

Shoresh Research Paper

The Socioeconomic Effects of Education Quality versus Quantity

Lessons from Israel's extensive natural experiment in the 2000s

Dan Ben-David*

Abstract

In 2002-2003, Israel entered into one of the most severe recessionary periods that the country has known. Sharp increases in the government deficit, national debt and exchange rate led to – among other outcomes – extraordinary policy measures that included sharp cuts in welfare spending. The policy changes led primarily to improvement in labor quantities (such as employment), but not in labor quality (specifically, on the level of human capital in the labor force).

This turned out to have been a natural experiment leading to unique socioeconomic outcomes that pushed Israel to developed world polar extremes – good and bad, simultaneously – in terms of living standards, income inequality and poverty. Whether or not it was the Israeli government's intention, the country underwent a rare socioeconomic experiment enabling the isolation of key determinants influencing Israel's economy and society. The findings highlight the necessity of a turnaround in policies affecting the country's level of human capital.

December 2016

* Dan Ben-David, President, Shoresh Institution for Socioeconomic Research; Department of Public Policy, Tel Aviv University; The author thanks Ayal Kimhi for his helpful observations and suggestions as well as to Karnit Flug, Nathan Sussman, Kobi Braude, Yoav Friedman and Yuval Mazar from the Bank of Israel for their comments.

The Socioeconomic Effects of Education Quality versus Quantity

Lessons from Israel's extensive natural experiment in the 2000s

Dan Ben-David

Introduction

The issue of the working poor has increasingly penetrated Israel's public discourse (see, for example, Stier 2011). Ostensibly, there is no problem when there are two wage earners in a family. According to a 2014 report by Israel's National Insurance Institute (similar to the U.S. Social Security system), there was a large difference in 2014 poverty rates between families with no wage earners (68.0%), one wage earner (25.4%) and with two wage earners or more (5.6%). However, a dozen years earlier, in 2002, the rate of poverty among families with two+ wage earners was 2.5% (National Insurance Institute, 2004), roughly one-half the rate today.

In the natural experiment implemented by Israel since 2002 – only a part of which was actually planned – it is possible to clearly see the core problems in the country's policies at the national level. The tools and conditions needed for successfully coping in a modern and competitive economy were not provided to large and growing portions of Israel's population. Since the depths of the recession over a decade ago, Israel adopted policies that substantially reduced the high rates of persons not employed. While the country dealt with the quantity problem, it almost completely ignored the truly important issue, worker quality. Results of this broad one-dimensional (dealing only with quantities) experiment yield a rare glimpse of the importance of the missing component: labor quality.

Labor force quality is commonly characterized by measuring the levels of education – and on the face of it, this does not appear to be a problem. The main education measures focus on quantity, such as the number of years of schooling or the number of academic degrees. In and of themselves, these are important measures and their utilization yields findings showing that employment rates and wages tend to rise with levels of education (see for example, Kimhi, 2012). But the value of a year of education varies from country to country, and even from school to school. As Hanushek and Woessmann (2015) show, the quality of education – as measured by student achievements in core subjects – has a significantly stronger impact on economic growth than do total years of education.

Background

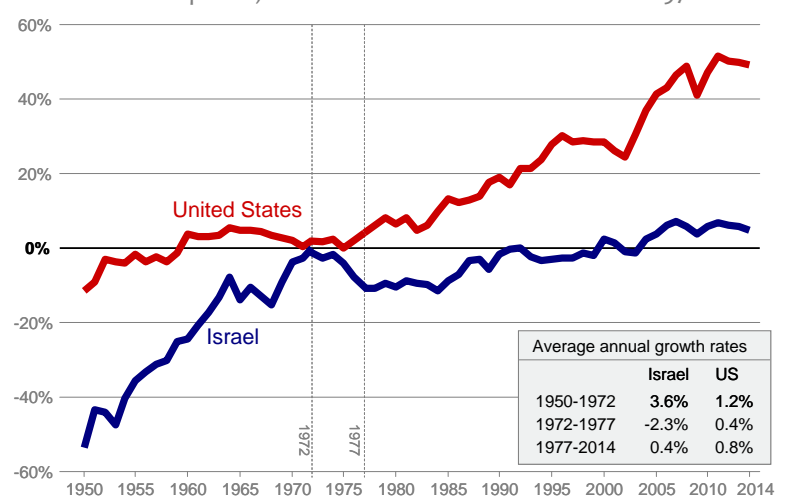
Beginning this story from its end can provide insight as to its importance. The greater the number of workers, the larger a country's GDP. Similarly, increasing the amount of physical capital (such as equipment) expands GDP. If output grows at the rate that the number of workers rises, then output per worker remains constant. The key to raising output per person – that is, increasing GDP beyond the contribution by increases in physical inputs – is called total factor productivity (TFP). It is the primary engine of economic growth. An increase in TFP does not result from an increase in the quantity of inputs, but rather from an improvement in their quality and in the manner in which they are used.

The U.S. economy has lead the developed world for over a century. Figure 1 shows total factor productivity in the U.S. and in Israel for six and a half decades, from 1950 (two years after Israel gained independence) through 2014. The base in the figure is Israel's TFP in 1972. All other observations for both countries are in relation to this base. In 1950, U.S. TFP was 90% higher than Israel's TFP.¹ During the years 1950-1972, Israel's productivity grew by 3.6% a year, three times the American growth rate. This, in turn, led to near equality (a gap of 2% between the U.S. and Israel) by the eve of the Yom Kippur War.

The war led to a watershed period in Israel. By 1977, TFP had fallen by 11%. The Arab oil embargo during this period also led to difficult times in the West, though not at the magnitude of what transpired in Israel. In 1977, Israel moved to a new growth path – one that is much slower not only in relation to the past, but also in comparison with the United States. During the nearly four decades that have elapsed since then, Israel's TFP has grown at 0.4% a year, just half of the 0.8% annual American growth rate. This very large disparity in growth rates has caused Israel's economy to fall further and further behind (in relative terms) for 37 years and has substantially increased the gap between the two countries. By 2014, TFP in the U.S. was 42% greater than TFP in Israel.

Israel's change in direction in the 1970s was sharp and widespread across myriad socioeconomic realms, as shown in Ben-David (2015). In the area of physical infrastructure – critically important for productivity – congestion on Israeli roads rose from complete

Figure 1
Total factor productivity* in Israel and the US, 1950-2014
in constant prices, both countries relative to Israel in 1972**



* Total factor productivity (TFP) reflects the part of GDP growth not explained by increases in labor and capital inputs. TFP is considered to be the primary engine underlying the economic growth of nations.

** percent point difference between all observations for each country and Israel in 1972.

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

Data: Penn World Tables 9.0

¹ Division of (1-13.0%) by (1-54.3%).

equality with small European countries in 1970 to three times the European congestion. In general, there has been a decline in Israel's gross domestic investment from 28% of GDP in the early 1970s to under 20% at the beginning of this century (Yashiv, 2013).

Education plays a critical role in determining productivity. In this realm, Israel would appear to be on the right path in terms of education quantities. The country has one of the most educated populations in the world. The average prime working age Israeli (35 to 54 years old)² has 13.4 years of schooling (Figure 2). Only the persons living in the United States and Switzerland average more (13.5) years of schooling. But a year

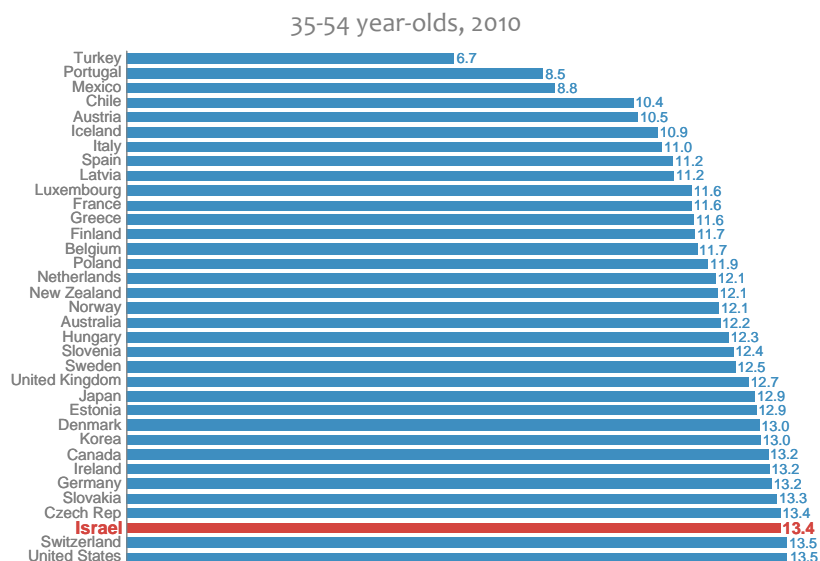
of education in one country is not identical to a year of education in other countries in terms of quality – which is vitally important in assessing a country's actual stock of human capital.

In core fields of education such as mathematics, science and reading, international exams such as PISA and TIMSS are given every few years with the goal of assessing educational quality at secondary school levels. In every single one of these exams in recent decades, the children of Israel have consistently produced achievement levels at or near the bottom of the developed world

Furthermore, it is not possible to ascertain if the achievement levels of Israeli pupils have actually risen or fallen over time. While the country administers annual nation-wide matriculation exams to its high schoolers, these exams have never been calibrated in a way that could enable their comparison over time. The education ministry has never considered this an important enough issue to resolve. What is evident, however, is that a larger share of children are studying in Arab sector schools (whose pupils attain scores in core subjects below those of many developing countries) and in the Haredi (Ultra-Orthodox Jewish) schools that systemically prevent nearly all of the boys from receiving anything beyond a very basic eighth grade education in core subjects (with some subjects even missing at this level).

In 1977, roughly one-quarter of Israel's primary school pupils studied in the Arab and Haredi schools (Ben-David, 2010). Today, these children account for nearly half of Israel's primary school pupils. Therefore, the fact that a greater share of Israeli children pass these uncalibrated matriculation exams today than in the past obscures the fact that the level of

Figure 2
Average years of schooling per person



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

Data: Barro and Lee (2016)

² The prime working age in the West is considered to be between the ages of 25 and 54. The situation among Israelis at the lower end of this age group tends to be skewed as a result of compulsory military service that puts most of the younger Israelis on a delayed path to college and work. From the age of 35, this bias is no longer a major issue. Therefore, the 35-54 age range was chosen here for international comparisons of Israel.

basic education received by a large and growing share of Israeli children does not fit either their personal needs or the national requirements of an economy competing at the global level with the other developed countries.

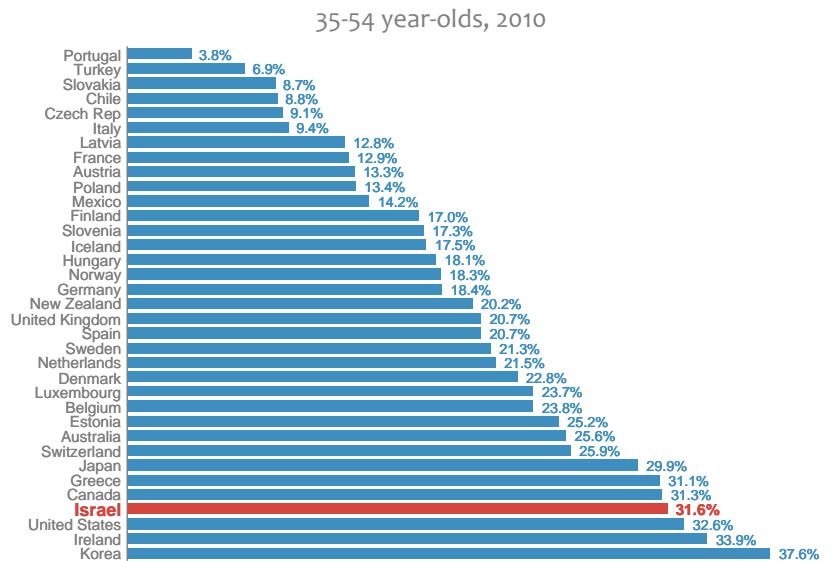
As in the case of primary and secondary education, the conventional focus on quantity can be misleading. Almost one-third (31.6%) of prime working age Israelis have an academic degree (Figure 3), a percentage surpassed by just three other countries in the world. But not all degrees are equal. There are vast qualitative differences across academic institutions both within Israel and across the world. Advancing a

country's technological envelope requires cutting edge abilities – and the simple counting of degrees from institutions of higher education provides very little guidance in this regard.

During the 1970s there was a massive turnaround in the realm of higher education. By 1973, there were seven research universities on the ground in Israel. Since then, the country's population has more than doubled, but not one research university has been built.³ Non-research colleges have, in fact, been established. This is an important step, in and of itself, that provides an intermediate level between high schools and the universities at the top of the academic ladder for those unable to get accepted to universities. But a country that wants to reduce the gaps that exist between the leading countries and itself must have academic research institutions at the highest international levels that will educate and train future generations. It is very difficult to address the national needs with an increase of just 14% in the number of university research faculty since 1973.

Consequently, the primary issue that needs to be the policy focus is not the average years of schooling, nor the percentage of matriculation certificate holders, nor the number of academic degree holders – nor, as will be evident below, the share of employed persons in the population. The fundamental focus needs to be on the quality rather than on the quantity of education. Israel's natural experiment since its deep recession last decade provides a rare glimpse of this fact.

Figure 3
Share of individuals with an academic degree



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

Data: Barro and Lee (2016)

³ The arguments for and against the institution in Ariel are primarily political.

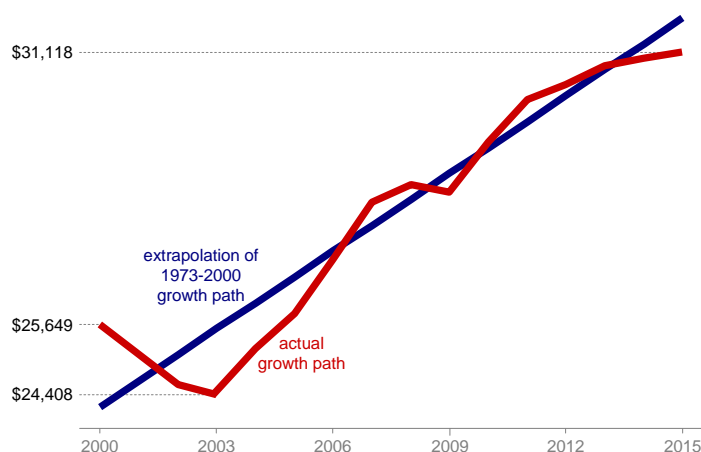
The natural experiment

Israel's natural experiment began in 2002. From 1973 through 2000, Israeli GDP per capita (the common measure for living standards) grew along a relatively stable long-run trajectory. Extrapolation of the 1973-2000 growth trajectory during the years 2000-2014 is depicted by the blue line in Figure 4. As is evident from the actual growth path (depicted by the red curve in the figure), the rising terror wave of the second intifada led to a very deep recession in Israel. There was a substantial decline in Israeli living standards between 2000 and 2003.

The rate of unemployment rose steadily, peaking at 10.7% in 2003 (Bank of Israel, 2015). Inflation was negative that year (-1.9%). During the years 2000-2003, the general government budget deficit rose from 1.3% to 5.6% of GDP while the national debt climbed from 80% to 93% of GDP. With the decline in the Israeli economy, and in the confidence in it, the shekel was devalued to such an extent that it reached an all-time high of 4.994 shekels to the dollar in June, 2002.

A number of policy changes were enacted to halt the economic fall accompanied by rising deficits and debt. Among these changes were massive cuts in welfare benefits. Figure 5 shows the turnaround in three key entitlement programs: income maintenance, child benefits and unemployment benefits. Depicted in the figure are real changes (that is, after discounting inflation) in income maintenance per recipient, child benefits per receiving household and average unemployment benefits per unemployed person.⁴ In 1995, income maintenance and unemployment benefits per person were 20% below their 2001 peak. Average child benefit payment per family were 12% below, and rising steadily until 2001.

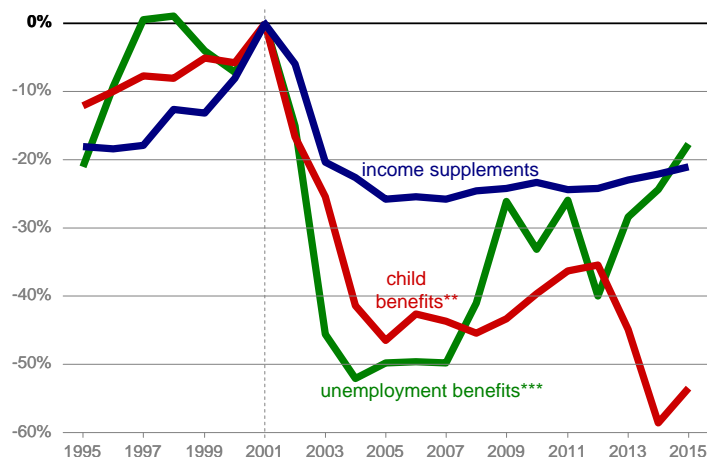
Figure 4
Israel's growth path
GDP per capita*, 2000-2015



** In 2010 international dollars, logarithmic scale.

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

Figure 5
Welfare benefits per recipient, 1995-2015
relative to 2001*



* Changes in real terms (i.e. after discounting inflation).

** Total child benefits per household.

*** Average unemployment benefits per unemployed person (total expenditure on unemployment benefits divided by the number of unemployed persons).

Source: Dan Ben-David, Shoresh Institution and Tel Aviv University
Data: National Insurance Institute

⁴ Average unemployment benefits per unemployed person were calculated by dividing total expenditure on unemployment benefits by the actual number of unemployed persons.

The policy reversals began in 2002 and accelerated considerably in 2003 and afterwards. By 2005, average income maintenance per recipient fell by a quarter, average children's benefits per family fell by 46% while average unemployment benefits per unemployed person fell by about half. In the following years, the cuts in unemployment benefits were partially removed while child benefits were cut further. In 2014, income maintenance benefits per recipient were 22% below their 2001 peak, unemployment benefits were 24% lower and average child benefits fell to a level 59% below their 2001 levels. The large cuts in these three benefits had a considerable impact on the labor market.

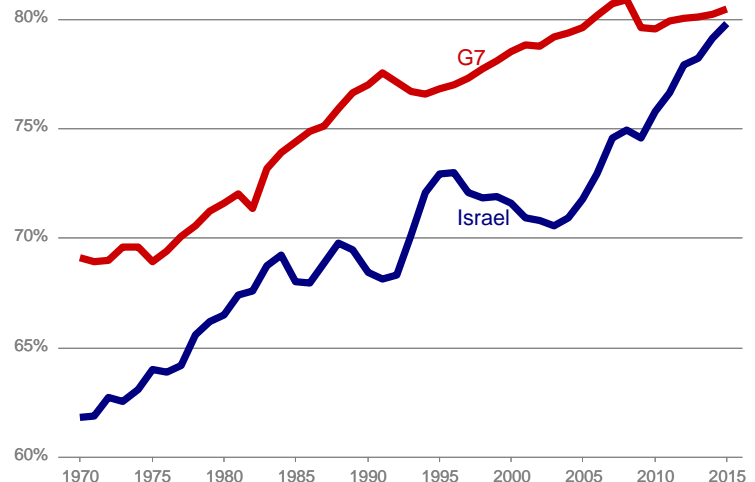
Israel's emergence from the recession was accompanied by a very positive change in employment. From the 1970s until the early 2000s, gaps between the G7 and Israel in rates of employment among prime working age adults (35-54) ranged from 4 to 9 percentage points (Figure 6). The big change in this gap began with Israel's natural experiment. Since 2003, the country's rates of employment have risen steadily, from 70.6% in 2003 to 79.8% in 2015. Although the Great Recession in the G7 lowered their employment rates in 2009 – a blow from which the countries have still not completely recovered – it is clearly evident that the primary contributors to the reduction in the employment gap were Israel's exceptional employment improvements since 2003. Subsequently, the employment gap with the G7 fell to under one percentage point in 2015.

As noted above, employment rates rise with education, in Israel and in other developed countries. In 2015, employment rates among all Israeli working-age workers with academic degrees were 79% as opposed to just 54% among those who do not hold an academic degree. The characteristics of the growth process underlie this phenomenon. As economies progress from primarily agriculture to light industries, and then to more sophisticated industries and services, the demand for skilled and educated persons rises.

However, the events that transpired in Israel since 2003 are uniquely different in this regard. The primary increase in employment since that year was among less educated workers. This is distinctly visible in Figure 7, which shows the ratio of increases in employment to increases in population, prior to and following the recession.

In 1990-2002, the dozen years preceding the recession's trough, each increase of 100 persons in the prime working age population with 16+ years of education (which usually represents holders of academic degrees) was accompanied by an increase of 87 employed persons with 16+ years of education. During this same period the increase in employed persons with 0-15 years of schooling was 69% of the increase in this population. These

Figure 6
Employment rates, 1970-2015
as percent of 35-54 year-old population



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

outcomes accord completely with the common link between education and employment. Not so in the years that followed.

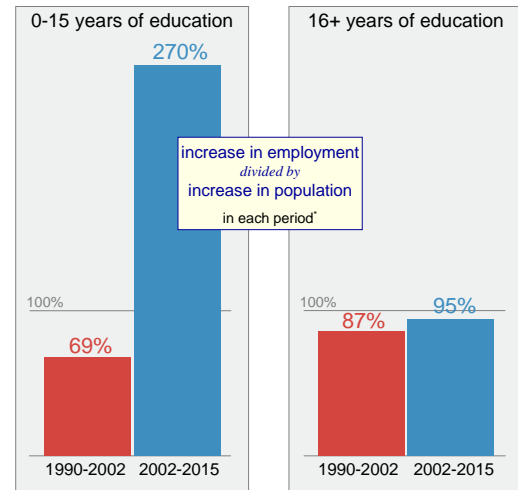
From 2002 to 2015, the increase in employed persons with 16+ years of education was 95% of the increase in that group's population. However, the big employment change following the recession was in the population with 0-15 years of schooling. For each 100 persons who joined this group in the years 2002-2015, there was an increase of 270 employed persons with 0-15 years of schooling. In other words, an exceptionally high number of individuals without an academic education, who did not work in the past, joined the work force after the recession.

The outcomes in Figure 7 should not be interpreted as implying that the educational level of Israel's overall workforce has fallen. The context is a dynamic rather than static one. As Israel's economy grows, so does the demand for educated and skilled workers. The supply of such workers in the country has risen as well. While the more-educated/less-educated employment mix continues to rise, this increase has been dampened by the policies enacted since Israel's major recession at the beginning of the 2000s.

Hence, while employment rates among 35-54 year olds with 16+ years of education have risen by 3-4 percentage points between each of the end points in the two periods designated in Figure 8, this was not the case for persons with 0-15 years of education. There was only a 1 percentage point increase in employment rates from 1990 to 2002, which is consistent with the long term changes in the composition of labor demand. Despite the steady shift in demand away from the less educated and toward the more educated, the Israeli policy changes that induced many of the less educated to enter the labor force between 2002 to 2015 resulted in a 7 percentage point increase in employment rates for those with 0-15 years of education during this period (compared to an increase of 4 percentage points for those with 16+ years of education).

Figure 7
**Relative employment increases*
by years of education**

before and after Israel's
severest recession in decades



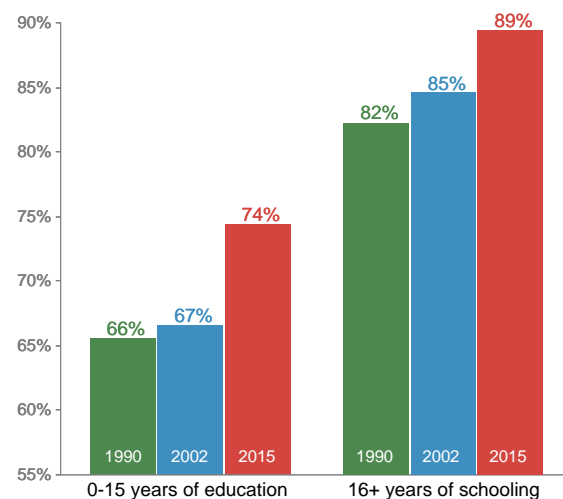
* Among 35-54 year-olds.

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

Data: Central Bureau of Statistics

Figure 8
Employment rates by education levels

ages 35-54, in 1990, 2002, 2015



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

Data: Central Bureau of Statistics

The socioeconomic consequences of Israel's natural experiment

The large number of poorly educated Israelis, and their increased share of the work force, has serious ramifications in three key socioeconomic areas: total factor productivity (the underlying source of economic growth), inequality and poverty. Though parts of Israeli society belong to the “start-up nation”, the amount of GDP produced per hour (commonly referred to as labor productivity) in the country as a whole is among the lowest in the developed world (Figure 9). When only a little is produced in an hour of work, it is not possible to provide high hourly wages. The problem is not just the low national average. There is also a major problem resulting from the very large inequality around this average.

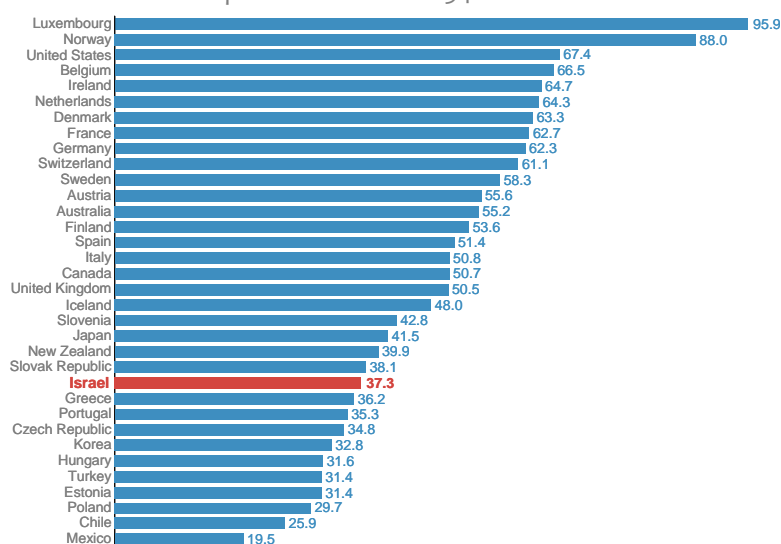
It is possible to look at these gaps through the visor of market incomes (income prior to government intervention via taxes and welfare benefits) and through the visor of disposable incomes (which reflects what finally ends up in the household's hands after paying taxes and receiving benefits).⁵ Figure 10 shows continued increases in market income gaps and in disposable income gaps through 2002.

Since 2002, the slashed benefits were replaced, in varying degrees, by wages received by many who had no choice but to enter the labor force. This led to a rise in their market incomes and to a sharp turnaround in the trajectory of market income inequality. The steady decline in market income inequality since 2002 moved Israel toward the middle of the OECD countries (Figure 11a). On the face of it, Israel's inequality issue is no longer particularly distinctive when the country is compared to the other developed countries in the world.

Figure 9

Labor Productivity in 2014

GDP per hour worked in 34 OECD countries*



* in current PPP dollars

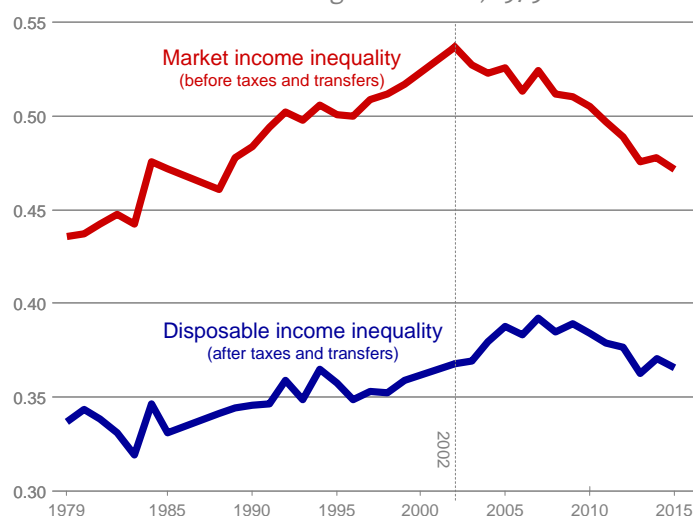
Source: Dan Ben-David, Shoresh Institution and Tel Aviv University

Data: OECD

Figure 10

Income inequality in Israel over time*

Gini coefficient among households, 1979-2015



* Including East Jerusalem from 1997 and chained for period prior to 1997.

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

Data: National Insurance Institute

⁵ Market incomes are often referred to as gross incomes while disposable incomes are often called net incomes.

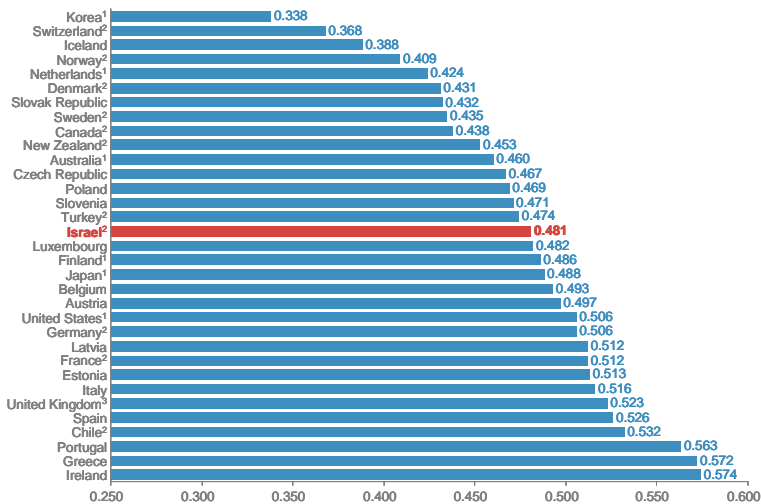
Figure 11

Income inequality in the OECD

Gini coefficient among households, 2013

Figure 11a

Market income inequality*

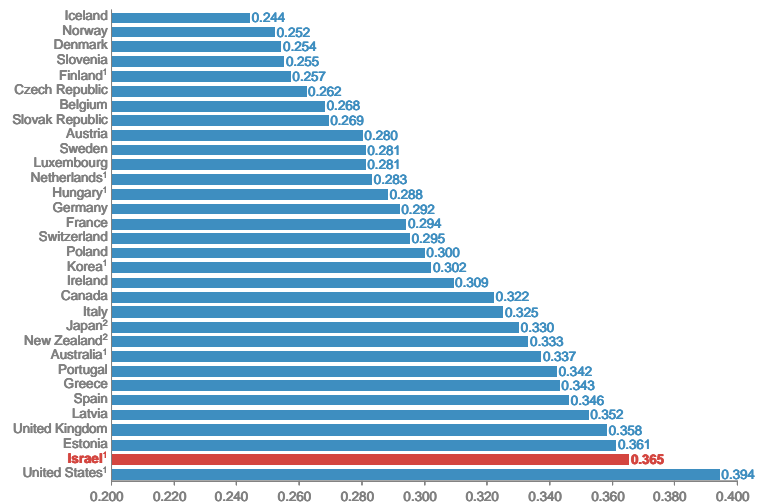


* Income before taxes and transfers. All OECD countries except Mexico and Hungary.

¹ 2012; ² 2011; ³ 2010

Figure 11b

Disposable income inequality*



* Income after taxes and transfers. All OECD countries except Mexico, Chile and Turkey.

¹ 2014; ² 2012

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

Data: OECD

But this is only a partial picture. It turns out that, at least during the initial years following 2002, wages received by the new workers did not compensate for the loss in benefits. As a result, disposable income inequality continued to rise (Figure 10). Only in recent years has the trend reversed itself and disposable income inequality begun to fall.⁶

The bottom line is provided by Figure 11b. When all of the household's income from all the various sources is taken into account – adding welfare benefits and subtracting taxes – it turns out that Israel is left with the second highest income gaps (after the United States) among industrial countries.

The poverty situation is even more polarized. Poverty in market incomes rose continuously during the decades preceding 2002 (Figure 12). The increase in poverty halted in 2002, though only in recent years was there a major change in direction. Today, Israel has one of the lowest market income poverty rates in the OECD (Figure 13a). Israel's poverty rates are lower than even those of Sweden, Norway and Denmark.

When the focus shifts to poverty in disposable incomes, the share of households under the poverty line has declined only slightly since 2002. Consequently, Israel is today at the peak of the OECD, with the highest rates of poverty among its member countries. (Figure 13b).

The root (*shoresh* in Hebrew) problem underlying Israel's high rates of poverty and inequality is the same root problem underlying the country's low productivity: very large

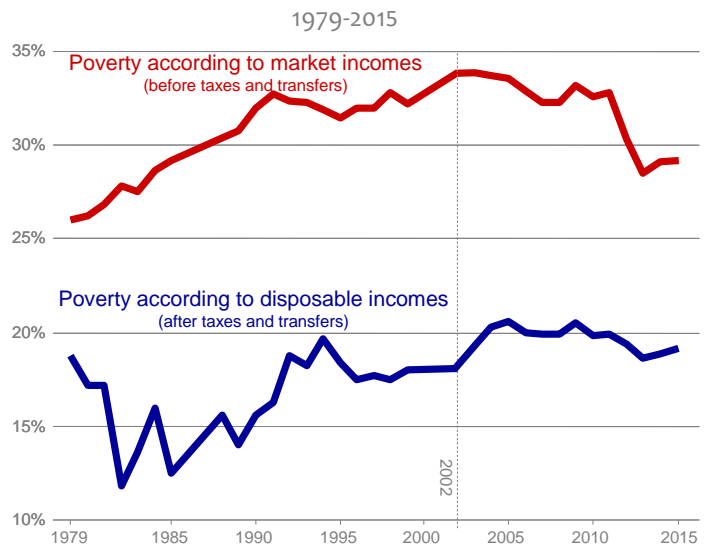
⁶ This recent decline in disposable income inequality could be due to increases in Israel's minimum wage. It is also possible that as workers became more experienced – or attained greater seniority – their wages rose.

shares of Israel's population do not have the necessary tools or conditions for successfully coping in a modern and competitive economy.

Israel's natural experiment since 2002 has operated only in one of the two channels that needed to be taken. It was indeed an extraordinary success in pushing people into the labor force. In and of itself, this is a positive result when healthy working-age individuals replace government benefits with labor income. But this is not enough.

The exceptional improvement in employment rates raised Israel to the highest levels in the West while market income inequality and poverty rates were reduced to a point that places Israel in one of the best positions in the developed world. But the disposable income and productivity outcomes only emphasize how partial and misleading this picture is.

Figure 12
Percent of households under the poverty line*



* Including East Jerusalem from 1997 and chained for period prior to 1997.

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

Data: National Insurance Institute

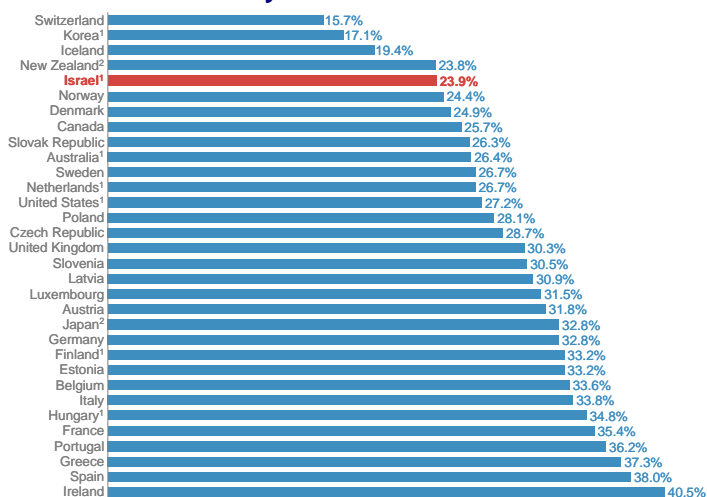
Figure 13

Poverty in the OECD

percent of households below poverty line, 2013

Figure 13a

Poverty in market incomes*

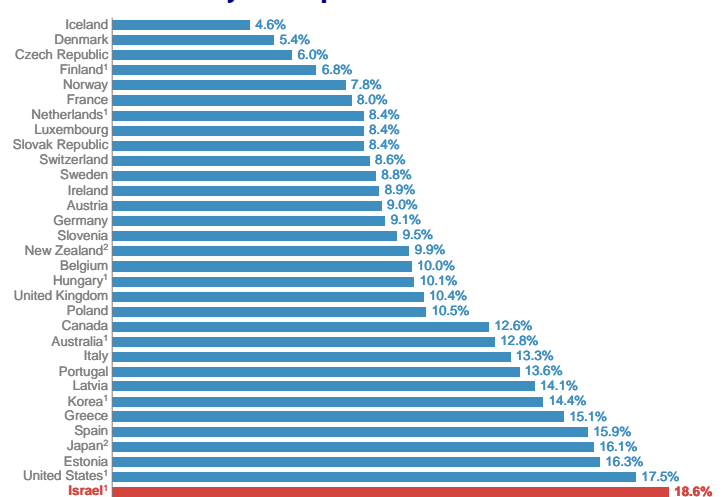


* Income before taxes and transfers. All OECD countries except Mexico and Hungary.

¹ 2014; ² 2012

Figure 13b

Poverty in disposable incomes*



* Income after taxes and transfers. All OECD countries except Mexico, Chile and Turkey.

¹ 2014; ² 2012

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

Data: OECD

A paradigm shift from policies focusing on quantitative increases to those leading to qualitative improvements

Israel's natural experiment showed that it is possible to completely change a country's employment situation within one decade and to bring about a reversal in the long-run market income inequality and poverty trajectories. But it is not enough to push people into the labor market with insufficient tools and conditions. The very clear results of Israel's natural experiment highlight the importance of its missing components. In essence, there is a need for a paradigm shift from an emphasis on quantity to an emphasis on quality.

Alongside the significant changes in benefits, there were no parallel steps taken to substantially upgrade worker knowledge and skill levels. Public expenditure on active labor market policies in Israel, 0.24% of GDP, was about half the average OECD share (0.52%) in 2000. Thirteen years later, even that amount appears high. While average OECD expenditure on active labor market policies as a share of GDP in 2013 was nearly the same as in 2000 (0.49%), the share in Israel fell to 0.13%, roughly half the country's level in 2000 – and less than one-third of the OECD share in 2013 (Figure 14). This does not mean that throwing money at the problem is a substitute for a well-thought-out strategic plan, efficient implementation and continuous measurement and evaluation. But, compared to other developed countries, Israel is beginning from a very low starting position when it comes to the levels of education in the country's primary and secondary schools – which means that the country has to do considerably more so that its former pupils will be able to make up lost ground as adults.

The achievement levels of Israeli pupils in core subjects have been near the bottom of the OECD for many years (Ben-David, 2010, 2011 and 2015). A person who does not receive a good education at a young age finds it much more difficult to overcome these deficits in high school – which, in turn, makes it nearly impossible to get accepted and study at the highest academic levels.

Not only is the national mean low on the international exams, gaps in educational achievement within Israel are the highest in the developed world since the nineties. Similarly, the average achievement levels of Israel's weakest pupils – those in the 5 lowest percentiles – are below those of the weakest pupils in all the rest of the developed countries for many years. When the jumping board into the labor market looks like this, there should not be any surprise when the socioeconomic outcomes look as they do.

Figure 14
**Active labor market programs
in OECD and Israel**

public expenditure as percent
of GDP in 2000 and 2013



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

In its PISA exams, the OECD groups the achievement scores into 6 levels, with the lowest being level 1 and the highest, level 6. In mathematics, for example, the cutoff score between levels 1 and 2 was a score of 420 in the most recent PISA exam. This is a score that the OECD considers as reflecting a minimum basic level of knowledge needed for coping productively in a modern, competitive economy and for opening up possibilities for continued educational improvements in the future. A full third of Israel's children scored below this level in 2012, the most recent exam made public to date. This is far greater than the share of weak pupils in any one of the other 25 developed countries in Figure 15. If Haredi boys – who do not even study this material – would have participated in the exam, the share of Israeli children at or below level one would have been even higher.

In their path-breaking work on the importance of cognitive skills on economic growth, Hanushek and Woessmann (2015) include a simulation with results that provide some insight as to the socioeconomic gains that Israel would attain if “all” it did was to raise the minimum level of its pupils to the cutoff score of 420.

The Hanushek-Woessmann simulation covers a span of years similar to a human lifetime. They assume that the improvement in the school system is not sudden but rather occurring linearly over a decade and a half. The researchers also assume that it will then take an additional four decades until all remaining unskilled workers retire. The entire analysis is carried out for eight decades – roughly equal to current life expectancy of a person born in 2015.

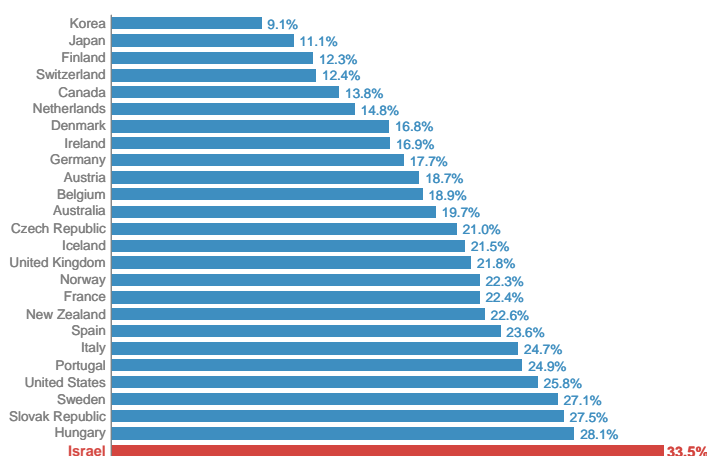
Since the weakest children in Israel are prime candidates to become future adults living in poverty, then an education reform focusing just on raising their levels to the basic minimum should reduce future poverty levels in Israel. But the impact on the entire country would be much greater than a simple saving of future welfare benefits. It would raise Israel's overall ability to assimilate, utilize and develop new technologies (not just in high-tech sectors), which in turn would be reflected in a higher GDP.

In light of the fact that Israel has the greatest share of children below level 2, the country would also be the biggest gainer if all of the developed countries began improving their education systems as described above (Figure 16). The following numbers can be useful for gaining a sense of the magnitude of the additions to Israel's GDP. Israel's GDP in 2015 was 1,150 billion shekels. The present value of the addition to Israel's GDP over the next eight decades would be 3,462 billion shekels, or 301% of the country's current GDP. For comparison purposes, the 2015 budget of the entire Education Ministry was 51 billion shekels. Even if the Hanushek-Woessmann simulation grossly over-estimates the increase in GDP by a factor of 2, or even by a factor of 4, the socioeconomic results of raising the

Figure 15

Share of pupils at the lowest math level

Percent of pupils scoring at or below level 1
(below 420 points) in mathematics, PISA 2012



* Israel examinees do not include Haredim (ultra-orthodox Jews)

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

Data: OECD

education levels of the weakest pupils simply swamp Israel's current default growth trajectory.

A reform that would improve the entire education system would obviously have an even greater effect than just focusing on the weakest pupils. But even a focus on them alone would reverse the current inability of Israel to catch-up to the developed world leaders. A comparison with the G7 countries bears this out directly. Figure 16 shows the percentage point increase in future annual growth rates if every current pupil acquires a minimum score of 420 in the PISA exams. The increase in Israel's growth rates would range from nearly twice the French increase to over four times the Japanese increase.

There have been efforts at improving achievement levels, some artificial and some not. With regard to the latter, a study by Kimhi and Horovitz (2015) on the direct and indirect impact of high level mathematics education in high school on wages a dozen years after graduation helped the Education Ministry in its unique campaign this past year. The Ministry attempted to convince pupils, parents, teachers, and principals to prefer five units of math (the highest level) in the matriculation studies when possible. This campaign came after a steep decline in the percentage of pupils choosing to study five units of math in recent years.

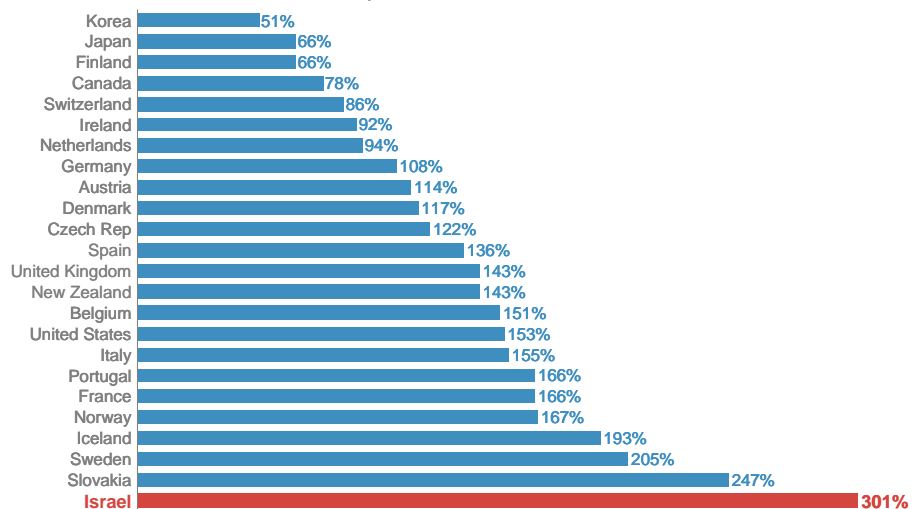
But these are symptomatic solutions. Israel's education system is in need of a systemic, structural and fundamental reform. Such a reform should focus on three areas:

- determination of a high-quality uniform core curriculum that is mandatory for all the children of Israel, without exception;
- changing the manner in which teachers are chosen, taught and compensated;
- total reorganization of the Education Ministry, from how it operates to how it is managed.

Figure 16

Increase in GDP resulting from raising education among the lowest achievers to top of bottom level

Present value of additions to future GDP as a percent of current GDP*



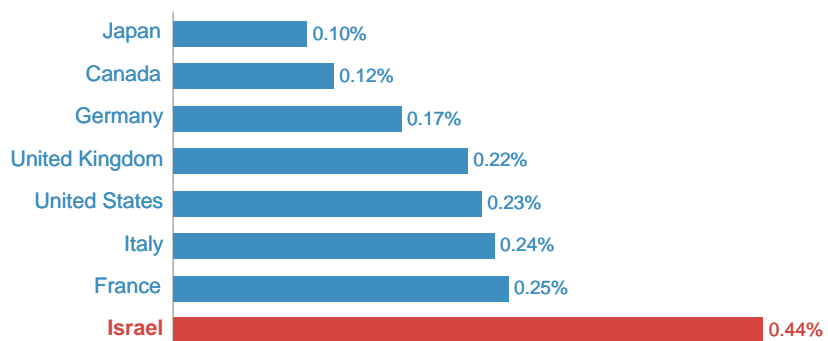
* Additions to GDP if every current student attains a minimum of 420 points in PISA exam.

Source: Eric Hanushek and Ludger Woessmann, (2015)

Figure 17

Increase in economic growth rates

as a result of educational improvement among the lowest achievers in Israel and the G7 countries*



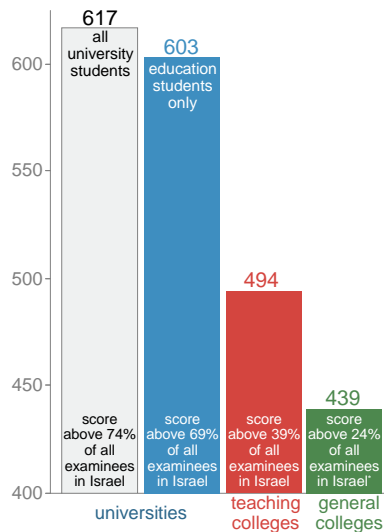
* percentage point increase in future annual growth rates if every current student acquires a minimum of 420 points in PISA exam.

Source: Eric Hanushek and Ludger Woessmann, (2015)

Figure 18

Average psychometric score

by type of institution, 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).

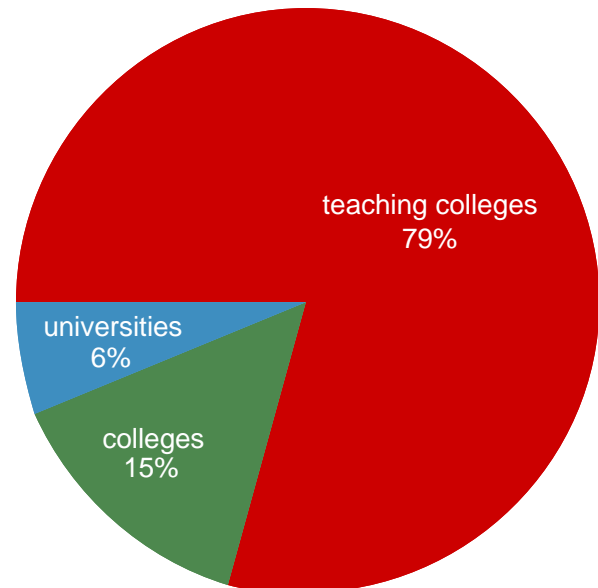
Source: Dan Ben-David, Shoresh Institution and Tel Aviv University

Data: Central Bureau of Statistics

Figure 19

Distribution of education students

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



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

Governmental inaction in this regard led to the formation of the independent, unaffiliated and apolitical E.L.A. commission in 2001.⁷ The commission's report (2003) was the first to encompass all three of the above areas. In the year that the E.L.A. report was made public, the Dovrat commission was established by the government of Israel with the mandate to conduct a thorough official examination and to make recommendations for a general reform of the system. The commission's recommendations focused on the fundamental issues affecting the education system. The report was approved by the government in 2004, but most of its key recommendations were never implemented. In the case of the core curriculum, there has even been some backpedaling since 2004 with regard to the Haredim. Also, the education of teachers is still based primarily on teaching colleges that are of very low academic quality.

To get a better understanding of the scale of the teacher quality problem, and the degree of its severity, Figure 18 shows the average psychometric grade of all first year undergraduate students in Israel, by type of institution, during the 2014-2015 school year.⁸ That year, the average psychometric grade of university students was 617. This score was above 74% of all first year students in academia. Shifting the focus to students majoring in education, only 6% of the first year education students in Israel studied in universities (Figure 19). Their average psychometric score was 603.

⁷ The eight-member E.L.A. commission included a former head of the Israeli air force, a past head of the Mossad, educators, academics – including the writer of these lines – and hi-tech entrepreneurs.

⁸ Israel's psychometric exams fulfill the same role as the SAT exams in the United States, providing a common baseline for comparison of all high school graduates applying to institutions of higher learning.

Over three-quarters (79%) of all first year education students studied in teaching colleges. Their average psychometric grade was 494, a score below 61% of all those taking the exam. The remaining first year education students (15%) studied in general colleges (which differ from country's research universities) and had an average grade of 439 – which was lower even than that of the average in the teaching colleges.⁹

Is this the best way to educate the future teachers of Israel? Both the E.L.A. commission and the Dovrat commission reached the conclusion that it is not. The two commissions recommended that teachers study first for undergraduate degrees in disciplines like math, English etc. (having to first pass the requisite entrance requirements for these, and then pass the degree requirements, which would also serve as initial filters) so that they will become professionals in these fields – at least at the level of undergraduate degrees. Later, those interested in teaching can undergo a brief period of study towards a teaching certificate.

The very large gaps between the various types of academic institutions in Israel that are depicted in Figure 18 provide a glimpse of another issue that is insufficiently clear to many in the general public – and to too many among the policy makers. The quality of undergraduate degrees differs considerably among the various higher education institutions. In and of itself, this is not a problem but a virtue of a system that enables a large segment of the population to upgrade its education beyond the high school level. However, it is insufficient to focus only on increasing the number of students in higher education. It is vitally important to increase the number studying at the highest levels of academia.

In lieu of any standardization, it is difficult to illustrate the extent of the enormous gaps that exist between institutions within the various fields. However, there are a few cases in which it is possible to make comparisons – and these are illuminating. One very popular direction of academic study is law. This is a field that requires all who are employed in it to pass the Israeli bar exam. Only 55% of those taking the exam in May 2016 passed it. On the face of it, this could appear to be a very low pass rate. But the outcomes vary greatly across academic institutions. Over 90% of the students from the Hebrew University and Tel-Aviv University passed the bar exam (Figure 20). There were relatively high pass rates in other institutions as well. But most of the law students in Israel studied in institutions where the majority of students failed in the exam – which is indicative of both the level of students who get accepted to these institutions and also of the level of teaching in them. If one generalizes to additional fields in which it is not possible to conduct such a comparison, then it is possible to understand how poorly the primary and secondary education systems – which are the funnel to higher education – prepare the students and how substantial the teaching gaps are between the various institutions of higher education.

In general, the business sector distinguishes between the various disciplines and institutions. One outcome of this is that there are fields requiring advanced knowledge with many more available positions than qualified candidates. In the field of computers, for example, there are three open positions for every candidate (Tzuk, 2016). At the national level, this severely constrains productivity growth, which determines the country's wages and

⁹ In their literature review on teacher quality and its importance, Shavit and Navon (2012) highlight the fundamental role that teacher quality has on student achievements. They add that in many studies undertaken thus far, no link has been found between student achievements and teacher education. It is possible that the missing element in these studies is that the common measure of teacher education is the number of academic degrees that they hold rather than the quality of these degrees.

living standards. At the personal level, too many who could have attained higher-paying positions are unable to overcome the barrier of poor education in the schools that they studied. Even when students are able to get accepted into Israel's leading academic institutions, they are too often unaware of the huge gaps between the higher education institutions that they could get into – and of the implications that their choices will have afterwards when they enter the job market.

While the business sector makes the distinction between qualitative levels of the various academic routes of study, the public sector is not allowed to do so. Its salary ladders are based on, among other things, the number of academic degrees – without any relation to their qualitative levels – instead of on the workers' actual performance. The bottom line is that what matters most is not the total number of academics in Israel, but the quality of their education. This is the most important factor in raising the overall standard of living and in lowering rates of poverty and inequality.

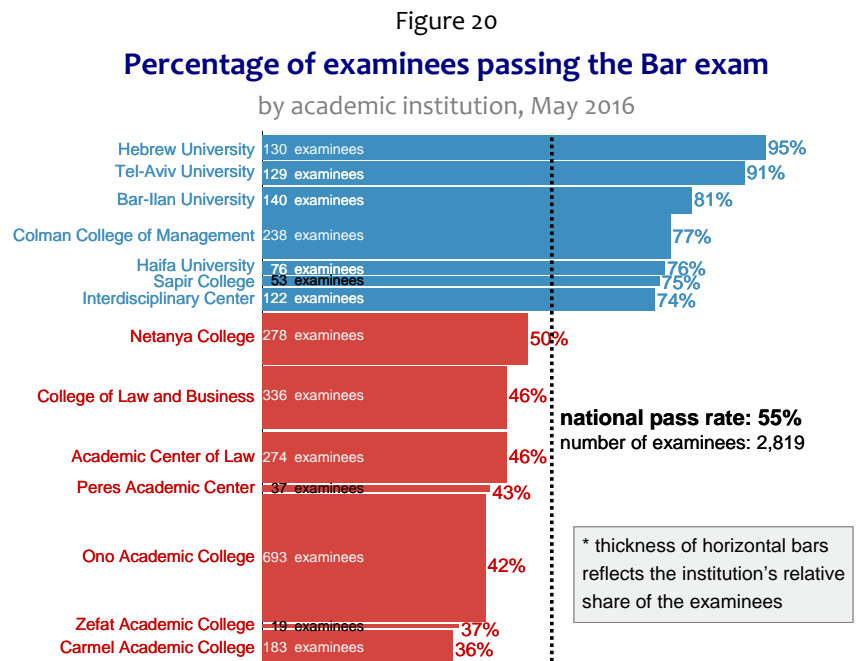
Conclusion

The deep recession in 2002-2003 forced Israel to take significant steps to stop the economic free-fall. The steps that were taken had far-reaching socioeconomic effects. Their cumulative effect was to create a sort of unique natural experiment that enabled an examination of the primary underlying determinants affecting the standard of living and its rate of growth, as well as influencing rates of income inequality and poverty.

A root treatment aimed at raising living standards – increasing the share of persons employed while upgrading their tools and conditions – is the same root treatment necessary for reducing inequality and minimizing poverty. But the major policy measures adopted by Israel following the recession only affected the quantity of workers and not the quality of workers. Accordingly, Israel's macro level indicators simultaneously diverged to polar opposite extremes.

On the one hand, Israeli employment rates rose to near average G7 levels while unemployment rates dropped precipitously. Market income inequality fell close to the OECD average while market income poverty rates were among the lowest in the OECD. These outcomes are very positive. But they go hand-in-hand with much more problematic outcomes, those that reflect the true root problems.

Israel's labor productivity is among the lowest in the OECD. It is steadily falling (in relative terms) further and further behind the G7 average (Ben-David, 2015). The country's total factor productivity, which grew at a rate that can be described as no less than incredible



Source: Dan Ben-David, Shoresh Institution and Tel Aviv University
Data: Israel Bar Association

until the 1970s, almost completely closed the gap with the United States. Since the significant change in Israel's national priorities in the seventies, TFP has been falling further and further behind (in relative terms). In light of the fact that TFP is the primary determinant for increasing a country's living standards, the implications of these trajectories, and their underlying determinants, are extremely problematical – if not ominous. Alongside the economic growth challenges, disposable income poverty and inequality in Israel have risen to OECD pinnacles, and this is, after all, the bottom line that reflects the situation after government intervention.

One of the key elements in Israel's public policies is a severe lack of emphasis on quality. This ranges from neglecting active labor market policies to non-treatment of the quality of primary and secondary education which is near the bottom of the developed world, with all that this implies for the ability of future graduates in these countries to compete with one another. Israel not only ignores the need to substantially upgrade its human capital, it also does not provide reliable and comprehensive information to prospective students and their parents on the vastness of the differences that exist between institutions and fields in higher education and of the resultant implications of these differences for future wages and employment. This is information that could help them choose the institution that best fits the prospective student's ability, and to adequately equip that individual with the necessary educational preparation in earlier learning stages.

It is still possible for Israel to change direction. But in light of the fact that a large and growing share of its population is being educated at the level of Third World countries, the ability to implement the necessary changes is continuously declining while the time to do so is running out.

References

English

- Barro, Robert and Jong-Wha Lee (2013), "A New Data Set of Educational Attainment in the World, 1950-2010," *Journal of Development Economics*, 104, pp.184-198 (updated February 2016).
- Ben-David, Dan (2010), "Israel's Education System – An International Perspective and Recommendations for Reform," in Dan Ben-David (ed.), *State of the Nation: Society, Economy and Policy 2009*, Taub Center for Social Policy Studies in Israel, pp. 115-156.
- Ben-David, Dan (2011), "Israel's Educational Achievements: Updated International Comparisons," in Dan Ben-David (ed.), *State of the Nation: Society, Economy and Policy 2010*, Taub Center for Social Policy Studies in Israel, pp. 327-336.
- Ben-David, Dan (2015), *The Shoresh Handbook on Israel's Society and Economy*, Shoresh Institution for Socioeconomic Research.
- E.L.A. Commission (Herzl Bodinger, Tamar Barak, Dan Ben-David, Edo Ohayon, Dalia Prashker, Shabtai Shavit, Tsvi Tsameret and Hillel Wahrman, 2003), *A Proposal for Structural Reform of Israel's Educational System*.
- Feenstra, Robert C., Robert Inklaar and Marcel P. Timmer (2015), "The Next Generation of the Penn World Table," *American Economic Review*, 105, pp. 3150-3182. (PWT9.0 release, 2016)
- Hanushek, Eric A. and Ludger Woessmann (2015), *The Knowledge Capital of Nations: Education and the Economics of Growth*, Cambridge, MA: MIT Press.

- Kimhi, Ayal (2012), "Labor Market Trends: Employment Rate and Wage Disparities," in Dan Ben-David (ed.), *State of the Nation: Society, Economy and Policy 2011-2012*, Taub Center for Social Policy Studies in Israel, pp. 123-160.
- Kimhi, Ayal and Arik Horovitz (2015), "Impact of the Level of High School Math on Israeli Pupils' Academic and Career Outcomes," Taub Center Policy Paper No. 2015.01.
- Navon, Yael and Yossi Shavit (2012), "Teacher Quality: A Literature Review and Policy Directions," in Dan Ben-David (ed.), *State of the Nation: Society, Economy and Policy 2011-2012*, Taub Center for Social Policy Studies in Israel, pp. 303-324.
- OECD, various statistics.
- Stier, Haya (2011), "Working and Poor," in Dan Ben-David (ed.), *State of the Nation: Society, Economy and Policy 2010*, Taub Center for Social Policy Studies in Israel, pp. 153-203.
- Yashiv, Eran (2013), "A Macro Perspective of the Economy and Society in Israel," in Dan Ben-David (ed.), *State of the Nation: Society, Economy and Policy 2013*, Taub Center for Social Policy Studies in Israel, pp. 73-94.

Hebrew

- Bank of Israel (2015), Statistical Appendix to *Annual Report*.
- Dovrat Commission (National Task Force for the Advancement of the Educational System, 2005), *A National Program for Education*.
- E.L.A. Commission (Herzl Bodinger, Tamar Barak, Dan Ben-David, Edo Ohayon, Dalia Prashker, Shabtai Shavit, Tsvi Tsameret and Hillel Wahrman, 2003), *A Proposal for Structural Reform of Israel's Educational System*.
- National Insurance Institute (2003), *Poverty and Social Gaps Report*.
- National Insurance Institute (2014), *Poverty and Social Gaps Report*.
- Tzuk, Michal (2016), *The Israeli Labor Market – Success and Challenges*, Ministry of Economy and Industry.

The Shoresh Institution is an independent, non-partisan policy research center. The institution conducts impartial, evidence-based analyses of Israel's economy and civil society. Its objective is to assist in moving the country towards a sustainable long-term trajectory that raises Israel's living standards while reducing disparity among its citizens. To further this goal, the Shoresh Institution informs Israel's leading policymakers and the general public, both inside and outside the country, through briefings and accessible publications on the source, nature and scope of core issues facing the country, providing policy options that ensure and improve the well-being of all segments of Israeli society and create more equitable opportunities for its citizens.

Findings and points of view expressed in Shoresh publications are the authors' alone.
