

Labor Productivity in Israel

Dan Ben-David*

Abstract

Israel's economic growth over the past several decades reflects a unique – and unsustainable – blend of factors. The country is one of the developed world's leaders in innovation, a central component in the productivity growth that drives economic growth. However, its productivity is among the lowest in the developed world, and has been falling further and further behind other leading countries since the 1970s. This chapter focuses on some of common factors underlying Israel's low productivity and provides a sector by sector comparison of productivity, capital formation, and wages across countries.

Economic growth is driven by productivity growth, and productivity growth is dependent on innovation. As a country that is home to some of the world's top academic institutions (Kirsh, 2010), with more patents relative to country size – as measured by GDP – than the G7¹ country average (Ben-David, 2012) and one of the leading medical, bio-tech and high tech sectors internationally, Israel has been labeled “the Start-Up Nation” (Senor and Singer, 2011). The country has been the

* Prof. Dan Ben-David, Executive Director, Taub Center; Department of Public Policy, Tel Aviv University; Research Fellow, CEPR, London.

I would like to thank Haim Bleikh, Ayal Kimhi, Daniel Premisler, and Kyrill Shraberman for their valuable comments and suggestions.

¹ The G7 countries are the United States, Canada, the United Kingdom, France, Germany, Italy, and Japan.

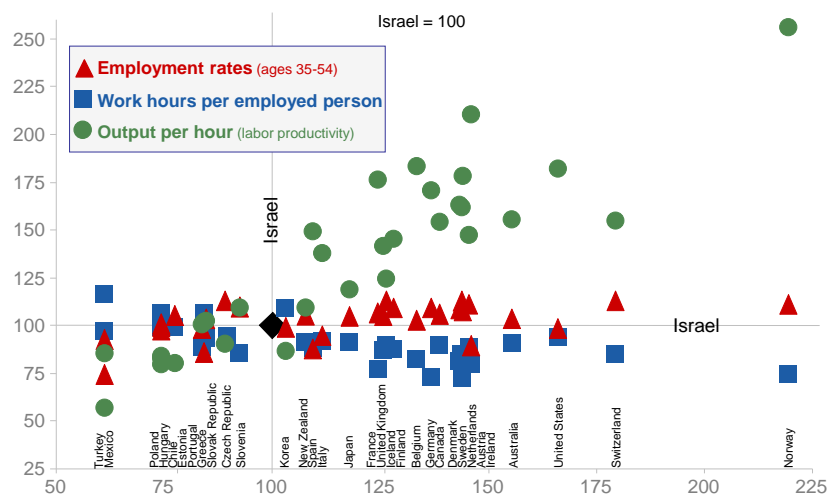
recipient of venture capital at a level higher than that of any other OECD country relative to GDP, together with large increases in foreign direct investments between 1990 and the onset of the recent world-wide recession (Ben-David, 2012).

1. Productivity, Employment, and Living Standards: An International Comparison

While innovation is a necessary condition for productivity growth, it is not a sufficient condition. The importance of labor productivity, as measured by GDP per hour worked, can be seen in Figure 1, which compares 2012 living standards in all of the OECD countries with some of the primary determinants of these living standards. In all of these comparisons, Israel is the base country in the graph (i.e., Israel = 100). The horizontal axis depicts GDP per capita – reflecting national living standards – in each of the countries relative to Israel. As can be seen in the figure, the majority of OECD countries have higher levels of income than Israel. The vertical axis measures three different GDP determinants.

Rates of employment among prime working age adults aged 35-54 are higher in nearly all of the countries than in Israel. On the other hand, the number of hours worked per employed person in the large majority of these countries is lower than in Israel. Neither one of these measures appears to be directly related to the level of GDP per capita. The relationship between the third determinant, labor productivity, and GDP per capita is readily visible in the figure. The higher the labor productivity, the higher GDP per person tends to be. In a sense, the evidence in Figure 1 suggests that when a greater share of the population is employed and when labor productivity is higher, then each employed person can work fewer hours while average living standards in the country will nonetheless be higher.

Figure 1
Living standards and the labor force, 2012
 32 OECD countries relative to Israel



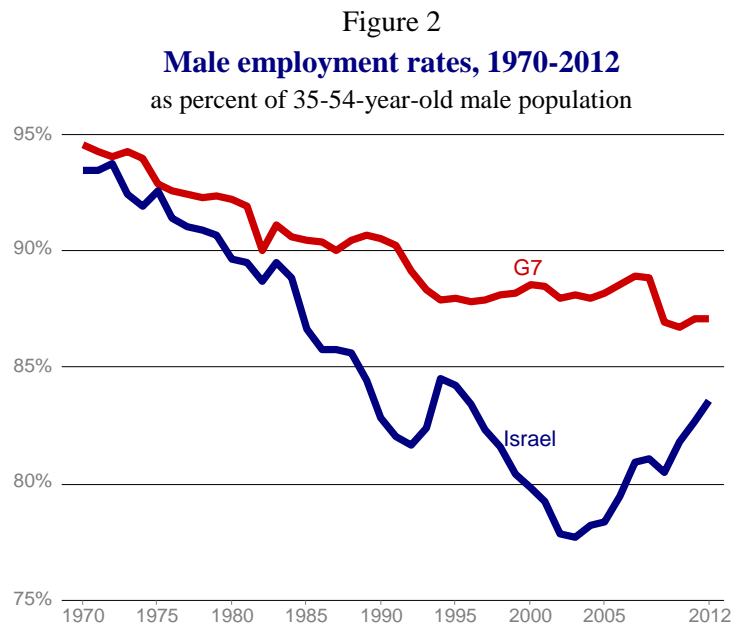
Source: Dan Ben-David, 2003b (updated)

Data: OECD

Little has changed with regard to Israel's relative position in terms of employment, hours, and productivity since 1997, as can be seen in a similar graph in earlier work by Ben-David (2003b). In the area of productivity, Israel has been – and continues to be – facing a major problem.

2. *Employment and Productivity: The Long-Run Comparative Picture*

Though Israel has been emerging from a severe recession that began at the beginning of the last decade – with rising rates of employment among its prime working age men as a result of this emergence – the overall, multi-decade, negative trend in Israeli male employment has been steeper than in the G7 countries (Figure 2).



Source: Dan Ben-David and Eitan Regev, Taub Center

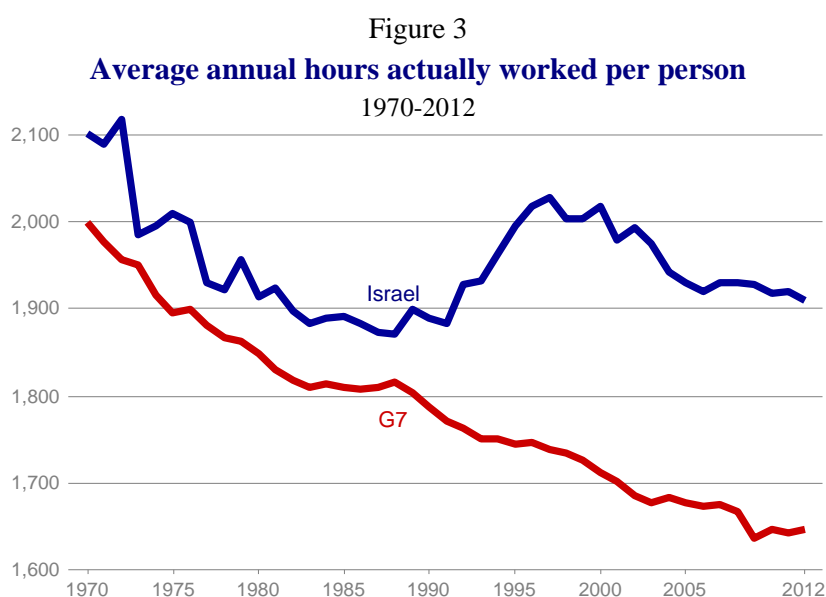
Data: Central Bureau of Statistics, OECD

Consequently, even though the G7 countries have not yet emerged from their deepest recession since the 1930s, the employment gap between the G7 and Israel has grown to 3.5 percentage points.² This

² Israel's Central Bureau of Statistics (CBS) substantially improved its labor force surveys in 2012, picking up a large number of labor force participants

contrasts with the nearly identical employment rates in the G7 and in Israel in the 1970s, nearly four decades ago.

A look at hours worked in Israel and in the G7 (Figure 3) provides further insight into changes in relative work habits since 1970. The number of annual hours worked per person in Israel and the G7 fell until the mid-1970s. Since then, the number of hours worked has continued to fall in the G7, while rising sharply in Israel during the 1990s and then declining. Following the fluctuations of the past several decades, the number of annual hours worked in 2012 roughly equaled the number of hours worked over three decades earlier, in 1980.



Source: Dan Ben-David, Taub Center and Tel Aviv University

Data: Central Bureau of Statistics, OECD

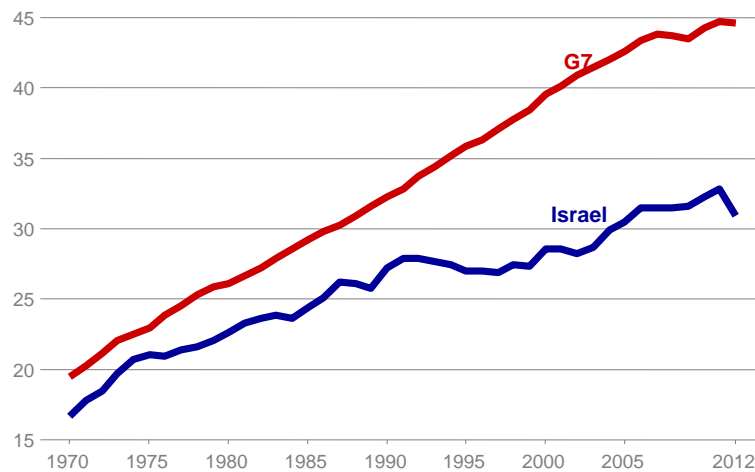
that had been unaccounted for in the past (Cohen, Burck, and Makovsky, 2013). Until the CBS publishes comparative data between the old methodology and the new one, it is not possible to know how much of the 2012 increase in employment is due to actual changes in employment and not simply reflecting improvements in survey methodologies.

In addition to the rising – over the long run – gaps in male employment and hours worked between Israel and the G7, and despite Israel's proven innovative abilities, the country's labor productivity is among the lowest in the OECD, as is evident in Figure 1. Here too, a gap has been developing over the past several decades. Israel's labor productivity has been rising at a slower pace than the increase in average labor productivity in the G7 countries for close to four decades (Figure 4) – with all of the attendant economic growth implications of falling further and further behind in relative terms.³

Figure 4

Labor productivity, 1970-2012

GDP per work-hour in 2005 PPP-adjusted dollars



Source: Dan Ben-David, *State of the Nation Report 2009*, Taub Center (updated)

Data: Central Bureau of Statistics, Bank of Israel, OECD

³ The fall in 2012 productivity is probably not reflective of an actual sharp decline in productivity but is more likely due to the higher employment numbers that year resulting from more accurate labor force survey methods implemented in 2012.

3. Some Common Factors Underlying Israel's Low Productivity

The productivity problem is widespread in Israel, as will be shown below, and while there are undoubtedly factors that are idiosyncratic to different business sectors that influence this outcome, there are also a number of economy-wide issues that are related.⁴ The problematic level of the country's human and physical capital infrastructures has been documented in Ben-David (e.g., 2003 and 2012). For example, the achievements of Israeli children in core curriculum subjects (such as mathematics, science, and reading) on international exams have been consistently below each of 25 relevant OECD countries since the late 1990s (and it is possible that this has been the case for quite a bit before then as well, though no representative national samples exist prior to 1999). This is compounded by the fact that even these exams do not include ultra-Orthodox boys, and many of the ultra-Orthodox girls, who do not study core educational material at all and today comprise 20 percent of Israel's primary school pupils.⁵ The education provided to

⁴ The fact that the share of Israel's shadow economy is one of the highest in the developed world (see Ben-David, 2011) means that there is a considerable amount of unreported economic activity in the country. However, this would presumably be reflected not only in a numerator (GDP) that should be larger, but also in a denominator (hours worked) that would likely be larger as well – so it is not obvious what kind of an effect this would have on productivity. In any event, unless the shadow economy share is changing over time, then this should be reflected primarily as a level effect and should not have much of an impact on the slope of the productivity path over time.

⁵ The recent TIMSS examination in 2011 indicates an 11.4 percent improvement in mathematics achievement since the previous exam was administered in 2007. A total of 4,699 eighth graders participated in the 2011 TIMSS exam. Also in 2011, an annual nationwide mathematics exam called MEITZAV was administered to 44,002 pupils – nearly all of the country's eighth graders. This exam was not given in 2007, so there is no way to compare overall improvement over this period. However, the exam was given in 2008 and there was a 4.4 percent improvement between 2008 and 2011. The MEITZAV exam was given again in 2012 – and the eighth graders' math

Arab Israeli children yields achievements not only below all of the developed countries, but also below many third world countries.

Ultra-Orthodox Jews and Arab Israelis comprise almost half of the country's primary school pupils, and these are not the only children in Israel receiving one of the worst basic educations in the Western world. During the decade between 2000 and 2010, there were enrollment increases of 37 percent in Arab Israeli schools and 57 percent in ultra-Orthodox schools that far exceeded the enrollment growth in the state-religious schools (11 percent) and in the state secular schools (0.3 percent). The current distribution of enrollment levels combined with the changes in enrollment that occurred over the past decade place Israel's overall human capital infrastructure at an increasingly lower relative level than that in other developed countries. Even if a share of the more gifted children continue on to university, the foundation of high-quality human capital that will subsequently be available in the labor market will be far less than the potential.

An influx of large numbers of relatively uneducated and unskilled foreign workers – at one point reaching a high of one out of every eight workers in Israel's business sector – only exacerbates the issue of low human capital in the labor market (Ben-David, 2010). Unlike many Western countries that need a young workforce to supplement their aging societies, Israel has an unusually young population compared to most developed countries. The relatively low skill level of a large portion of this local population eliminates the need for inundating the economy with additional workers from abroad who are similarly poorly educated. Nevertheless, large numbers of foreign workers continue to receive work permits in the country.

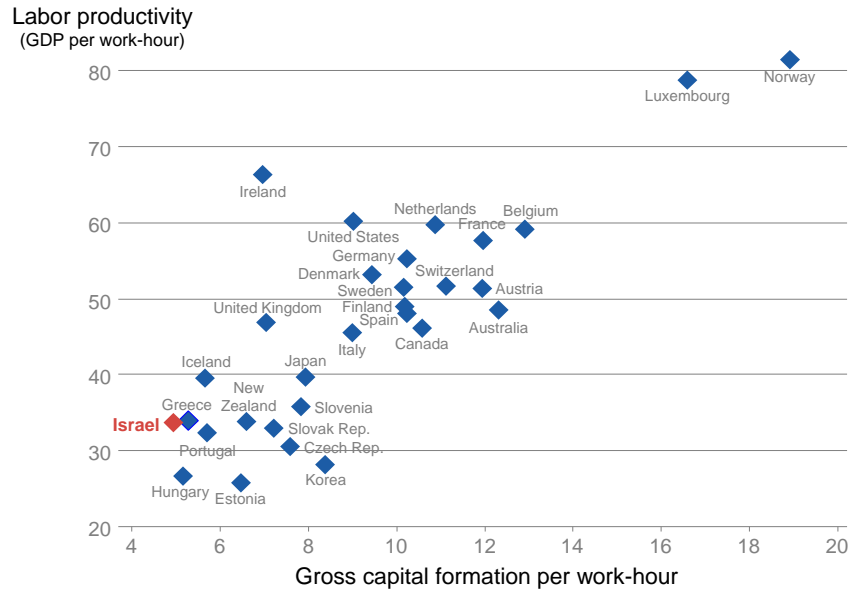
In addition, the country's transportation infrastructure has been neglected for decades. As shown in Ben-David (2012), the congestion on Israel's roads as measured by the number of vehicles per kilometer road

achievements returned to their 2008 levels, leaving a big question mark as to the meaning of the improvement that lasted only until 2011, the year of the TIMSS exam.

is 2.6 times the OECD average. At the same time, the number of vehicles per person is only half the OECD average, giving an indication of how out of balance the transportation infrastructure is with the country's needs. The more congestion on the roads, the more resources – drivers, trucks, etc. – are needed to transport the same products. The use of rail in Israel is even more limited in comparison with developed countries. Insufficient capital investment in roads and rail is a major inhibitor of productivity growth.

The positive relationship between capital formation, in general, and labor productivity is reflected in Figure 5. Israel's capital formation is on the low end of the OECD. So it should come as no surprise that a country with relatively low national levels of physical and human capital is exhibiting problematic productivity growth at the national level. Add to this a very cumbersome governmental bureaucracy and the implication is that even more resources need to be diverted away from actual production of goods and services.

Figure 5
Capital intensity and labor productivity in the OECD
 in 30 OECD countries, current PPP-adjusted dollars, 2011



Source: Dan Ben-David, Taub Center and Tel Aviv University

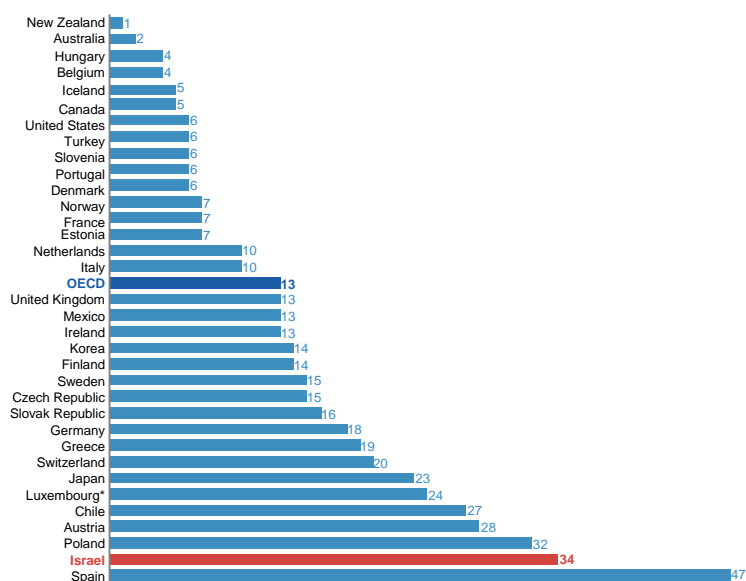
Data: OECD, World Bank

Figure 6 shows that the number of days needed to start a business in Israel (34 days) is the second highest in the OECD, and two and a half times the OECD average of 13 days. The country's small domestic market is concentrated in the hands of too few individuals,⁶ with too

⁶ One of the main recommendations by a recent governmental commission for increasing the economy's competitiveness (2012), led by former Finance Ministry Director-General Haim Shani, was a separation between control of firms focusing on the real side of the economy and firms focusing on its financial side.

much regulation,⁷ and insufficient competition – a crucial factor in spurring physical and human capital investments necessary for productivity growth. All of these factors combine to yield higher domestic prices that reduce the economic viability and attractiveness of Israel's economic environment even more.

Figure 6
Number of days needed to start a business in 2010
in all 34 OECD countries



* Luxembourg data is from 2009

Source: Dan Ben-David, Taub Center and Tel Aviv University

Data: World Bank

⁷ Following the summer protests in 2011, the government's Commission for Economic and Social Change, headed by Prof. Manuel Trajtenberg, recommended a number of changes in government policies regarding regulation and enforcement aimed at increasing the level of competitiveness in the economy and lowering prices.

4. A Sector by Sector Productivity Comparison Across Countries

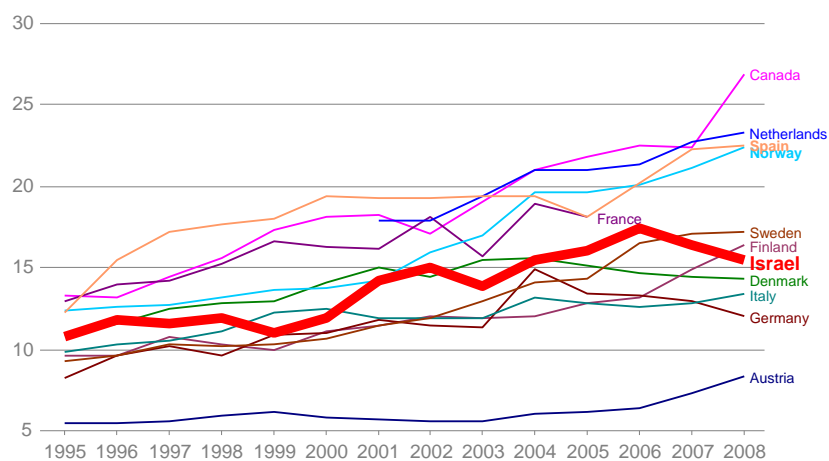
A sector by sector comparison with the OECD countries that have comparable data on labor productivity reveals a similar – and problematic – picture.⁸ In 1995, labor productivity in agriculture (Figure 7, panel A), one of the historical jewels in Israel's crown, was roughly in the middle of the OECD countries. Since then, labor productivity in agriculture has risen, though Israel remained in the middle range of the OECD countries in 2008.

In manufacturing (panel B), which includes high tech as well as more traditional industries, labor productivity was below the OECD countries for nearly all of the years since 1995. By 2008, Israel had exceeded only Italy and remained below the other countries. Labor productivity in financial intermediation, real estate, renting, and other business activities (panel C) went from second to last place in 1995 to being tied for last place in 2008. In the areas of wholesale and retail trade, repairs, transport, hotels and restaurants, Israel's labor productivity was below all of the OECD countries in panel D in 1995, and even further below all of these countries in 2008. In construction, a sector with very large numbers of unskilled foreign workers, labor productivity has been much lower, and remained much lower, than in the OECD countries appearing in panel E since 1995.

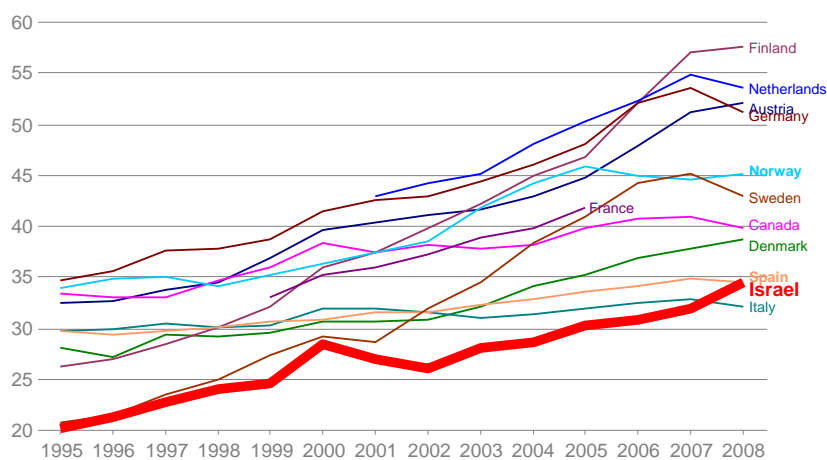
⁸ The within-sector comparison across countries is done here for all countries including Israel for which the OECD provides sectoral data and it uses national purchasing power parities. It would have been preferable, and more accurate, to conduct these comparisons using purchasing power parities by business sectors – but these are not available.

Figure 7
Labor productivity in Israel and OECD, 1995-2008
 GDP per work-hour in constant 2005 dollars*

A. Agriculture



B. Manufacturing



* Conversion to dollars using purchasing power parities

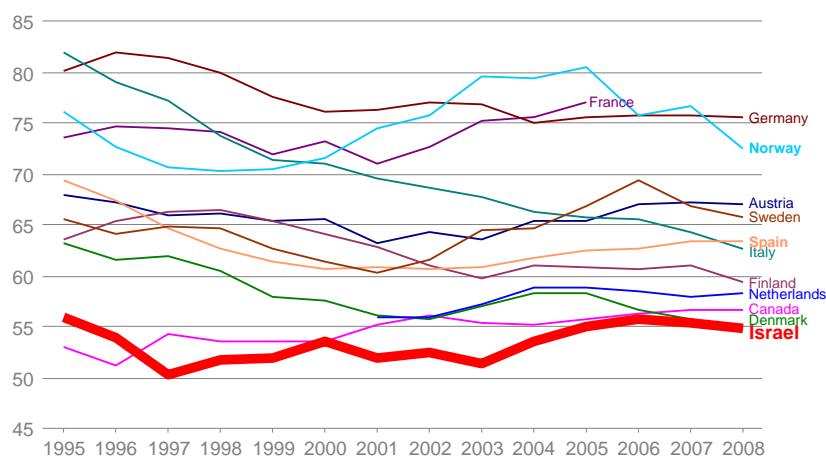
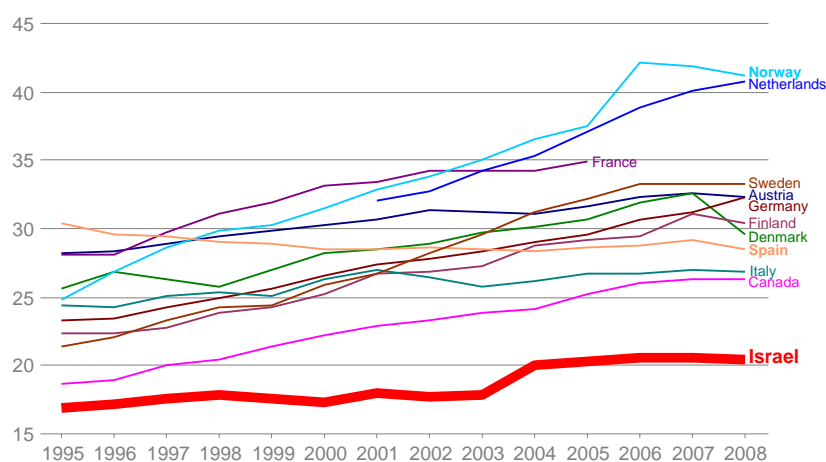
Source: Dan Ben-David, Taub Center and Tel Aviv University

Data: Central Bureau of Statistics, OECD

Figure 7 (continued)

Labor productivity in Israel and OECD, 1995-2008

GDP per work-hour in constant 2005 dollars*

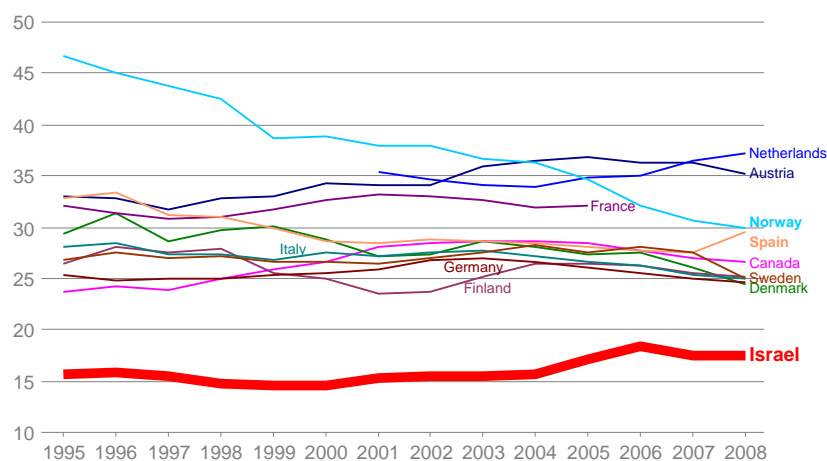
C. Financial intermediation; real estate, renting and business activities**D. Wholesale and retail trade, repairs; hotels and restaurants; transport**

* Conversion to dollars using purchasing power parities

Source: Dan Ben-David, Taub Center and Tel Aviv University**Data:** Central Bureau of Statistics, OECD

Figure 7 (continued)
Labor productivity in Israel and OECD, 1995-2008
 GDP per work-hour in constant 2005 dollars*

E. Construction



* Conversion to dollars using purchasing power parities

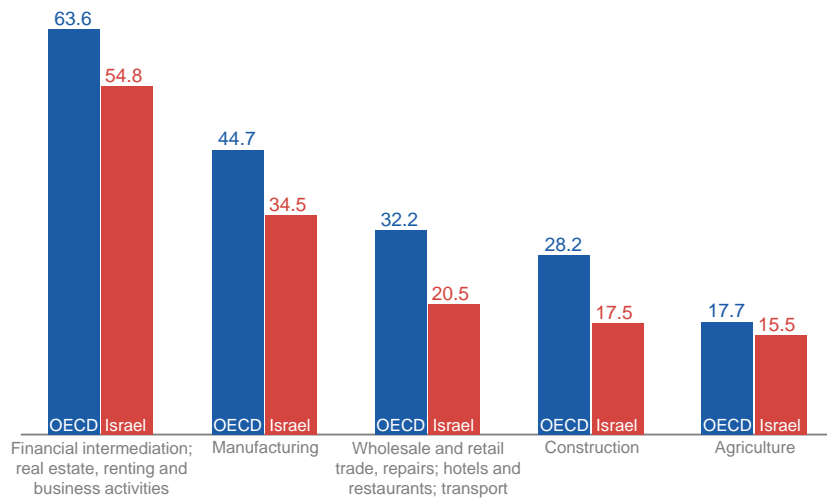
Source: Dan Ben-David, Taub Center and Tel Aviv University

Data: Central Bureau of Statistics, OECD

Figure 8 summarizes the comparative picture at the sector level. Of all of the sectors, labor productivity is highest in financial services, real estate, renting, and other business activities, both in the OECD and in Israel. The average for the OECD countries is 16 percent greater than Israel's labor productivity in that sector. Labor productivity in manufacturing is the second highest among business sectors in the OECD and in Israel, with productivity in the OECD 30 percent higher than in Israel. In wholesale and retail trade, as well as in construction, labor productivity is progressively lower than in the other business sectors mentioned above, with gaps between the OECD and Israel rising to

roughly 60 percent. In agriculture, where Israel is the most similar to the OECD, labor productivity is the lowest of all the branches.

Figure 8
Labor productivity in Israel and OECD*, 2008
 GDP per work-hour in constant 2005 dollars**



* Average for Austria, Canada, Denmark, Finland, France, Germany, Italy, Netherlands, Norway, Spain, and Sweden

** Conversion to dollars using purchasing power parities

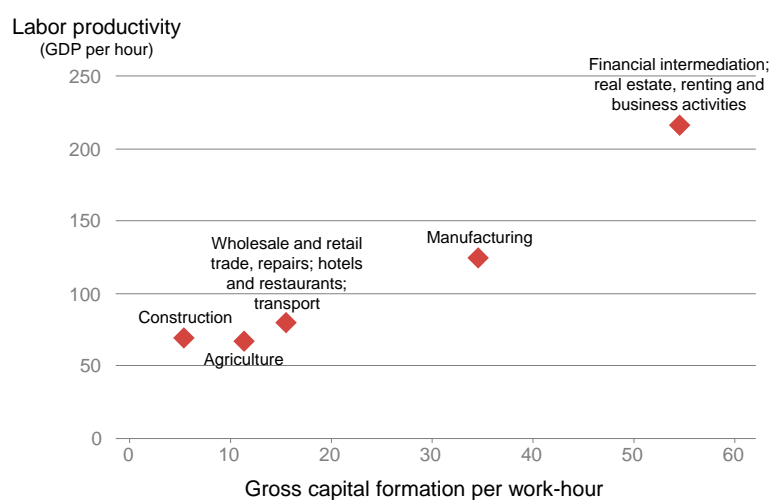
Source: Dan Ben-David, Taub Center and Tel Aviv University

Data: Central Bureau of Statistics, OECD

5. Capital Formation, Productivity, and Wages at the Sectoral Level

The relationship between gross capital formation per hour worked and labor productivity across sectors within Israel (Figure 9) is similar to the positive relationship depicted between the two variables across countries in Figure 5. The more capital, the greater the labor productivity is in a given sector.

Figure 9
Capital intensity and labor productivity in Israel, 2008
in shekels

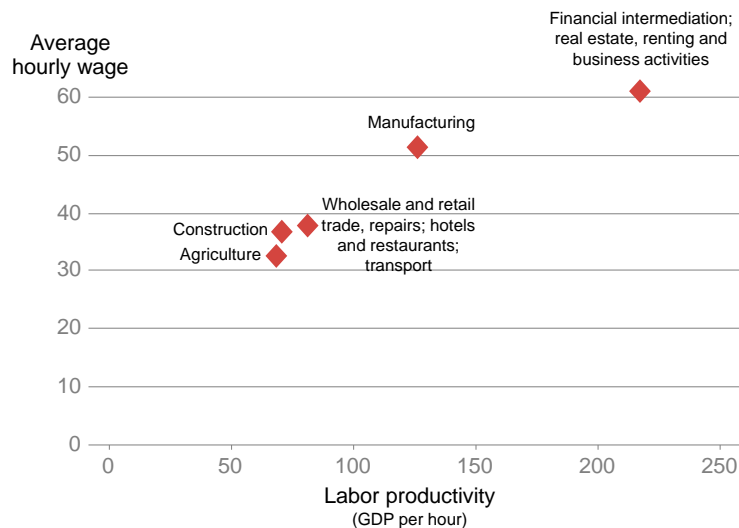


Source: Dan Ben-David, Taub Center and Tel Aviv University

Data: Central Bureau of Statistics, OECD

The subsequent positive relationship across business sectors between labor productivity and wages can be seen in Figure 10, and it is no coincidence. The more that is produced per hour by a worker, the more that worker can be compensated. Consequently, the higher level of capital formation in the sector that includes financial intermediation, real estate, renting, and other business activities is related to higher labor productivity, which in turn is related to higher wages. At the other end of the spectrum, agriculture and construction have very little capital, hence very low labor productivity – and subsequently, they pay lower wages.

Figure 10
Labor productivity and wages in Israel, 2008
in shekels



Source: Dan Ben-David, Taub Center and Tel Aviv University

Data: Central Bureau of Statistics, OECD

6. Conclusions

As one might surmise, the more educated the individual, the greater the opportunities abroad, the higher the rate of potential emigration – and that is certainly the case among Israelis (Gould and Moav, 2007). Among the most mobile group, university professors, Israel's brain drain is unparalleled among developed countries (Ben-David, 2008, and "The State of Israel's Universities and Its Researchers" in this report). To be able to pay competitive salaries to individuals vital to its future – engineers, physicians, academic researchers, that is, those who can easily relocate from one country to another – the country must be able to generate productivity at levels that are equal to or above those in other developed countries. In light of the exceptional caliber of talent currently available at the pinnacle of Israel's human capital pyramid, this is not an insurmountable obstacle.

But having the best and brightest at the top is not sufficient. The human capital pyramid's foundations need to be broadened and strengthened considerably. That can be done if the country overhauls its education system, upgrading its core curriculum and ensuring that it is provided at a high level in all of the country's schools to all of its varied populations. Such an overhaul also needs to include a major change in the way that the country selects, trains, and compensates its teachers, and in the way that the extremely cumbersome and inefficient Ministry of Education is run and managed.

In addition to boosting its human capital infrastructure, Israel needs to substantially improve its transportation infrastructure. The current state of its roads and rails provides a sad commentary on the country's national priorities. It is unconscionable neglect that has led a nation with only half the vehicles per capita to more than two and a half times the congestion of the OECD average. The increase in transportation infrastructure investment during the past decade has been to a level similar to the OECD average (Ben-David, 2012), so that the gap is not expected to

continue to rise – but current investment levels are also insufficient for closing the gap.

Increasing competition is crucial for creating the pressure to invest and innovate, to create better products and services at lower cost. Current barriers to competition include high bureaucratic entry and exit costs for firms wishing to do business in Israel. Although protective regulation has been reduced, it continues to exist and to take a toll.

The provision of high-quality social services is an important goal and a hallmark of modernity. The ability to provide such services at the highest levels is very dependent on the relative wealth of a country. There is a tradeoff between wanting to provide as good and as plentiful a service to the public as possible, and not raising taxes to a point that makes the country less competitive, inhibiting its productivity growth and, ultimately, its rate of economic growth – which in turn will reduce the nation's ability to provide such services.

A country wishing to improve its quality of life must focus on the basics. It is no coincidence that the primary contributors to productivity growth are also the major elements underlying core treatment of poverty and income inequality. An improved educational system and physical infrastructure are vital for providing individuals currently in Israel's social periphery with the tools and conditions to lift themselves and their children out of the poverty cycle. As these individuals gain the necessary skills, they contribute directly to the country's overall capacity to assimilate and implement new ideas – the key to innovation, and the heart of productivity improvements.

Israel currently has all of the knowledge, know-how and resources needed to move to new socioeconomic trajectories that will bring it closer to the leading developed countries. But it needs to find the leadership and political wherewithal to initiate the policy changes that will in turn yield the structural, long-run, socioeconomic changes that Israel needs to excel, to flourish, to retain its best and brightest, and to attract its young professionals to return.

References

English

- Ben-David, Dan (2008), *Brain Drained*, CEPR Discussion Paper No. 6717.
- Ben-David, Dan (2010), "Israel's Labor Market – Today, in the Past and in Comparison with the West," in Ben-David, Dan (ed.), *State of the Nation: Society, Economy and Policy 2009*, Taub Center for Social Policy Studies in Israel, pp. 213-275.
- Ben-David, Dan (2011), "Public Spending in Israel over the Long Run," in Ben-David, Dan (ed.), *State of the Nation: Society, Economy and Policy 2010*, Taub Center for Social Policy Studies in Israel, pp. 87-90.
- Ben-David, Dan (2012), "The Start-Up Nation's Threat from Within," in Dan Ben-David (ed.), *State of the Nation: Society, Economy and Policy 2011-2012*, Taub Center for Social Policy Studies in Israel, pp. 17-93.
- Senor, Dan and Saul Singer (2009), *Start-Up Nation: The Story of Israel's Economic Miracle*, Hachette Book Group.

Hebrew

- Ben-David, Dan (2003a), "A Socio-Economic Perspective of Israel's Educational System in an Era of Globalization," *Quarterly Journal of Economics*, pp. 47-72.
- Ben-David, Dan (2003b), "Israel's Work Force from an International Perspective," *Quarterly Journal of Economics*, pp. 73-90.
- Cohen, Noam, Luisa Burck, and Itzhak Makovsky (2013), *Examining the Increase in Unemployment in the Transition to a Monthly Labour Force Survey*, Working Paper 78, Central Bureau of Statistics.
- Gould, Eric and Omer Moav (2007), "Israel's Brain Drain," *Israel Quarterly Journal of Economics*, pp. 1-22.
- Kirsh, Uri (2011), *Estimating the Excellence of Israel's Universities*, Working Paper, Shmuel Neeman Institute, Technion.

