale to produce all of their needs and are even more reliant than the large countries on international trade, these outcomes are especially problematic.

Even without the Haredi boys, the average score of the remaining Jewish children are below most of the developed countries. The education that Israel provides to its Arabic-speaking children is below that in many Third World countries. In fact, Arab Israeli pupils attained a lower score than the average scores in most of the predominantly Muslim countries participating in the exam.

AVERAGE LEVEL OF EDUCATION IN DEVELOPED WORLD, PISA 2015



* National average in math, science and reading exams. Israeli examinees did not include Haredi boys.

Source: Dan Ben-David, Shoshon Institution and Tel-Aviv University

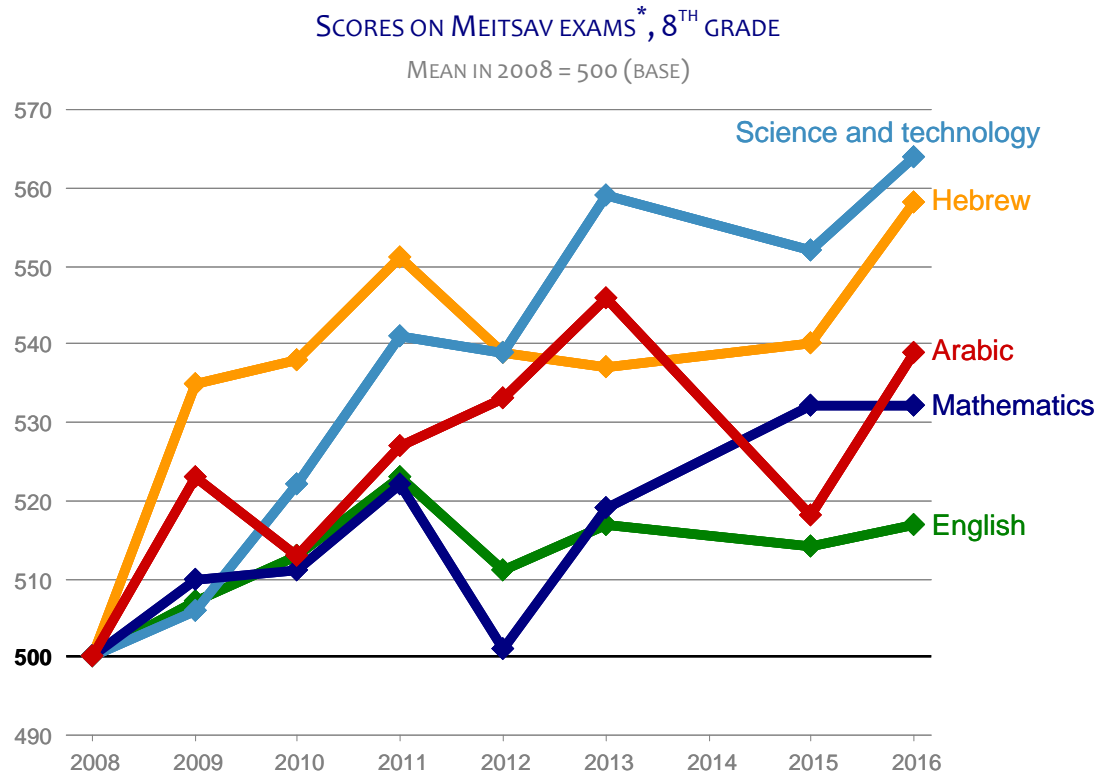
Data: PISA and Israel's National Authority for Educational Measurement and Evaluation

Actual improvement in 8th grade scores over past decade ...

In 2008, sixty years after attaining independence, Israel finally began administering a domestic exam that is calibrated over time. The benchmark for all years that followed is the 2008 mean score of 500. The exam is given to both 5th and 8th graders in a number of core subjects – including the native language of Arabic or Hebrew speakers.

In all areas and at both grade levels, the recent results are higher than those a decade ago. Once again, there is a need to keep in mind that a large – and growing – share of the pupils, Haredi boys, are not studying the material and are not being tested. So this apparent improvement at the national level needs to be taken with a grain of salt.

While there has been an improvement among the remaining children, these results do not provide any indication of how well the pupils actually know the material that they are supposed to know.



* Not including Haredi boys.

Source: Dan Ben-David, Shoresh Institution and Tel-Aviv University

Data: National Authority for Educational Measurement and Evaluation (RAMA)

... and yet, a very large share of the children still don't know the core material

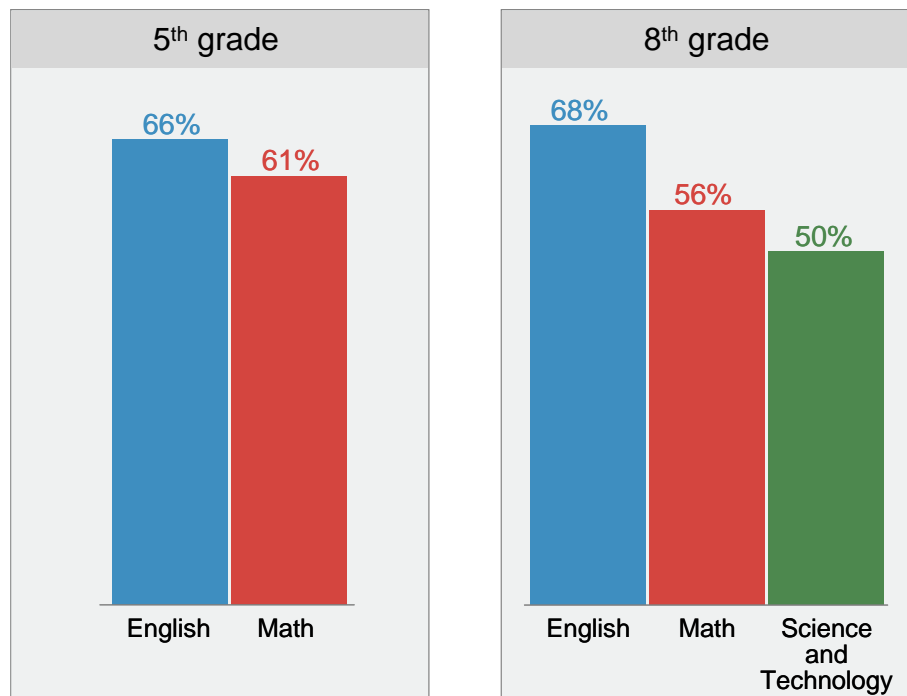
In addition to publishing the scores indexed to the 2008 base year of 500, the Meitsav exams also publish the actual scores of the pupils in each exam.

The highest scores were in the English exams. On average, the 5th and 8th grade pupils answered correctly on roughly two-thirds of the questions. The percent of correct responses is even lower in math: 61% in 5th grade and 56% in 8th grade math. In the case of the science and technology exam – which for some reason was administered to 5th graders in the past, but dropped in recent years – the 8th grade pupils managed to answer correctly on only half the questions. In short, if these were regular exams, grades in the 60s are barely passing while 56 and 50 are failing grades.

Aside from a nation of children apparently not knowing a sufficient share of the answers to questions on core subjects, it is not clear that the pupils are even being questioned on what they need to know at their respective grade levels.

Israel has never determined a specific core curriculum that all pupils at each grade level need to know. Therefore, these Meitsav exams are not really testing how well the pupils are familiar with the material required of them since this has never been formally specified.

PERCENT CORRECT RESPONSES IN MEITSAV EXAMS, 2016*



* Not including Haredi boys.

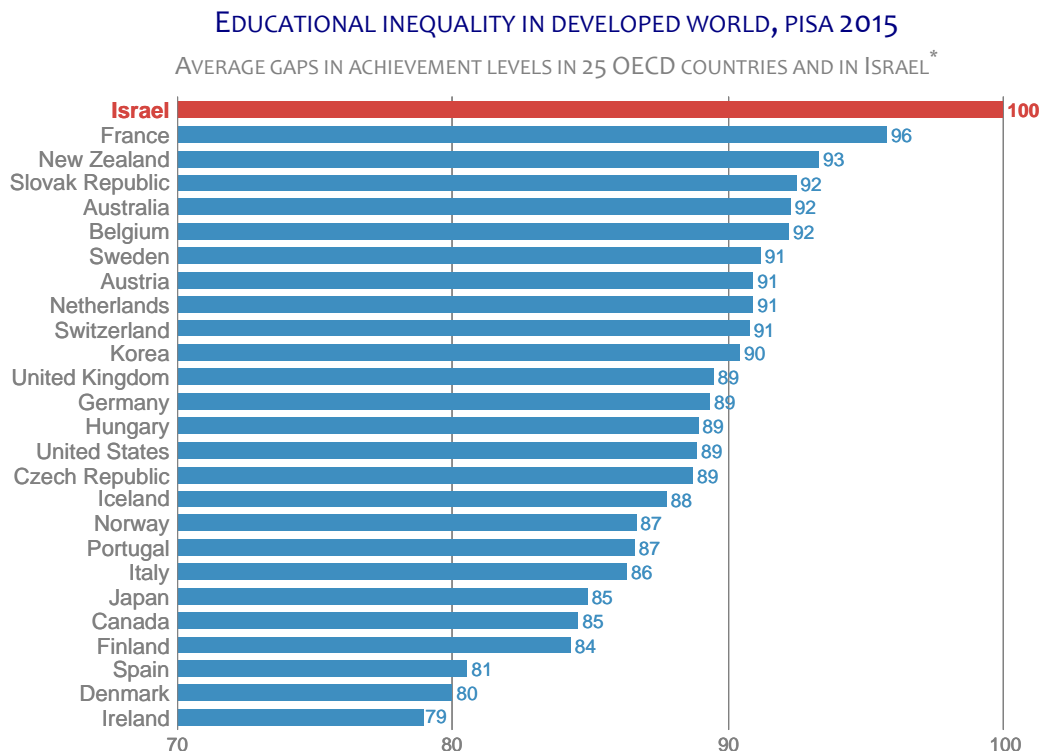
Source: Dan Ben-David, Shores Institution and Tel-Aviv University

Data: National Authority for Educational Measurement and Evaluation (RAMA)

Educational inequality within Israel is the highest in the developed world

While the average national achievements of Israeli children in core subject are low from both an absolute perspective and from a comparative international perspective, educational gaps among Israeli children are the highest in the developed world – and have consistently been at the developed world peak for decades.

Such inequality during the formative years cannot be conducive to reducing income inequality in subsequent adulthood.



* National average standard deviation in math, science and reading exams. Israel is the base (100). Israeli examinees did not include Haredi boys.

Source: Dan Ben-David, Shoresh Institution and Tel-Aviv University

Data: PISA

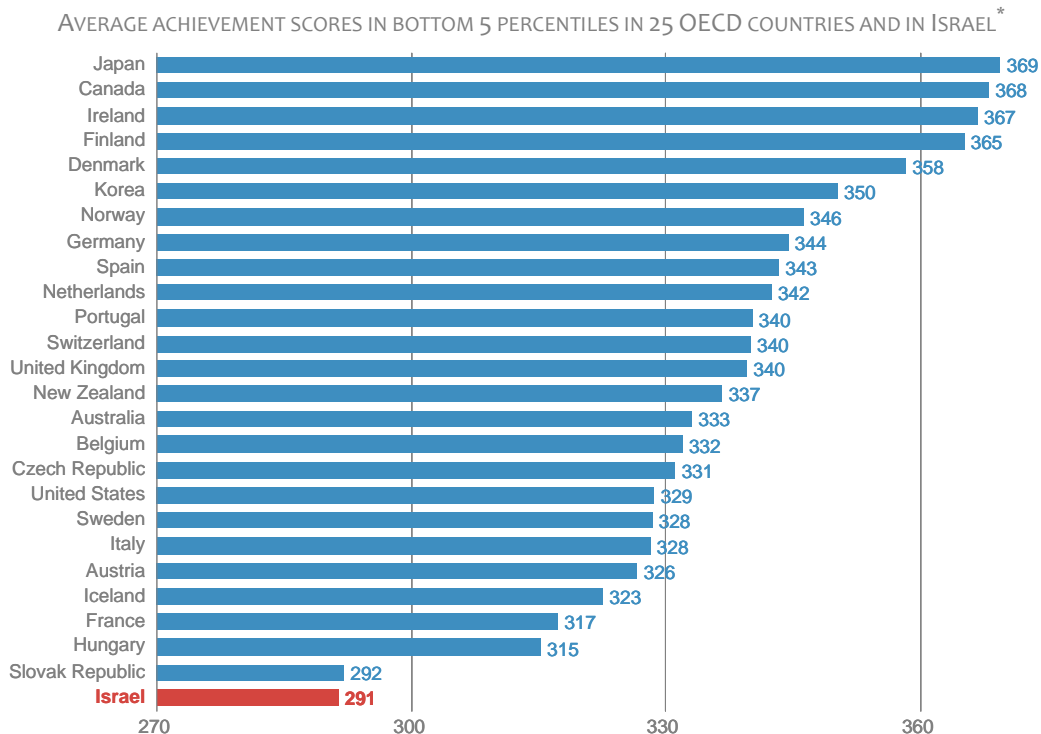
Israel's weakest pupils are the weakest in the developed world

A comparison of the scores attained by Israel's weakest pupils – those at the bottom 5 percent of the distribution – with the scores of the weakest pupils in the developed world does not auger well for the future.

The weakest Israeli pupils score below the weakest pupils in each of the other developed countries. The future ability of these children to attain the skills needed to successfully contend with a global, competitive economy is severely handicapped by the poor level of education that they are receiving today.

This handicap apparently extends far beyond not knowing basic math, science and reading, as indicated in the next figure.

COMPARISON OF WEAKEST PUPILS IN DEVELOPED WORLD, PISA 2015



* National average in math, science and reading exams. Israeli examinees did not include Haredi boys.

Source: Dan Ben-David, Shores Institution and Tel-Aviv University

Data: PISA and Israel's National Authority for Educational Measurement and Evaluation

More than twice as many Israeli pupils as in the G7 do not have the ability to plan ahead

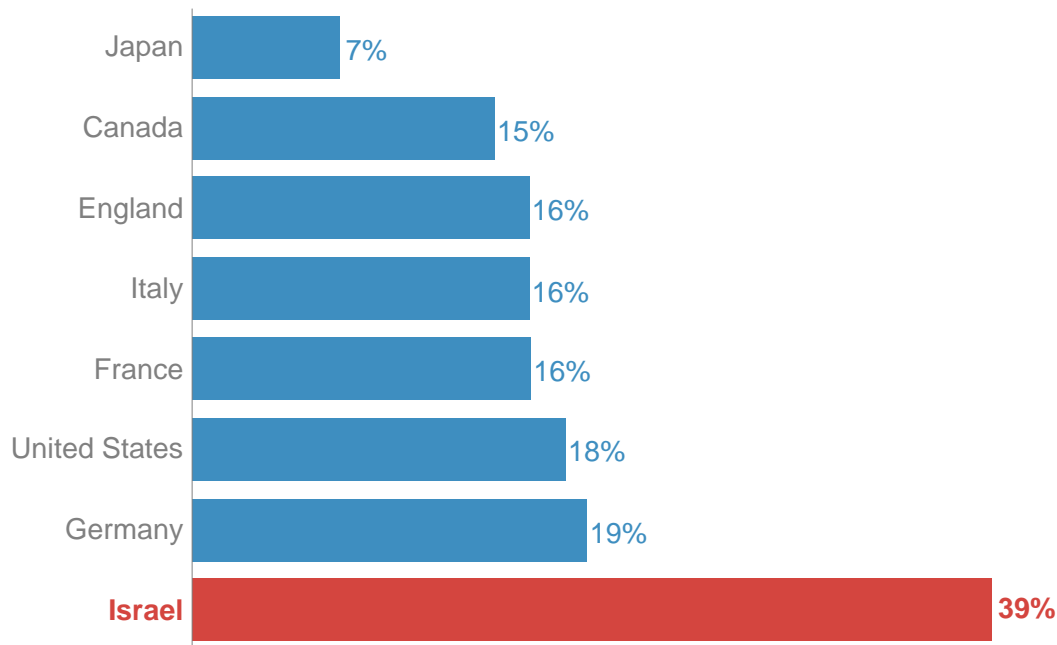
Roughly two out of every five Israeli pupils are below the minimum level deemed sufficient by the OECD for planning ahead or setting subgoals. This is over twice the shares found in each of the G7 countries.

As shown on the next page, there exists a strong relationship between the share of pupils unable to plan ahead and the share of pupils lacking the necessary core educational skills. This mix as adults can become combustible.

Frustration mounts for those with an increasing inability to secure jobs in rapidly changing economies. An accompanying inability to distinguish between the actual source of the problem and perceived sources can lead to democratic choices that are not conducive to dealing with the original problem – while potentially exacerbating the situation by creating new, and possibly greater problems.

SHARE OF PUPILS WITH POOR PROBLEM SOLVING SKILLS IN G7 AND ISRAEL

PERCENT AT OR BENEATH LOWEST LEVEL* IN PISA 2012



* The lowest problem solving level measured by the OECD is level 1, which defined as follows: "Level 1 students tend not to be able to plan ahead or set subgoals."

Source: Dan Ben-David, Shores Institution and Tel-Aviv University

Data: PISA

Democratic threat: strong positive link between share of population not knowing material and share of population not understanding consequences of political decisions

Attainment of level 2 in the core subjects (math, science and reading) is considered by the OECD to reflect the minimum skill level needed for contending in a modern economy. Pupils below this level will face major economic hurdles as adults that they may be unable to overcome.

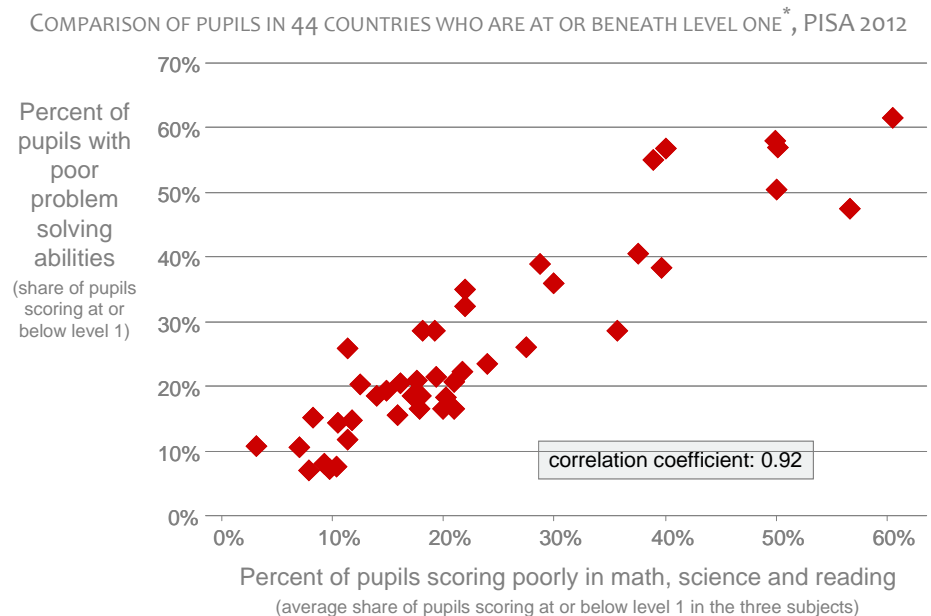
Similarly, level 2 in creative problem solving reflects a minimum in this realm. Specifically, the OECD defines the lowest level measured as follows: "Level 1 students tend not to be able to plan ahead or set subgoals."

There exists a very strong positive relationship between the percentage of students not reaching the minimum knowledge level required in a modern economy and the percentage of students not possessing the minimum ability to understand the consequences of their current actions on subsequent outcomes.

Imagine the political impact that this could have in democracies in which individuals lose jobs because of inadequate skills and education to keep up with technological advancements – and yet have the ability to vote without fully comprehending the actual source of their problems, nor the viability of populist solutions that some politicians offer.

The above is not intended in any way to minimize the importance of democratic institutions but rather to highlight the need for democracies to provide the best education possible to as many persons as possible in order to improve the decision-making process as much as possible.

RELATIONSHIP BETWEEN CREATIVE PROBLEM SOLVING SKILLS AND ACHIEVEMENTS IN MATH, SCIENCE AND READING



* The lowest problem solving level measured by the OECD is level 1, which defined as follows: "Level 1 students tend not to be able to plan ahead or set subgoals."

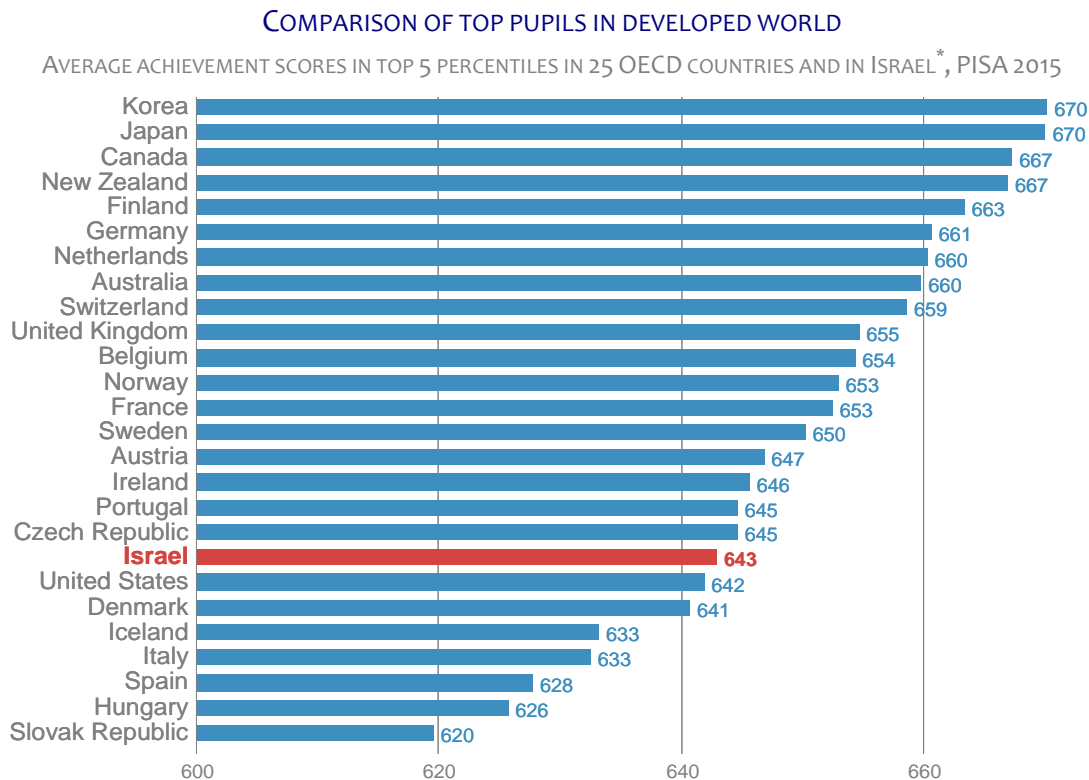
Source: Dan Ben-David, Shores Institution and Tel-Aviv University

Data: PISA

Israel's top pupils are in bottom third of developed world

Israel still has fine universities and a cutting edge hi-tech sector. The country's top pupils today are among the prime candidates to receive the leadership baton in these realms tomorrow.

The knowledge level in core subjects exhibited by the top five percent of Israel's pupils is not encouraging. Their average score place the Israelis in the bottom third of the developed world's leading pupils.



* National average in math, science and reading exams. Israeli examinees did not include Haredi boys.

Source: Dan Ben-David, Shores Institution and Tel-Aviv University

Data: PISA and Israel's National Authority for Educational Measurement and Evaluation

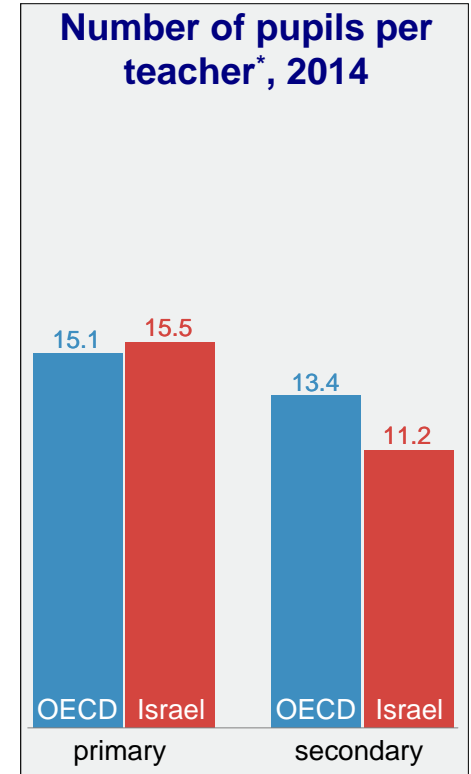
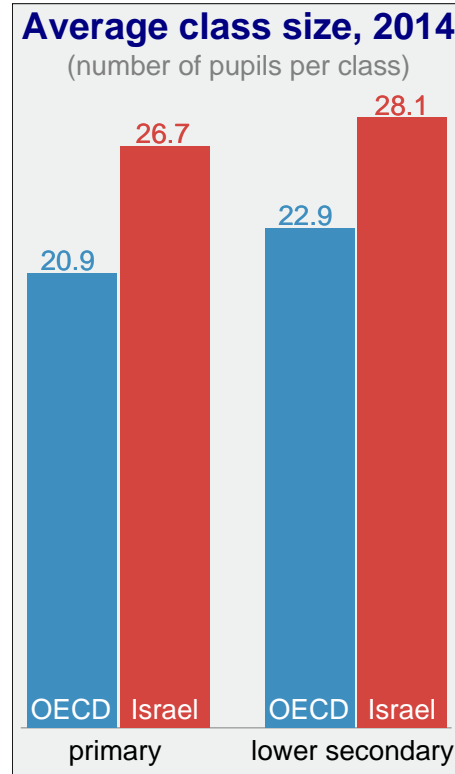
Crowded classes – but more than enough teachers

The prevailing wisdom – though not always corroborated by evidence – is that crowded classrooms have very negative effects on the quality of learning. While reducing class sizes from 25 to 18 may not always produce significantly better outcomes, it is likely that a reduction from 40 children in a class (the maximum allowable in Israel) to 20 could substantially improve the learning environment.

While a very large number of classes in Israeli schools reach the 40 pupil limit, the variance is high and there are many other schools with small classes. The average Israeli class is nonetheless considerably more crowded than the OECD average. The question is why this is so.

The number of teachers already on Israel's payroll is sufficient for substantially reducing class sizes. In fact, the number of pupils per full-time equivalent teacher in Israel's primary schools is nearly identical to the OECD average while the number of pupils per teacher in the country's secondary schools is even lower than the OECD average.

In short, there is no lack of teachers in Israel. The problem of overcrowded classroom is related to how Israel's teachers are utilized.

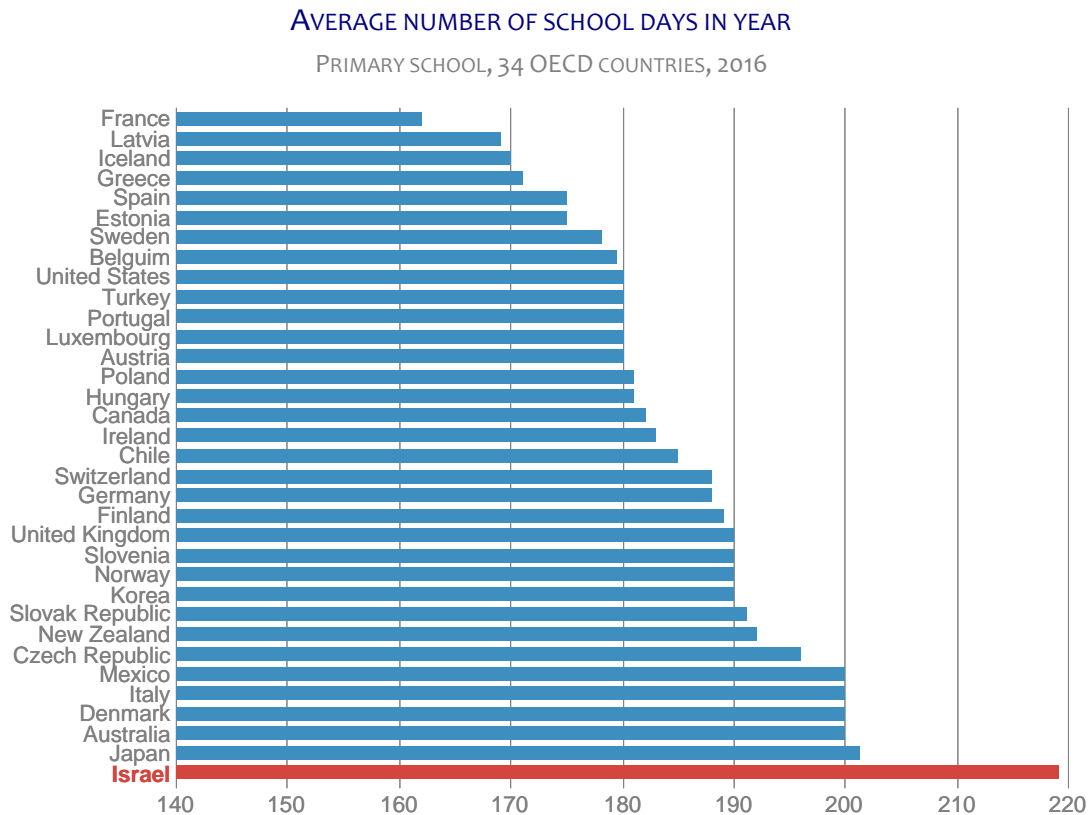


* According to full-time equivalents.

Source: Dan Ben-David, Shoresh Institution and Tel-Aviv University
Data: OECD

Israeli children have more school days – by far – than in all other developed countries

The number of school days in Israel cannot explain the poor level of knowledge in core subjects. There are many more days of instruction in Israeli school years than provided by any other developed country. In contrast with the common five day school week elsewhere, the Israeli school week lasts six days, from Sunday through Friday.



Source: Dan Ben-David, Shoresh Institution and Tel-Aviv University

Data: OECD

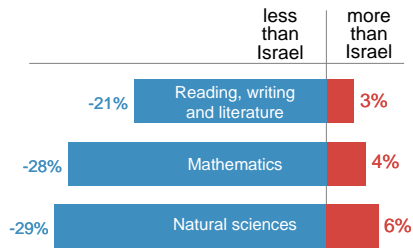
Most developed countries provide fewer instruction hours in core subjects – but attain better results than Israel

Not only does Israel provide its children with more days of instruction, it also provides more instruction hours in core subjects over the course of the school year than do most other developed countries.

And yet, most of the other countries that finance less hours of instruction still manage to obtain higher scores in the core subjects.

The key issue is not how many school days or the number of schooling hours the country pays. The primary problems emanate from what actually occurs during the instruction time: what is being taught; the level of teaching; and the kind of discipline that is being enforced.

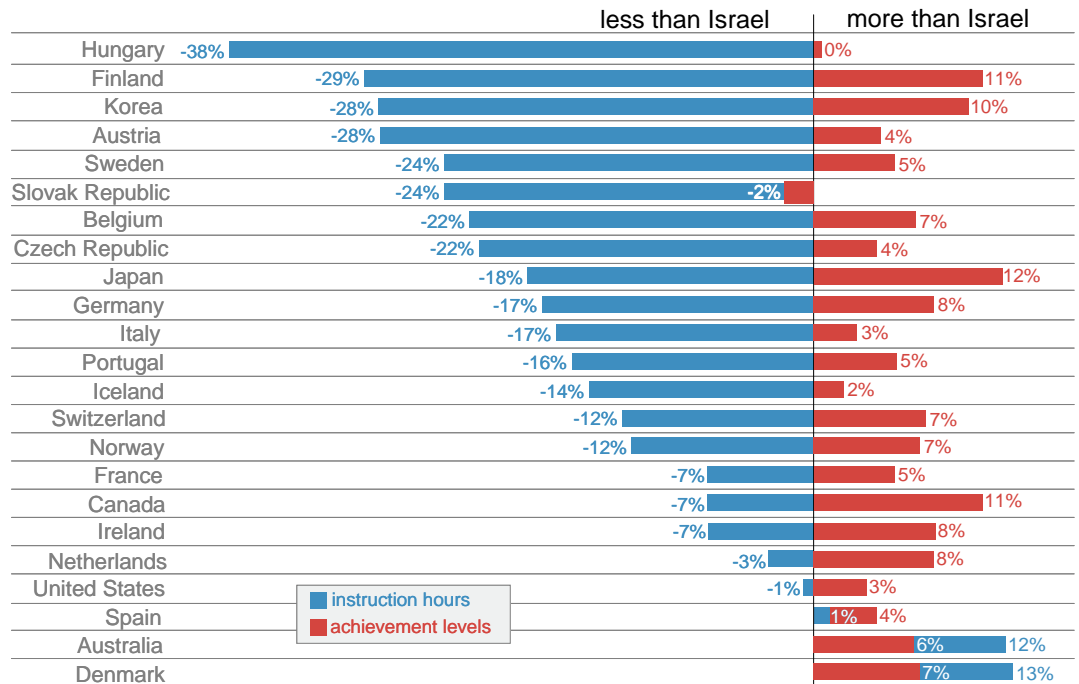
OECD AVERAGE RELATIVE TO ISRAEL IN CORE SUBJECTS



Source: Dan Ben-David, Shores Institute and Tel-Aviv University
Data: OECD

INSTRUCTION HOURS AND ACHIEVEMENT, 2015*

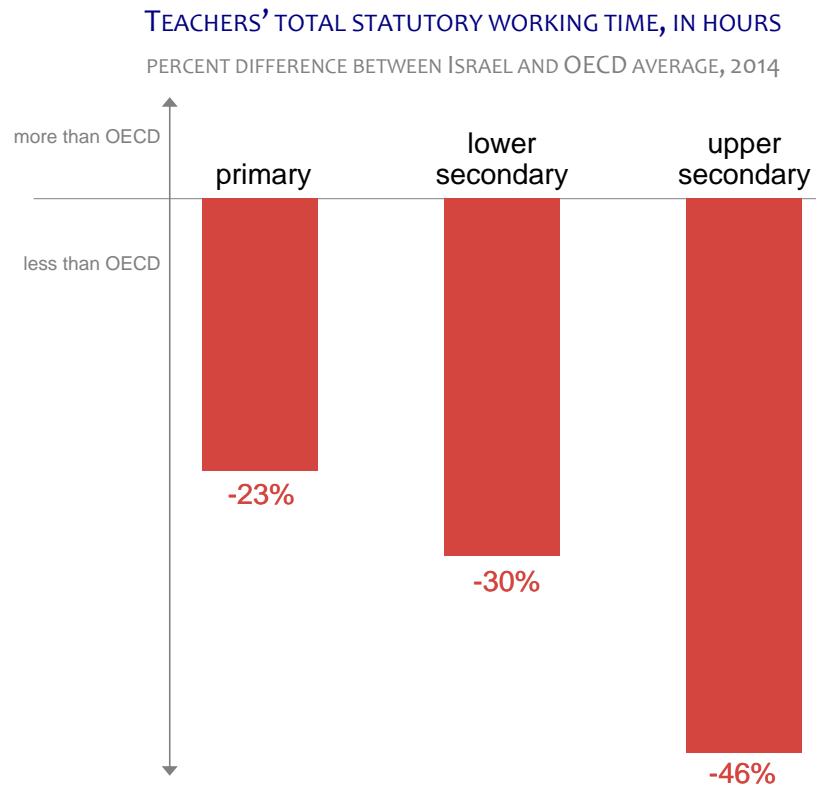
23 OECD COUNTRIES RELATIVE TO ISRAEL



* Cumulative number of compulsory instruction hours in primary and lower secondary schools. and average achievement levels in math, science and reading in PISA 2015.

Israeli teachers work many less hours than the OECD average

Primary school teachers in Israel work almost a quarter less hours per year than the OECD average. Israeli high school teachers work roughly half the average number of hours in the OECD.



Source: Dan Ben-David, Shoresh Institution and Tel-Aviv University
Data: OECD

Teachers' monthly salaries are low – but hourly salaries are higher than OECD average

A common complaint is that teachers' salaries are so low in Israel that it is difficult to attract good teachers. Public pressure to increase teacher salaries led to new comprehensive wage bargaining agreements in recent years that caused a spike in education spending.

Even after the new wage agreements, monthly salaries of Israeli teachers are still below the average OECD salaries. However, teachers in Israel work considerably less hours. Thus, a more accurate comparison of wages than amounts paid per month are amounts paid per hour worked.

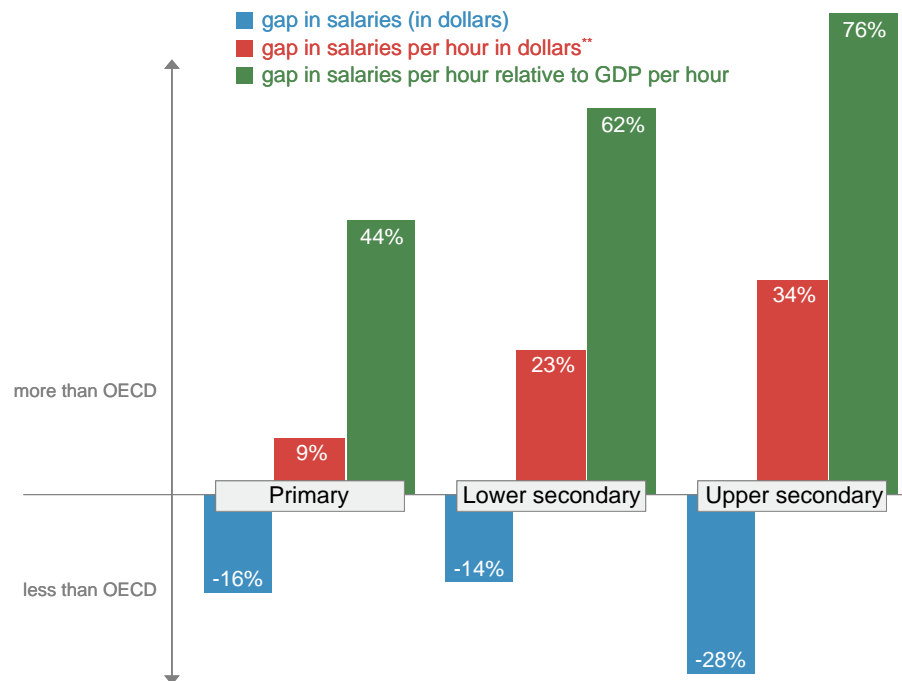
Israeli primary school teachers earn 9% more per hour than the OECD average while high school teachers earn a third more. But this does not really capture the full extent of the discrepancy in favor of Israeli teachers.

Since the amount of GDP produced per hour of work in Israel is low, hourly wages in general are also lower in Israel. When teachers' hourly wages are normalized across countries to account for the variance in GDP per hour, the gap between Israeli teachers' wage and the OECD average rises considerably.

The normalized salaries of primary school teachers in Israel are 44% higher than the OECD average. In lower secondary schools, this gap rises to 62%, while in upper secondary schools, it is a full three-quarters greater in Israel.

GAPS IN TEACHERS' SALARIES*

PERCENT DIFFERENCE BETWEEN ISRAEL AND OECD AVERAGE, 2014



* Annual average salaries (including bonuses and allowances) of 25-64 year old teachers in public institutions using purchasing power parities.

** Salaries per statutory hour worked.

Source: Dan Ben-David, Shores Institution and Tel-Aviv University

Data: OECD

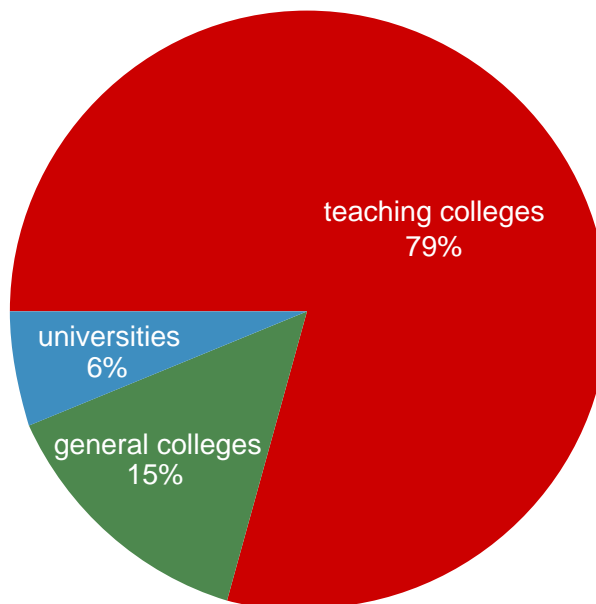
Education students are at the lower end of acceptance scores to higher education

Over three-quarters of Israel's future teachers study in teaching colleges. The entrance requirements at these colleges are so low that their average psychometric scores (similar to the American SATs) are below 61% of all persons taking the exam. An additional 15% percent of the first year education students study in general non-research colleges. Their average psychometric score is below three-quarters of all those taking the exam. All told, nearly all of Israel's future teachers (94%) have an average psychometric score below most Israelis. If a majority of teachers are not at a level that could enable them to get accepted to the better academic institutions, how can they be expected to raise their pupils' to these levels?

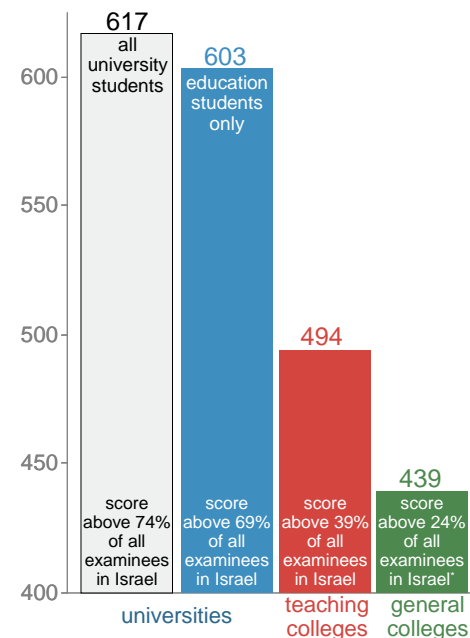
An alternative approach to the current one would be to require all teachers to obtain an academic degree in a specific discipline, and obtain a teaching certificate only afterwards. This will increase teachers' job market alternatives and lead to better pay – while also making it possible for teacher work hours to be competitive with the rest of the labor market.

EDUCATION STUDENTS – DISTRIBUTION AND GENERAL LEVEL

Distribution of education students
by type of institution, first year
undergraduate students, 2014-2015



Average psychometric score
by type of institution, all first year
education students, 2014-2015

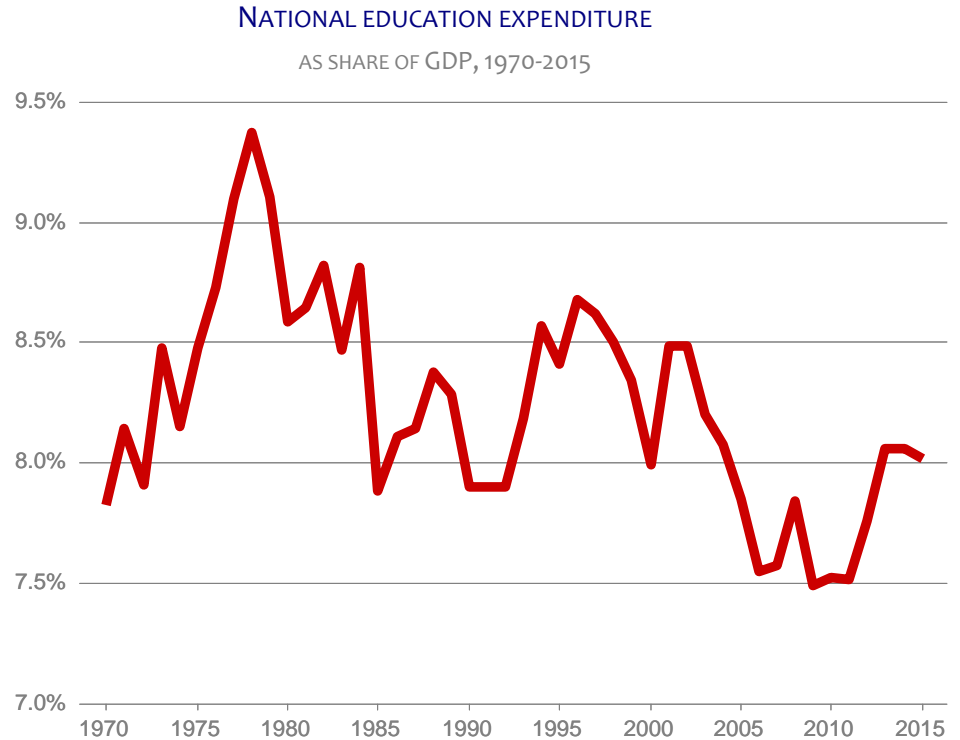


* The average psychometric score of all 1st year students in the general colleges was 529 (above 48% of all examinees in Israel).

Source: Dan Ben-David, Shores Institution and Tel-Aviv University
Data: Israel's Central Bureau of Statistics

National education expenditure in Israel is lower today than in most past years

After peaking in the late 1970s, Israel's national education expenditure (as a share of GDP) fell to the 8.0%–8.5% range from the mid-1980s until the early 2000s. The decline that followed ended only after implementation of comprehensive wage bargaining agreements in recent years that raised teachers' wages considerably.



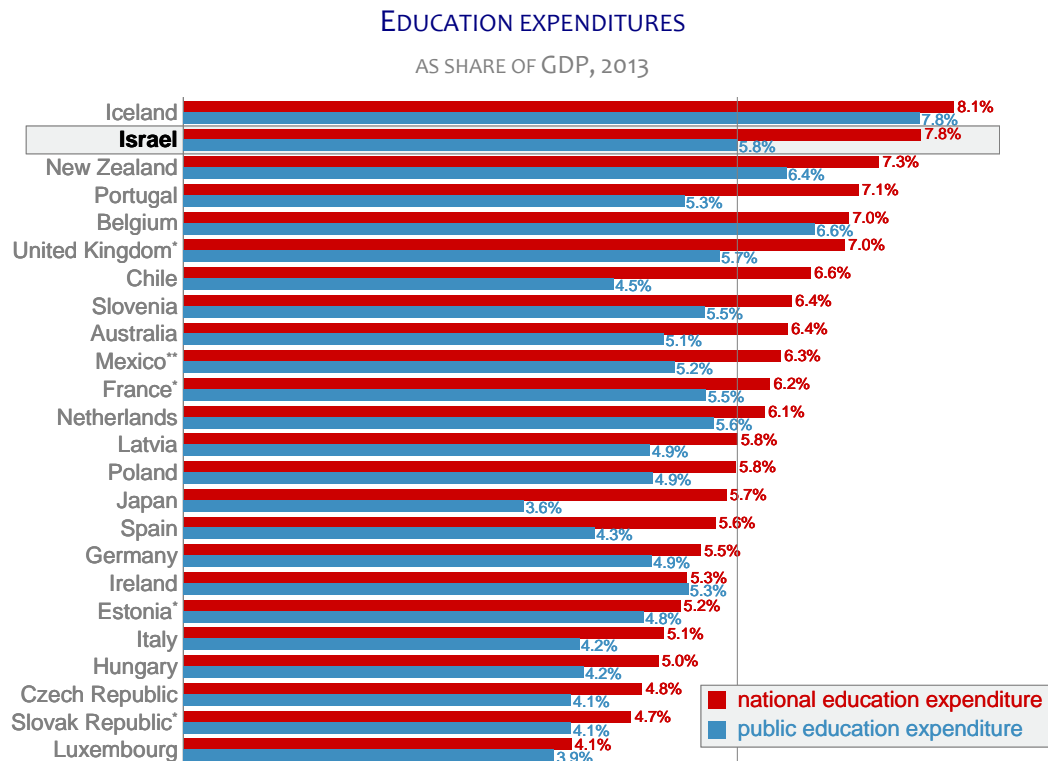
Source: Dan Ben-David, Shores Institute and Tel-Aviv University

Data: Israel's Central Bureau of Statistics

National education expenditure in Israel is among the highest in developed world ...

Israel's national education expenditure – which is comprised of public and private expenditures – is one of the highest in the developed world (when normalized by GDP). The country's public expenditure on education is also one of the highest among developed countries.

These relatively high levels of expenditure are not necessarily indicative of waste. One important factor that needs to be taken into account is the number of children that the education system is intended to service.



* National expenditure in 2012.

** Public expenditure in 2012.

Source: Dan Ben-David, Shoresh Institution and Tel-Aviv University

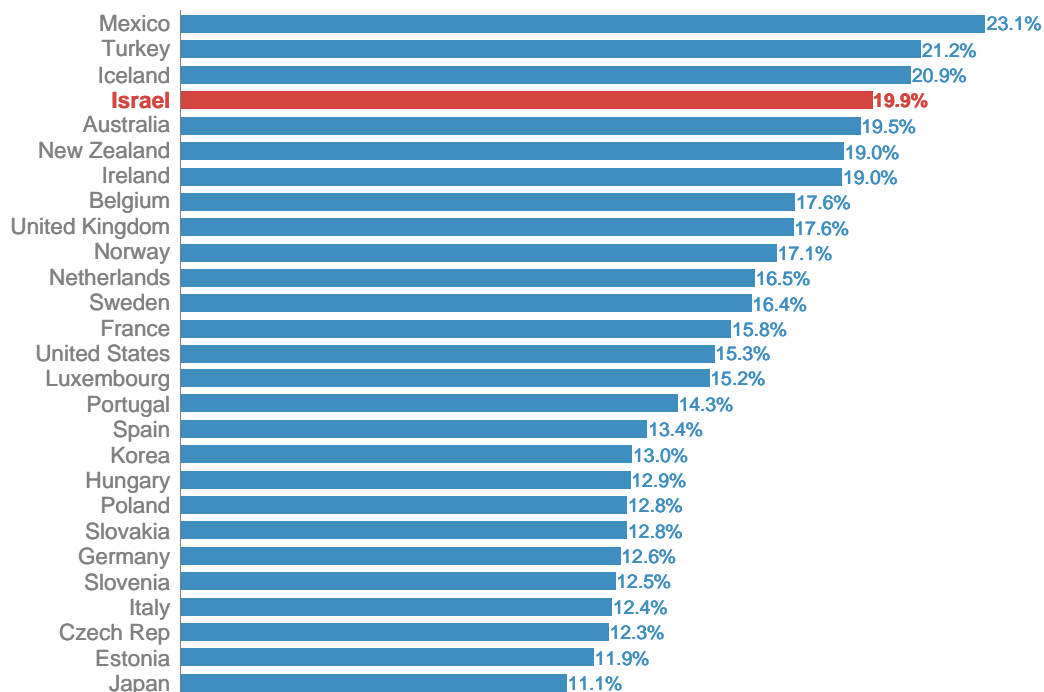
Data: OECD

... share of children in Israel's population near the top of developed world

While Israel's national and public education expenditures are high, the share of children in the country's population is one of the highest in the OECD as well.

Therefore, a more relevant measure of education expenditures is the amount spent per pupil – though, as will be explained below, this is also not free of bias.

SHARE OF PRIMARY AND SECONDARY SCHOOL PUPILS IN POPULATION, 2013



Source: Dan Ben-David, Shores Institution and Tel-Aviv University
Data: OECD

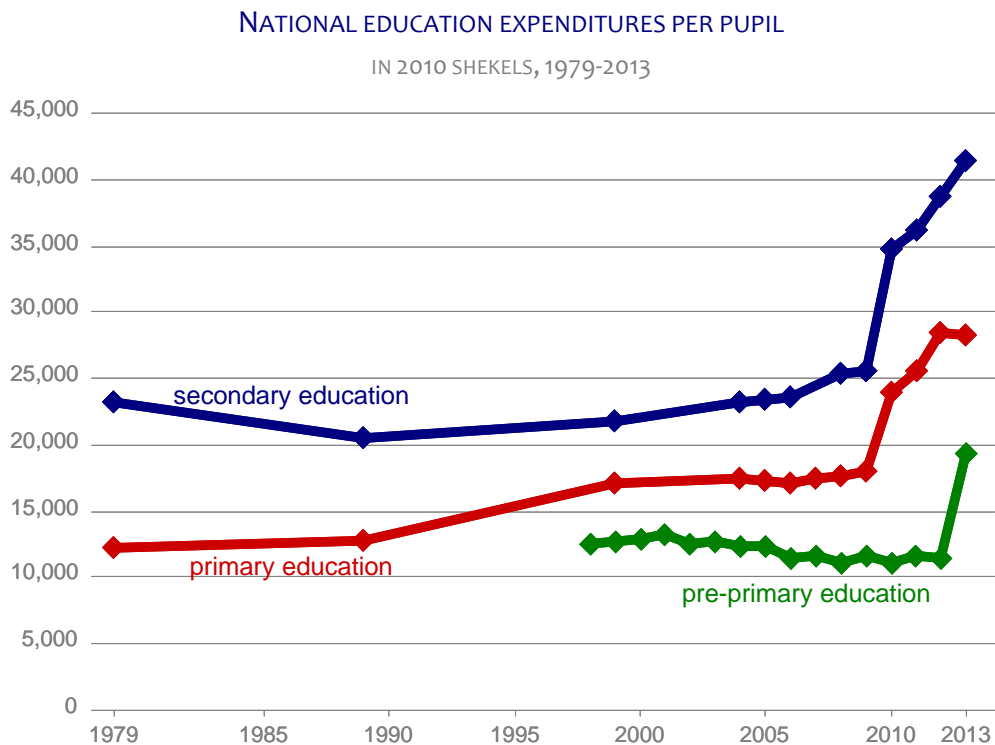
National expenditures in secondary, primary and pre-primary education rose steeply in recent years

In the three decades that elapsed between 1979 and 2009, national expenditures per pupil in secondary education (after netting out inflation) rose by 10%. In primary education, national expenditures per pupil rose by 47% during this period.

Comprehensive wage bargaining agreements in recent years led to considerable hikes in teachers' salaries – and to accompanying spikes in primary and secondary education expenditures. By the 2013/14 school year, education expenditures per pupil were 57% higher in the primary schools and 62% higher in the secondary schools than in the 2009/10 school year.

The situation in Israel's pre-primary school actually exhibited a 9% decline between 1998 and 2012. One of the results of the massive social protests in Israel during the summer of 2011 was a major increase in funding for pre-schools. Pre-school expenditures per pupil in the 2013/14 school year exceeded the 2012/13 expenditures by 69%.

Since no comprehensive education reform was implemented that could have accompanied the increased spending, it should come as no surprise that all of these additional education expenditures did not result in the provision of a better education.



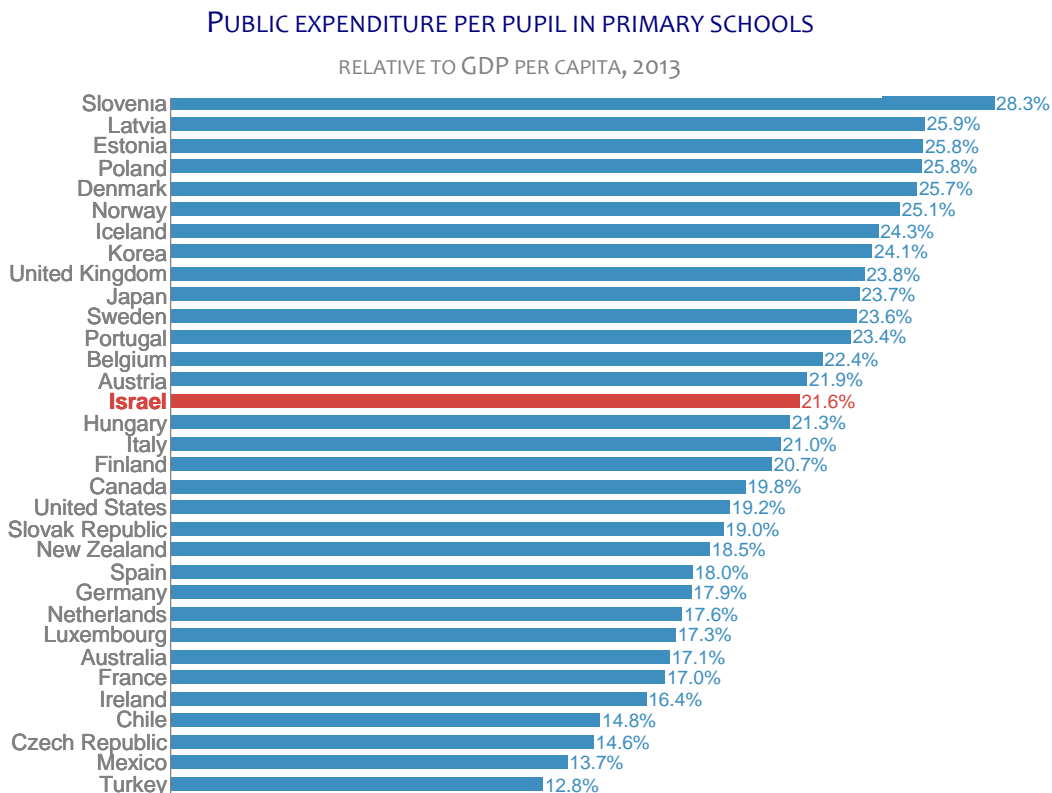
Source: Dan Ben-David, Shoresh Institution and Tel-Aviv University
Data: Israel's Central Bureau of Statistics

Public expenditure on primary education places Israel in middle of OECD

While education expenditures per pupil provide a more accurate gauge for comparison across countries, there is a need to account for the fact that most education expenditures are to pay salaries. There exist major differences in living standards across countries – and these, in turn, affect salaries.

Therefore, a comparison of education expenditures per pupil across countries requires that these be normalized by GDP per capita (which is used to reflect average living standards in a country). Mathematically, this is identical to normalizing the share of education expenditures in GDP by the share of pupils in the population.

When this normalization is performed, Israel's public expenditure per pupil on primary education is near the center of the OECD ranking. It is not excessively high, nor is it particularly low.

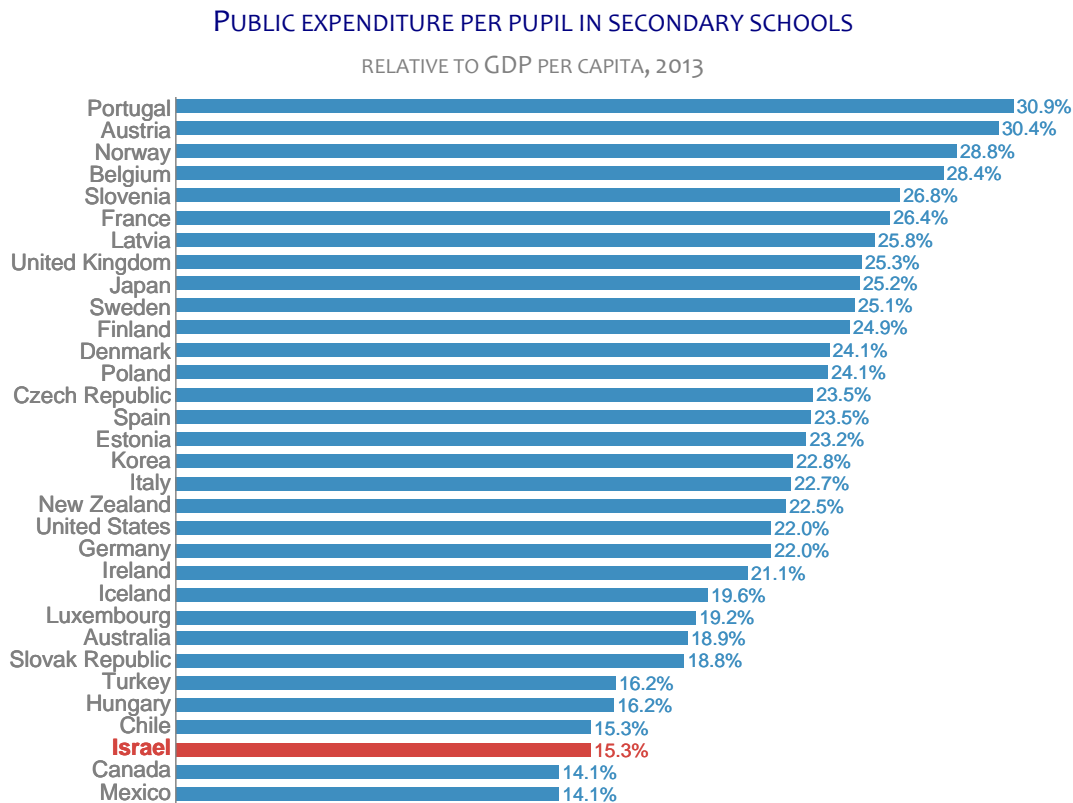


Source: Dan Ben-David, Shores Institution and Tel-Aviv University

Data: OECD

Public expenditure on secondary education near bottom of OECD

While public expenditure per pupil (relative to GDP per capita) in primary schools is near the OECD median, it is relatively low in secondary schools.



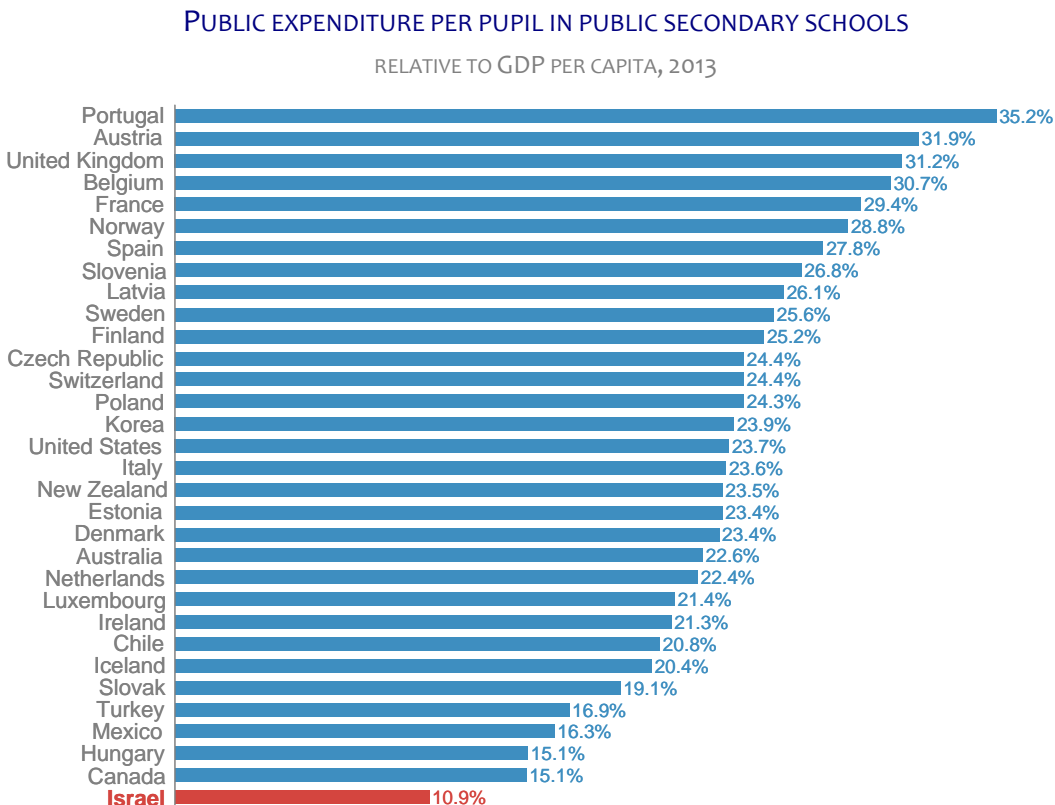
Source: Dan Ben-David, Shores Institution and Tel-Aviv University

Data: OECD

Public expenditure on **public** secondary education at bottom of OECD

Most public expenditures in secondary schools go to public schools while some are directed to private schools.

Israel's public expenditure per pupil (relative to GDP per capita) on public secondary schools is the lowest in the OECD.



* when public funding accounts for at least 50% of a school's income, that institution is considered a public school.

Source: Dan Ben-David, Shoresh Institution and Tel-Aviv University

Data: OECD

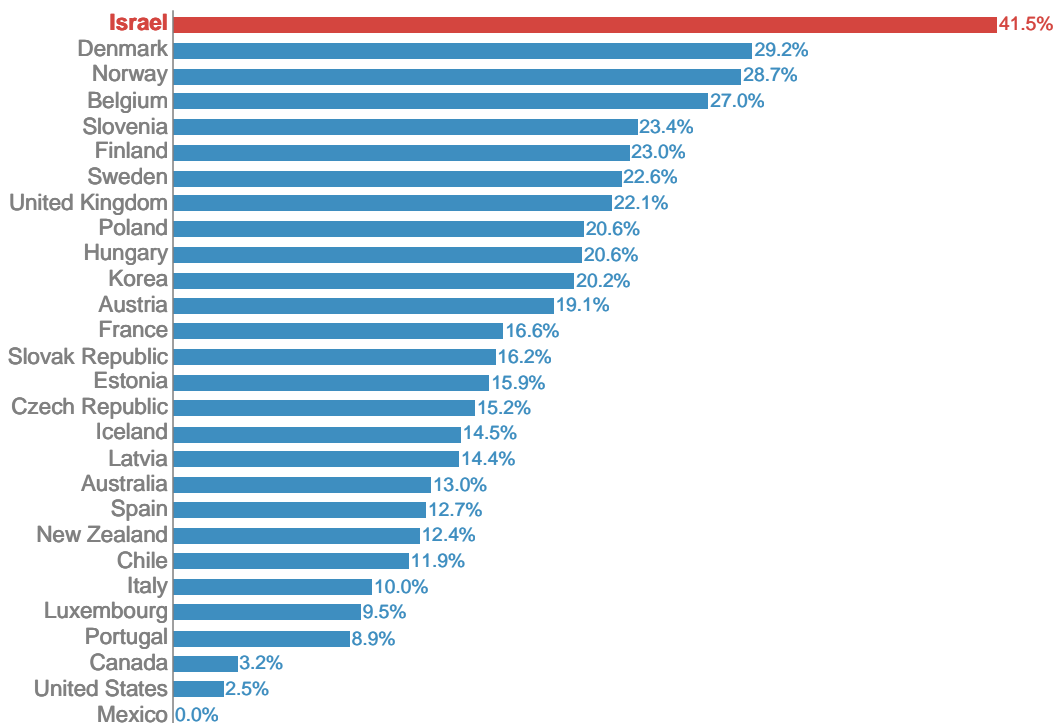
Public expenditure on *private* secondary education at top of OECD

Though Israel's public expenditure per pupil (relative to GDP per capita) on public secondary schools is the lowest in the OECD, the public expenditure per pupil on private secondary schools in Israel is the highest in the OECD – and four times the amount per pupil in public secondary schools.

In lieu of transparency in Israel's budgets, it is hard to discern where exactly this money is being directed, or how it is being spent. According to Israel's Central Bureau of Statistics, a private school is considered a school receiving less than half its income from public funds. A major share of Israeli schools considered private under this definition are Haredi schools.

PUBLIC EXPENDITURE PER PUPIL IN PRIVATE SECONDARY SCHOOLS

RELATIVE TO GDP PER CAPITA, 2013



* when public funding accounts for under 50% of a school's income, that institution is considered a private school. Haredi (ultra-Orthodox) education, which is dependent primarily on donations, accounts for a large part of the private schools.

Source: Dan Ben-David, Shores Institution and Tel-Aviv University

Data: OECD

coming soon, the complete

The Shoresh Handbook

Education and its impact in Israel

2017

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