A GROWTH STRATEGY FOR THE ISRAELI ECONOMY

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EXECUTIVE SUMMARY

Annual economic growth in Israel of 3.5% over the past decade has largely been the result of an increase in employment rates, while the growth rate in productivity has been very low. The rates of employment cannot continue to grow at this rate in the future due to the expected saturation in employment rates among the non-ultra-Orthodox Jewish population. Even the achievement of optimistic employment goals among sectors with currently low participation rates will not prevent a drop in GDP growth to a historically low level of only 2.3% per year. Israel's GDP per capita is not catching up to that of comparable OECD countries and the gap has remained unchanged for more than 40 years. Without reforms to increase the productivity growth rate, Israel's relative GDP per capita is expected to deteriorate.

This paper presents a macroeconomic analysis of the sources of the productivity gap — in terms of output per-hour of work — between Israel and a group of seven comparable OECD (Organisation for Economic Co-operation and Development) economies. The analysis points to three main policy related factors that potentially explain the existing gap: (1) low levels of public investment and capital stock, in particular in transportation infrastructure and information and communications technology (ICT) infrastructure; (2) shortage of human capital, primarily among individuals who do not obtain academic education; and (3) heavy regulatory and bureaucratic burden on the business sector.

The goal of this policy paper is to propose a comprehensive economic strategy for the Israeli economy, backed up by a methodological framework based on the economy's strengths and weakness, including a description of the areas that are in need of specific and implementable programs and continuous measurement of progress. We are proposing a strategy to deal with the main factors that can be influenced by government action and which have an effect on the productivity gap between Israel and the benchmark OECD economies. The vision is to bring the levels of the factors of production up to those in the benchmark economies, including investment in public

infrastructure, and in particular transportation infrastructure and ICT infrastructure; improvement in human capital by establishing a post-secondary vocational education and training (VET) system, in parallel to the academic system; and the stimulation of the business sector through the reduction in the bureaucratic and wasteful regulatory burden.

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1. SUMMARY AND CONCLUSIONS

The gap in standard of living, as measured by the gap in GDP per capita, between Israel and seven comparable Organisation for Economic Co-operation and Development (OECD) countries — referred to as the "benchmark economies" — is not narrowing and the size of the gap has remained largely unchanged since the early 1970s (Figure 1).[1] There are two engines of growth for closing the gap: employment rates and productivity rates as measured by output per workhour. Since the end of the Second Intifada in 2003, Israel has shown consistent growth in rates of employment. This growth, which was the result of a designated government policy, has been the main engine of growth in the economy in recent years. Of the average annual growth of 3.5% during the past decade, the increase in workhours (2.6% per year) contributed about 75% of the growth while the increase in productivity (only 0.9% per year on average) was responsible for only about 25% of growth. The rates of employment in Israel are now almost equal to those in the benchmark countries and therefore this engine of growth is close to having been exhausted, while the gaps in productivity per workhour are widening.

FIGURE 1: RATIOS OF GDP PER CAPITA, PRODUCTIVITY, AND RATE OF EMPLOYMENT BETWEEN ISRAEL AND THE BENCHMARK ECONOMIES, 1970–2017

GDP per capita ratio   GDP per worker ratio   Employment rate ratio
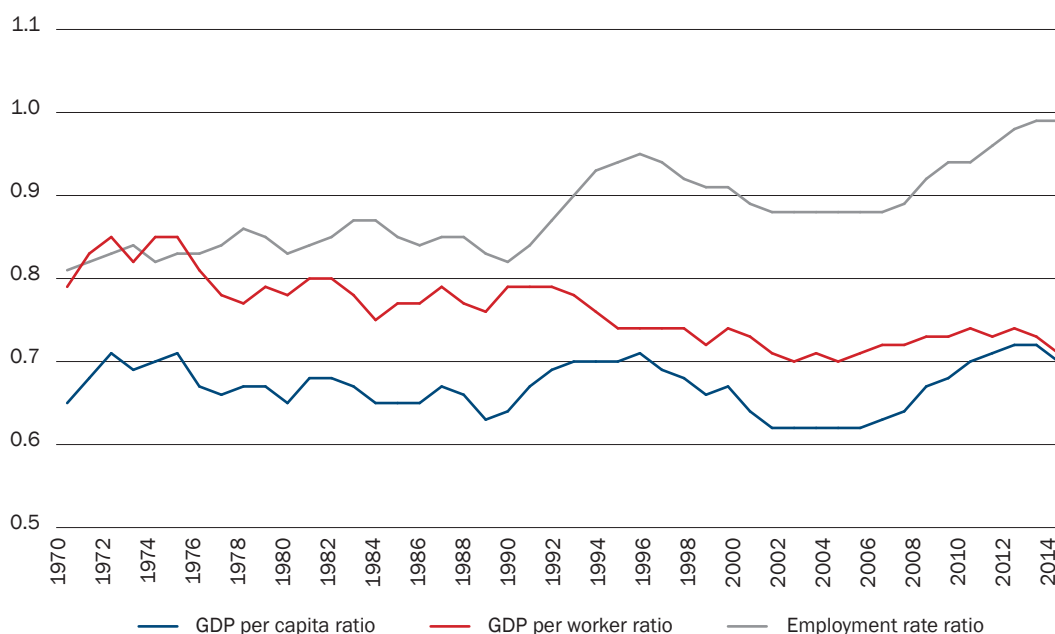
Source: OECD and calculations by the Aaron Institute.

One of this paper's authors, Professor Zvi Eckstein, chaired Israel's Committee for Advancement of Employment by 2030 (hereafter "2030 Employment Committee"), established by government approval and appointed by Minister of Labor and Welfare Haim Katz in August 2017. The committee was mandated to formulate policy recommendations and implementable proposals designed to increase employment among populations that are underrepresented in the labor market. These include improvement in the skill levels of workers and their degree of suitability to the needs of the economy as well as reinforcement of the government's preparedness for the labor market of the future.

The rate of employment among the population aged 25–64 is currently about 78%. The committee targets increasing this employment rate to about 80.4%. We estimate that even under the assumption that the ambitious employment targets of the 2030 Employment Committee are achieved, without accelerated growth in productivity the rate of economic growth will slow during the coming decade to about 2.3% annually. This translates into negligible GDP growth per capita and a widening of the gap between Israel and the comparable European countries. Productivity is currently the economy's barrier to growth; without an increase in the level of productivity, Israel will not manage to provide its citizens with a high standard of living and to deal with the social problems facing the country.

The incidence of poverty in Israel is particularly high in comparison to other countries and is ranked second-highest among the OECD countries. In 2013, the incidence of poverty in Israel stood at 18.6% as compared to an average of 8.2% in the benchmark economies. In 2016, this figure fell to 17.7% while there was no change in the benchmark economies. As in the rest of the world, the gaps in labor income are the main source of poverty and inequality in households' disposable income, due both to the gaps in rates of employment and the widening disparities in income per workhour. The increase in the rate of employment, which is drawing large numbers of individuals with little experience into the labor market — many of whom have lower-than-average labor skills, and many of whom enter the low-productivity commerce and services industry — is one of the reasons for the slow growth in productivity during the last decade. However, this point only reinforces the need to raise productivity, primarily among workers in this industry, which usually is also manifested in increased wages.

In order to understand the reasons and the sources of the gap in GDP per capita and in output per workhour, and in particular the factors that determine government policy, we carry out a macroeconomic analysis based on the main factors of production and the economic growth using widely accepted macroeconomic methodology. This methodology analyzes GDP per capita as stemming from all of the economy's factors of production: employment, human capital, private and public capital, and total productivity (the "Solow residual" which represents the efficiency of production). On this basis, we carry out a comparison of the gap between Israel and the benchmark economies. As mentioned, since the number of workhours in Israel is similar to that in the benchmark economies, all of the gap in GDP per capita will be the result of the level of output per workhour, which is more than 44% lower than in the benchmark economies.

The comparison of the data on the levels of factors of production in the economy — the capital stock in the business sector; the stock of capital in the public sector, which is divided primarily into two types of physical infrastructure, i.e. transportation infrastructure and digital or information and communications technology (ICT) infrastructure; and the skill level and education of the labor force (human capital) — shows that Israel lags behind in all of them. Thus, the stock of public capital per capita in Israel is only 25% of that in the benchmark economies and is the lowest-ranked among the OECD countries, apart from Chile. The stock of public ICT capital per capita in Israel is only 42% of that in the benchmark economies. The stock of private capital in the business sector per workhour is only 38% of that in the benchmark economies. Large gaps also exist in the quality of human capital as measured by the skills of individuals: workers in the benchmark economies have scored 12% higher than workers in Israel on an OECD index of basic skills.[2]

The level of public investment in Israel is about 2% of GDP, about half of that in the benchmark economies (3.8%). Meanwhile the rate of annual population growth in Israel is 1.8% while that in the benchmark economies is only 0.6%. These figures are evidence that the gaps in the factors of production between Israel and the benchmark economies are growing and will continue to do so as long as there is no major change in government policy regarding each of the aforementioned factors of production.

In order to determine the recommended government's priorities, the productivity gap must be broken down according to the various factors of production and the implied potential policy reforms. The macroeconomic analysis makes it possible to estimate the share of each factor of production in the output gap per workhour relative to the benchmark economies, which stood at $26 in 2016.[3] The analysis indicates that the stock of public capital in Israel, which is primarily composed of transportation infrastructure, explains about 30% of the productivity gap (which amounts to $7.90 per workhour). The stock of ICT capital contributes 3.2% to the productivity gap (which amounts to $0.85 per workhour or about 2% of GDP (about 25 billion Israeli new shekels, NIS, per year). According to the economic literature, the investment in ICT has a significant influence on economic growth.[4] In particular, government investment in ICT supports the digitization of the public sector and thus raises the level of innovation in the economy as a whole, which has also been stressed in OECD publications.[5] It is unfortunate that in a "start-up nation" such as Israel, the innovation in the business sector is almost entirely directed to the outside rather than to advancing the Israeli economy. Given current trends, the gap in the stock of public ICT capital is expected to widen since the level of investment in Israel is about one-third of that in the benchmark economies. The investment needed to close this gap is much less than the needed investment in public physical capital, although it has a significant effect on the efficiency of the government and on the development of the business sector.

The gap in the stock of private capital per workhour in Israel explains 31% of the productivity gap, i.e. a gap of $8 in output per workhour. The analysis also indicates that the low figure for private capital per workhour in Israel is indicative of a high effective cost of capital for the business sector, which is the result of, among other things, a heavy bureaucratic burden. An inefficient bureaucracy increases uncertainty in doing business and constitutes a tax on business activity, which hinders entrepreneurship and competition in the economy, among other things. The gap in the quality of human capital explains 20% of the productivity gap, equivalent to $5.20 per workhour. The unexplained part (the "Solow residual"), which is mainly attributed to management, ability to compete, and innovation, constitutes 15.5% of the gap, which is equivalent to $4 per workhour.

The macroeconomic analysis enables us to propose a strategy to deal with the main factors that can be influenced by the government and which determine the productivity gap between Israel and the benchmark economies.

The main policy recommendations that arise from our analysis, as well as related studies at the Aaron Institute for Economic Policy, are as follows:

- **Employment targets.** While previous employment targets have been achieved, there are still sectors of the population that are underrepresented in the labor market, including ultra-Orthodox men, Arab women, and the disabled. Therefore, we recommend the implementation of the 2030 Employment Committee targets

whose goal is to increase employment among these sectors. The achievement of these goals is dependent to a large extent on removing legal barriers and economic disincentives that limit their integration in employment.

- **Reinforcement of the government effort to reduce excess bureaucracy and excess regulation by adopting advanced tools to measure the direct cost of regulation and bureaucracy in the economy.** This should be done through legislation to create a centralized entity with the ability to implement efficient regulation and thus serve as a single address for the encouragement of business in Israel, similar to those that exist in many Western economies.[6] This will increase the attractiveness of investing in Israel, for both Israelis and foreigners, and will lead to greater competitiveness, efficiency, and labor productivity.

- **Infrastructure investment.** In order to overcome the huge gap in the levels of public physical capital, which is primarily (about 75%) composed of transportation infrastructure, we propose a national program of investment in infrastructure. This program would double the investment in public capital. As a result, over a period of 15–20 years the gap with the benchmark economies would be closed and transportation infrastructure in Israel would provide accessibility at a level similar to that in the benchmark economies. In modern economies, economic growth takes place primarily in the cities and, like them, the Israeli economy is relying more and more on service industries which are in need of the advantages of agglomeration in order to achieve a high level of productivity.

- **Robust public transportation.** To this end, the Aaron Institute is preparing a comprehensive plan for urban development in Israel, which will reinforce the metropolitan centers alongside the development of the planned Tel Aviv Metro light rail project and the rest of the public transportation system.[7] Among its main recommendations:

  ○ The Metro plan for the Tel Aviv metropolitan region, which will be integrated with the rest of the public transit system, should be implemented. The financing of the Metro will come from revenue derived from land development, a special tax on business activity that benefits from Metro services, and government financing that will be spread out over 20–30 years.

  ○ Metropolitan transport authorities for each of the four metropolitan areas[8] and especially the Center (Tel Aviv) should be created immediately. Service supply during peak hours should be increased, a congestion tax should be imposed, and greater accessibility should be assured by allowing ride-hailing companies and shared transport, as should the full coordination between the various systems.

- **Preparation of a plan for "accessible governance."** This plan should ensure that by 2030 the level of public investment in ICT and the use of digital systems will be equal to that in the benchmark economies and that the business sector will benefit from the resulting externalities.

- **Improving the human capital by approving the recommendations of the 2030 Employment Committee.** These include an overall reform of vocational and technological training focused on individuals without an academic education and with a particularly low level of professional skills.

- **The removal of barriers to the acquisition of human capital in the Arab population.** The income disparities between Arab and non-ultra-Orthodox Jewish households is of 50% and it primarily stems from gaps in human capital. These disparities are for the most part a result of barriers in the education system and in post-secondary studies, including knowledge of Hebrew. They are manifested in fewer years of schooling and a lower quality of education. Therefore, and as an Aaron Institute study by Marian Tehawkho[9] shows, special programs in Druze high schools should be expanded to Arab high schools. This is part of the effort to eliminate disparities in budgeting and in order to raise matriculation rates. Per Tehawkho's study, we also recommend increasing the number of students in the paramedical professions in Israel by expanding the existing faculties or establishing a new institution that will specialize in this field of study. The goal will be to reduce the number of Arab students that leave the country for academic studies abroad. Academic studies in Israel will help the Arab population to overcome language challenges and will prepare the way for their integration in the labor market.

- **Maintain macroeconomic stability.** The government should the level of public expenditure at about 40% of GDP, with a stable debt-to-GDP ratio of about 60%. In order to meet these targets, the government must revise the tax and expenditure system in order that at the end of four years the stability targets will be maintained. In our opinion there is no economic reason to expand the deficit and the debt-to-GDP ratio that is not based on investment in continued growth by means of structural reforms and increased public investment. Significant reforms to increase productivity and in particular with respect to investment in transportation infrastructure will be backed up by revenues and payments that are spread out over many years. The closing of the gap in transportation infrastructure will require a substantial increase in government investment — of up to 3.7% of GDP during the period of the investment, as compared to the current level of 2% of GDP annually. Such an increase cannot come from existing sources in the budget under the current fiscal rules and therefore we recommend financing the additional investment by means of increasing the deficit to 3.5% of GDP, for a period of 15 years. According to this trajectory, the increase in the debt-to-GDP ratio as a result of the increase in the deficit will be minimal (an increase of only 0.5% at the end of 15 years). Care should be taken such that any addition to the deficit will be allocated to investment in transportation infrastructure, which will result in a maximal increase in productivity in a relatively short time. This will help preserve the economy's credit rating and perhaps will even raise it in the coming years.

- **Don't overspend on social welfare.** There are voices calling for a significant increase in social welfare expenditure to be financed by raising taxes and increasing government expenditure in terms of percent of GDP to levels common in Western Europe.[10] We think that at the current level of GDP per capita in Israel this should not be the main priority. Productivity and standard of living are closely related and it is not possible to provide a genuine solution to Israel's social problems without first raising the economy's productivity and increasing employment rates. In our opinion, measures to increase output through greater investment, while maintaining the size of the government relative to GDP and maintaining the real level of defense expenditure and interest expenses, is the prefered policy. This policy will lead to a reduction in the share of these expenses in GDP and the freeing up resources for social and welfare civilian expenditure. Such a policy is a long-term solution for the Israeli economy. We think that an increase in current expenditure and taxes at a time when Israel is still distant from the level of GDP per capita and standard of living in the leading Western countries would be a mistake.

2. A STRATEGY FOR ECONOMIC GROWTH

An economic strategy should include targets and a clear economic vision, as well as a plan of execution based on a macroeconomic analysis of the main problems in the economy. The target that we suggest is to raise the level of GDP per capita in Israel to the average level in the benchmark economies and to bring the poverty rate in Israel closer to theirs within about 15 years.

FIGURE 2: GDP PER CAPITA IN THE OECD COUNTRIES, 2017 (2010 USD, PPP)
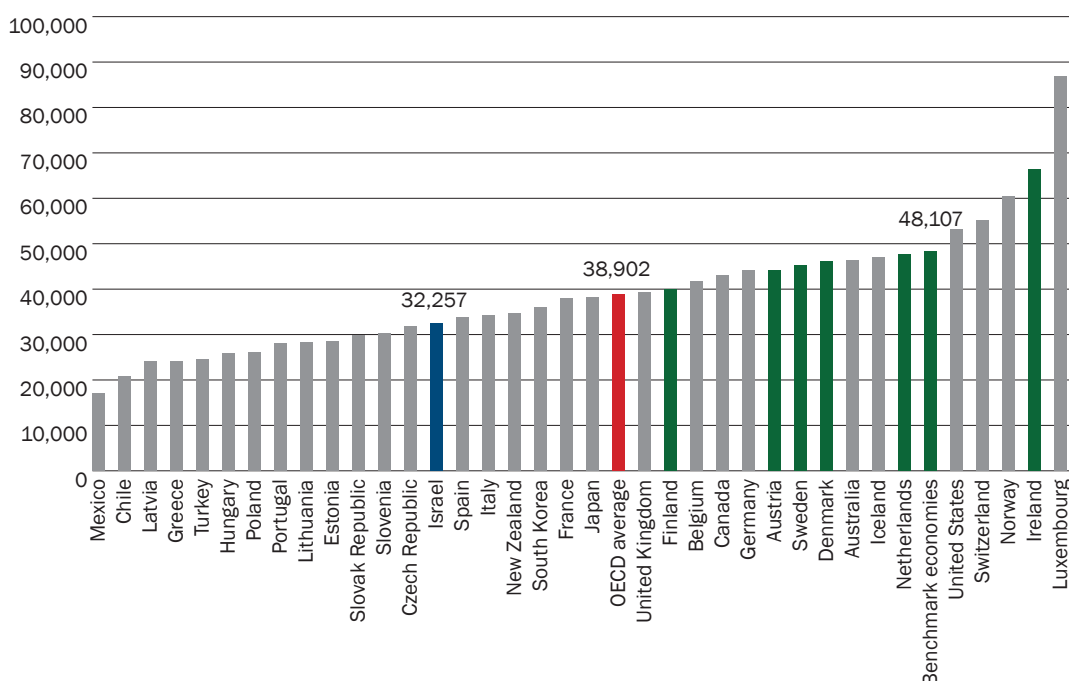
Source: OECD and calculations by the Aaron Institute.

The level of GDP per capita is a generally accepted measure of standard of living. We concentrate on the reduction of poverty rather than the concept of inequality since the appropriate goal is to provide a reasonable standard of living for the entire population relative to the accepted level in the country. The poverty rate, which is also a relative rather than absolute measure and which is measured as the number of people whose income is less than half of the median income, embodies this goal. In contrast, commonly used measures of inequality, such as the Gini coefficient, can be biased upward by the richest individuals (without affecting the median) and may lead to a policy that focuses on highly-skilled and high-earning groups instead of assisting the needy, a situation that can harm the incentives of this population and can also hinder economic growth.

The fact that Israel has remained at a low standard of living relative to comparable Western countries and has not managed to close the gap in recent decades — calls for the formulation of a strategy for economic growth that can change this situation. However, it appears that the government does not have any such strategy. Israel is characterized by slow growth in productivity (Figure 1), high rates of poverty, low levels of private and public capital, and a lack of human capital, as measured by the skills of individuals. Given the serious shortfalls in the economy and in the absence of reforms and productivity-oriented investment, a deterioration can be expected in Israel's relative position.

2.1 The analysis of low productivity

In order to adopt an efficient policy to implement the growth strategy, it is necessary to analyze the sources of the gap in GDP per capita and in the poverty rate. The growth in GDP is composed of growth in productivity and growth in employment (an increase in workhours). Israel has grown at a rate of 7% annually from its establishment until the early 1970s, and the gap in productivity (GDP per workhour) and in GDP per capita between Israel and the benchmark economies narrowed during that period (Figure 1). There was also improvement relative to the United States — Israel's GDP per capita rose from about 35% of that of the U.S. at the beginning of the 1950s to about 65% in 1974, while the gap in productivity shrunk to only 30%. However, since the slowdown in Israel's economic growth, and particularly in the growth of productivity, the rate of growth has not returned to the levels that characterized Israel prior to the Yom Kippur War in 1973. Thus, the gap in standard of living between Israel and the benchmark economies is not narrowing and the gap has remained unchanged since the early 1970s (Figure 1).

There are two engines of growth for closing these gaps: an increase in the rate of employment and an increase in productivity as measured by output per workhour. Since the end of the Second Intifada in 2003, Israel has shown a consistent upward trend in the rate of employment. This was the result of a designated government policy and was the main engine of growth in the economy during this period. Of an average growth rate of about 3.5% per year during the past decade, the increase in workhours (2.6% per year on average) contributed about 75%, while the increase in productivity (only 0.9% per year on average) contributed only about 25%. The rate of employment in Israel has almost reached the level in the benchmark economies and therefore this engine of growth is close to being exhausted, while productivity gaps per workhour are growing.

FIGURE 3: RATIOS OF GDP PER CAPITA, PRODUCTIVITY, AND RATE OF EMPLOYMENT BETWEEN ISRAEL AND THE BENCHMARK ECONOMIES, 1995-2030
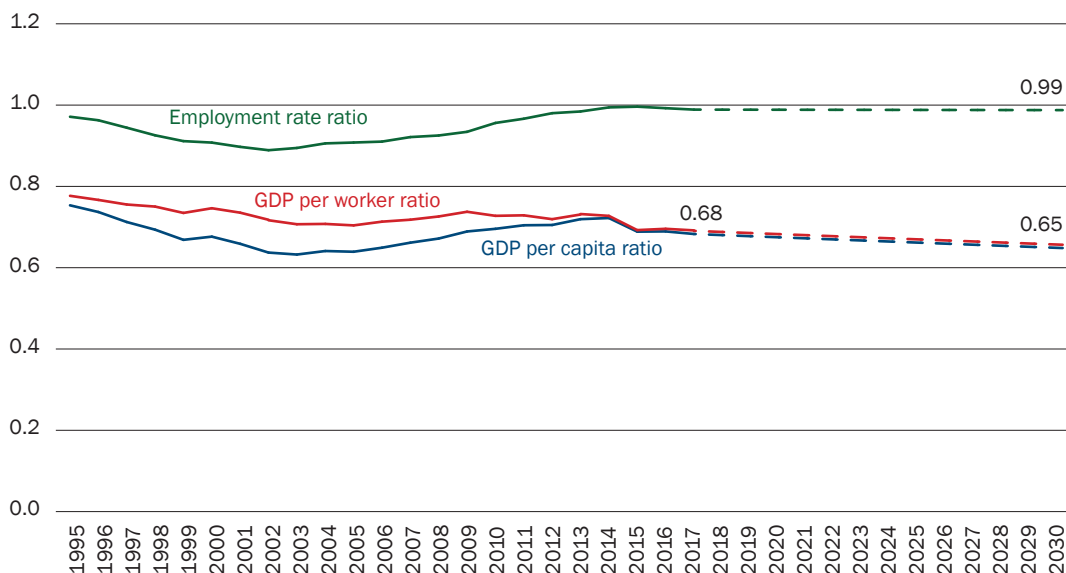
Source: OECD and calculations by the Aaron Institute.

Our calculation show that even assuming that the 2030 Employment Committee employment targets are met, without more rapid growth in productivity, the rate of

economic growth will slow in the coming decade to about 2.3% per year.[11] The outcome will be negligible growth in GDP per capita and a larger gap between Israel and the benchmark economies (Figure 3). Productivity is currently the barrier to growth for the economy — without an increase, Israel will not manage to provide a high standard of living to its citizens and to deal with social problems.

The poverty rate in Israel is high relative to other countries and the second highest among the OECD countries. In 2013, the poverty rate in Israel stood at 18.6% as compared to an average of 8.2% in the benchmark economies. In 2016, the figure for Israel fell to 17.7% while there was no change in the benchmark economies.

As in other countries, the disparity in labor incomes is the main factor in determining poverty and inequality in household disposable income in Israel, due both to the gap in rates of employment and the widening gaps in income per workhour. The three main factors determining the ongoing increase in the size of these gaps are human-capital-intensive technological innovation, globalization processes, and weak regulation, which is reflected in the non-enforcement of labor laws. All three of these factors are significant in Israel, some of them more so than in other countries, and they are becoming increasingly important over time.[12]

The increase in employment in Israel cuts across all sectors, levels of education, and age groups. However, a breakdown we carried out shows that the largest increase in employment occurred among the ultra-Orthodox and Arab populations, which are characterized by a low level of education, and among the relatively older (55–64 age group).[13] The analysis also shows that most of the increase in employment can be attributed to a series of policy measures that worked to increase labor incentives, including a cut in the guaranteed income supplement and the children's allowance, a reduction in unemployment benefits, changes in the tax system including the institution of earned income tax credits, raising of the retirement age, social welfare programs, a reduction in the number of foreign workers, and an increase in the minimum wage. Furthermore, the rate of increase in the rate of employment was greater among households that experienced a larger reduction in social welfare benefits. One of the main outcomes of the increase in employment is the growth in labor income and net disposable income of households. This fact indicates that the positive effect of increasing employment on disposable income was larger than the negative effect of the cut in social welfare payments.

In view of these findings, we would emphasize two points: First, a policy that focuses on incentives in the labor market should be continued and should continue to serve as a tool to simultaneously improve GDP and reduce poverty. Second, the increase in the rate of employment, which tends to attract individuals with little experience and lower-than-average labor skills into the labor market, is of course one of the reasons for the slow growth in productivity during the past decade. Israel's productivity problem is not equally distributed. Sectors that employ highly-educated employees, especially high-tech and exporting manufacturers, have relatively high productivity compared to the benchmark economies, while the productivity gap is mainly concentrated at the commerce and services sectors, which employ people with lower skills and suffer from low levels of capital intensity. While rising productivity in general is not guaranteed to reduce inequality, many of our suggested reforms are focused on increasing the income from work of individuals with low earnings — specifically reforms of the vocational education and training (VET) system and improved education for the Arab

population. Thus, we argue that increasing the productivity of individuals in lower-earning households will reduce poverty and increase employment rates among these individuals. Another parameter that affects employment rates is the statutory minimum wage. The minimum wage in Israel is high compared to other developed countries, and has risen from 45% of the median wage in early 1990s to about 60% of the median wage now. This has caused an increase in labor supply among people with low skills. Economic theory tells us that an increase in the minimum wage might reduce demand to low skill workers, but the shortage of workers in Israel during this period due the reduction in foreign workers seem to prevent such an effect. It is also important to note that the minimum wage is only sparsely enforced, and the increase in the minimum wage was accompanied by an increase in the share of employees earning less than the minimum wage, from 4% in the early 1990s to about 10% today.

When discussing a goal of reducing poverty it is also important to discuss social mobility. As comparable international estimations for mobility, calculated yearly, are not available, we do not set a goal for mobility the same way as we set for productivity and poverty. However, recent papers suggest that social mobility in Israel is not low. Aloni and Krill (2017), based on administrative data, find that intergenerational mobility in Israel is amongst the highest in the OECD, partly explained by the recent immigration from the former Soviet Union, which had very high levels of mobility. Heller (2017), in a paper for the National Insurance Institute, also finds similar results. Dobbin and Zohar (2021) analyze the reasons for Israel's intergenerational mobility and find that labor market participation has very large positive effects. Thus, it is reasonable to believe that our recommended policies, mostly focused on increasing labor participation among the lower half of the income distribution, will have significant positive effects on social mobility.

Israel's population growth rate is also triple the average for the benchmark economies — 1.8% compared to 0.6%. In an era of rising life expectancy, a trend that is expected to continue in the coming decades, Israel's population growth is one of the economy's strength. An aging population is one of the biggest challenges of Western economies due to the rise in the old-age dependency ratio (an economic indicator representing the number of individuals aged 65 and up per 100 individuals of working age, 20-64). Israel's lower dependency ratio, the result of a higher fertility rate, makes aging-related implications such as fewer taxpayers to support the welfare state a lesser challenge for Israel.

Conversely, a high level of population growth emphasizes the need to increase the level of public investment, especially on transportation infrastructure. The level of public investment in Israel is about 2% of GDP, about half of the benchmark economies' 3.8% average.

Another important policy adjustment required is related to the labor market. The fertility rate in Israel stands at 3.1 children per woman — the highest fertility rate in the OECD. There is considerable heterogeneity in fertility rates across different subpopulations within Israel where the fertility rate of ultra-Orthodox (Haredi) women is around 7 children per woman; 2.2 among Jewish women who self-identify as secular and traditional but not religious and 3.3 among Israeli Arab women.[14] These trends are indicating that ultra-Orthodox populations are growing quite rapidly.

As mentioned earlier, the labor market in Israel has been characterized by a dramatic rise, nonetheless, there are two population groups that are still at a low rate of

employment: ultra-Orthodox men and Arab women. The characterization of the poor population in Israel according to its distribution by family size, employment rate, and socioeconomic ranking provides additional local evidence that the incidence of poverty increases with number of children and declines with number of breadwinners.

Fertility patterns and the population composition projections reinforce the need for improving employment skills primarily among individuals who do not obtain academic education or sufficient knowledge of the Hebrew language. These challenges will be discussed in detail in the next chapters.

2.2 The growth and poverty pyramid

The pyramid diagram presented in Figure 4 is a conceptual framework for the visual planning of economic strategy.[15] The overall goal of economic policy, which is at the apex of the pyramid, is long-term growth in GDP and productivity and the reduction of poverty. As mentioned, our goal is to close the gap in GDP and productivity and to reduce the rate of poverty relative to the benchmark economies. The pyramid is a visual representation of a multi-layered model of growth, where each layer represents those components that contribute to the growth of the layer above, up to the target of economic policy at the apex. The pyramid makes it possible to identify the economy's strong and weak points relative to the targets, it describes the actions that need to be taken, and it facilitates the measurement of progress.[16] The pyramid can be used to focus policy on achieving the strategic goal.

The base of the pyramid represents the necessary institutional conditions for the proper functioning of a modern economy, where efficiency is determined by inputs of the public sector. In the economic literature, there is ample evidence of the necessity of well-functioning institutions (Acemoglu, Johnson, and Robinson, 2005 and many others). This layer includes:

- **Legal system.** A well-functioning legal system that protects property rights is considered to be a necessary condition for an efficient modern economy.[17]

- **Macroeconomic and budget policy.** In view of Israel's sustainable path of debt relative to GDP and its low deficit as based on expected growth, together with a small and stable size of government and the low rate of interest, Israel's fiscal situation is stable and relatively certain, which can also be seen in the risks derived from the capital market.

- **Monetary policy and financial system.** A responsible monetary policy which creates confidence that inflation will be in the vicinity of the target, as in other developed countries.

- **Balance of payments.** During the past decade, the economy has been characterized by a surplus of about 3% of GDP, in contrast to the chronic deficit in Israel's balance of payments up to the beginning of the 2000s.

- **Sustainability.** This allows the economy to benefit in a responsible and sustainable way from its natural resources.

FIGURE 4: PYRAMID OF LONG-TERM GROWTH AND REDUCTION IN POVERTY
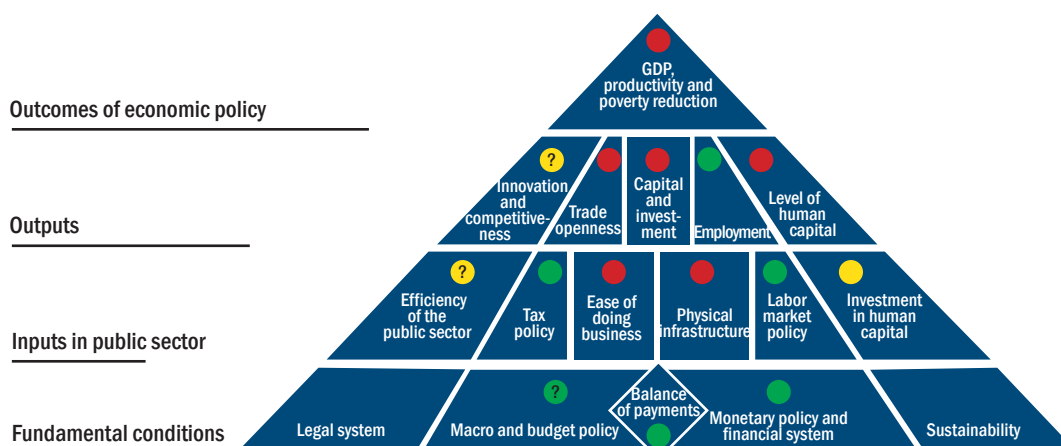
We believe that Israel enjoys healthy fundamentals due to the stability of these various components. Such stability provides the government with fiscal breathing space in order to advance the reforms that are necessary in order to achieve a breakthrough in the economy's productivity and to bring Israel closer to the situation of the benchmark economies.

The second layer of the pyramid represents the inputs and policy of the public sector. These are inputs required for a well-functioning modern economy, namely: an efficient public sector that works to achieve the stability and efficiency of the fundamental conditions; a high-quality healthcare system; a regulatory environment that is conducive for doing business; a tax system that encourages employment, investment, and entrepreneurship; safe, modern, physical infrastructure that meets the economy's demands; investment in education; the development of high-quality human capital; the ability to compete; openness to trade and investment in research and development. In this case as well, there is ample research demonstrating the importance of a competitive tax system (Lawless, 2013), effective and reasonable regulation (Nunn, 2007; Barbosa and Faria, 2011; Coe, Helpman, and Hoffmaister, 2009), investment in R&D (a large literature in the wake of Romer, 1986), public infrastructure and primarily transportation infrastructure (Aschauer, 1989) and a high level of human capital (Goldin and Katz, 2001; Hanushek and Woessmann, 2012). Effective government investment in these inputs will improve the economy's performance in both the present and the future.

The third layer of the pyramid represents the performance of the economy according to various factors that directly contribute to growth and the reduction of poverty. These are the factors of production that enter the economy's production function and are influenced by government activity as represented in the second layer ("inputs and policy"), but are not determined by it directly and in this sense they can be viewed as outputs of government activity.[18]

In order to understand the situation of the Israeli economy relative to the benchmark economies, we calculate a score for each component of the pyramid. The score is determined on the basis of a weighting of measures for an international comparison of various aspects of each component using the method of "distance to frontier" (DTF). This score makes it possible to categorize the gap between Israel and the benchmark economies for each component, where a red circle indicates a component in which

Israel's situation is particularly grave, a yellow circle indicates a component in which there is a substantial gap between Israel and the benchmark economies, and a green circle indicates a component in which Israel is in a better situation or that the gap is small (Figure 4). Appendix A describes the "distance to frontier" method in more details, and provides the scores of specific components in the pyramid.

3. MEASUREMENT OF THE PRODUCTIVITY GAP

In order to adopt an efficient policy for the implementation of the economic strategy, it is necessary to analyze the sources of the gap in GDP per capita and in poverty rates. Productivity is currently the main source of the gap between Israel and the benchmark economies with respect to GDP per capita. Therefore, raising the level of GDP per capita in Israel and reducing poverty requires that the weak aspects need to be overcome. To do that it is necessary to identify the causes of the productivity gap and to outline an economic policy that will support growth in productivity while also reducing poverty.

3.1 A framework for analyzing the productivity gap

The methodology we employ uses a macroeconomic model based on growth accounting, which is an analytical framework widely used in the economic literature (see, for example, Hall and Jones, 1999). Using this model, we identify the main factors determining the productivity gap between Israel and the average of the benchmark economies.

Assume the following production function with five factors of production that are identical between the two countries:

Equation 1: $$Y = A \left(\frac{G_n}{N}\right)^{\beta\gamma} \left(\frac{G_c}{N}\right)^{\beta(1-\gamma)} K^{\alpha}(HL)^{(1-\alpha}$$

where the factors of production are: capital in the private sector (*K*), number of workhours (*L*), human capital (*H*), public capital invested in the digital infrastructure (ICT) per capita , public investment in transportation infrastructure per capita () and a residual that represents total factor productivity (*A*).

The capital in the economy can be divided into public capital and private capital. The assumption is that the level of private capital is optimally determined by the firms subject to constraints they take as given (such as the price of capital and the level of infrastructure in the economy), while the level of public capital and its composition are determined in a political process that is based only partially on economic considerations. Although production functions appearing in the macroeconomic literature do not usually differentiate between the various types of capital, there is a branch of the literature that has tried to understand how the level of public capital and its composition affect productivity in the private sector and in turn the optimal level of private capital, and we will use that literature to evaluate the contribution of the lack of public capital to the productivity gap. There is a wide range of values for the coefficient of public capital (*β*), some of which are very high. For example, values of up to 0.4 were found in research into the contribution of the Interstate Highway System in the United States during the 1950s (Aschauer, 1989). We chose a conservative value of 0.1, which is located in the lower part of the range (Baxter and King, 1993). Another differentiation we made is between public capital invested in digital infrastructure (ICT) and the rest of public capital. The economic literature indicates that investment in ICT has a significant effect on economic growth.[19] This is particularly the case for government investment in ICT that focuses on digitization of the public sector and thus contributes to the level of innovation in the economy as a whole, as has been emphasized in OECD publications.[20] The differentiation between public capital invested in digital and non-digital infrastructure is accomplished by the coefficient. It is given

a value of 0.865 which is obtained from data on developed economies[21] for which the return on capital invested in digital infrastructure (1–) and the return on capital invested in non-digital infrastructure () are calculated.[22]

The level of human capital is usually measured using years of schooling. According to the human capital index based on years of schooling of the Penn World Table (PWT9.0),[23] the level of human capital in Israel is 10.7% higher than the average of the benchmark economies. However, this is a problematic measurement since it does not consider the level of schooling or its type and does not take into consideration whether indeed relevant skills were acquired. We use a measure based also on the Programme for the International Assessment of Adult Competencies (PIAAC), a survey of skills carried out by the OECD,[24] which directly measures cognitive abilities (reading, math and problem solving in a computerized environment), based on a sample of the entire working-age population. According to our measure, the level of skills in Israel is lower than in the benchmark economies by about 12%.

3.2 Results

As shown in the summery, the levels of the factors of production in Israel is much lower than in the benchmark economies. The stock of public capital per capita in Israel is 25% of that in the benchmark economies, the stock of public ICT capital per capita in Israel is 42% of that in the benchmark economies, the stock of private capital in the business sector per workhour is 38% of that in the benchmark economies, and workers in the benchmark economies have a 12% higher score on the human capital index that we constructed.

In order to examine the role of each of the factors of production to the gap in GDP per workhour between Israel and the benchmark economies and given the production function, we assume that private firms, which maximize profit, will optimally determine their level of capital by comparing the marginal productivity of capital to the cost of capital, according to Equation 1:

$$\textbf{Equation 2:}\quad \frac{K}{L} = \left(\frac{\alpha\, A \left(\frac{G_n}{N}\right)^{\beta\gamma} \left(\frac{G_c}{N}\right)^{\beta(1-\gamma)} (H)^{(1-\alpha)}}{r} \right)^{\frac{1}{1-\alpha}}$$

Given the expression for the firm's optimal level of capital and the level of private capital in the data, it is possible to solve for the marginal cost of capital *r*.[25] In other words, *r* is the implicit cost derived from the level of capital that firms actually chose.[26] After calculating the cost of capital, we isolate the decision of the private firm with respect to the level of capital per workhour (Equation 2) and substitute into the production function. It is now possible to decompose using a widely used method (Solow decomposition) in order to obtain the part played by each of the components, which are exogenous from the private firm's viewpoint (see Appendix B for the algebraic manipulations):

$$\textbf{Equation 3:}\quad \Delta \ln \left(\frac{Y}{L}\right) = \frac{1}{1-\alpha} \Delta \ln A + \frac{\beta\gamma}{1-\alpha} \Delta \ln \left(\frac{G_n}{N}\right) + \frac{\beta(1-\gamma)}{1-\alpha} \Delta \ln \left(\frac{G_c}{N}\right) + \frac{\alpha}{\alpha-1} \Delta \ln r + \Delta \ln H$$

We use Equation 3 and values that are widely accepted in the literature, where the share of capital in GDP is α=0.32,[27] the coefficient of the contribution of public capital

to productivity is β=0.1,[28] and the coefficient for the share of non-ICT public capital is Y=0.85.[29] The following results are obtained:

TABLE 1: CONTRIBUTION OF THE FACTORS OF PRODUCTION TO THE PRODUCTIVITY GAP IN THE BUSINESS SECTOR AS COMPARED TO THE BENCHMARK ECONOMIES

Productivity gap with the benchmark economies		Total Factor Productivity (A)		Public capital per capita $\left(\frac{G_c}{N}\right)$		Public ICT capital per capita $\left(\frac{G_n}{N}\right)$		Cost of private capital		Human capital
$26.10	=	4.00$	+	$7.90	+	$0.85	+	$8.10	+	$5.20
100%	=	15.5%	+	30.3%	+	3.2%	+	30.9%	+	20.1%

Table 1 summarizes the simulation results of the macroeconomic analysis of the exogenous factors that affect the productivity gap per workhour ($26.10) in the business sector, which represents a gap of 44% between Israel and the average of the benchmark economies.[30] As an illustration, if labor productivity in Israel was equal to what it is in the benchmark economies, Israel's GDP would have been higher by over NIS 600 billion of 2016.

A comparison of the data on the factors of production indicates that the stock of public capital per capita explains 30% of the productivity gap, which is equal to about $8 per workhour. The stock of public ICT capital contributes 3.2% to the productivity gap, which is equal to $0.85 per workhour or about 2% of GDP (about NIS 25 billion per year). This type of investment is of a much smaller magnitude than the investment in transportation infrastructure, but potentially has a major influence on government efficiency and on the advancement of the business sector. Interestingly, in a country dubbed the "start-up nation" the innovation of the business sector is almost completely channeled abroad and hardly at all towards improving the Israeli economy. In order to deal with this issue, the Aaron Institute recommends the formulation of a program for "accessible governance," such that by 2030 the level of public investment in ICT and the use of digital infrastructure will be equal to that in the benchmark economies and in particular Sweden.[31]

The stock of private capital per workhour in Israel explains 31% of the productivity gap, which is equivalent to a gap of $8 in output per workhour. As mentioned, the level of private capital per workhour is only 38% relative to the level of private capital per workhour in the benchmark economies. From the level of capital actually chosen by the firms, we solved for the implied marginal cost of capital r. This cost is higher in Israel by about 30% relative to the benchmark economies. The effective cost of capital in Israel is 19% as compared to 13% in the benchmark economies. The effective cost of capital is the result of many factors, such as: the rate of interest, depreciation, the corporate tax rate, the cost of excess regulations and bureaucracy in doing business, geopolitical risk, and sectorial composition.[32]

Another factor of production that contributes to the productivity gap is human capital. As mentioned, the index of labor skills and education indicates that the workers in the

benchmark economies scored 12% higher than Israeli workers. These differences in the quality of human capital explain 20% of the productivity gap, which is equivalent to $5.20 per workhour. After taking into account all of the factors of production, the residual (total factor productivity) constitutes 15.5% of the productivity gap, which is equivalent to $4 per workhour. This part of the gap is attributed mostly to quality of management, level of competitiveness, efficiency, and adoption of innovation and research and development. Although, this last term ("Solow residual") is not insignificant, it clearly is not the main source of the gap in productivity. The main findings of the analysis are that the level of per capita public capital and the level of private capital and human capital are the primary sources for the productivity gap.

4. PRODUCTIVITY-ENHANCING REFORMS

Based on the macroeconomic analysis of Section 3, we propose a strategy that focuses on government policies that directly increases that main three sources for the productivity gap between Israel and the benchmark economies. The vision is to raise the levels of these three factors of production to those prevailing in the benchmark economies, that is, the investment in public capital, which includes mainly investment in transportation infrastructure; the improvement of human capital through the creation of a technological/vocational higher education system in parallel to the academic system; and the encouragement of business investment by reducing the excess regulatory and bureaucratic burden.

4.1 Employment promotion

The labor market in Israel has been characterized by a dramatic rise in employment rates and labor force participation from 2003 to the present. Employment among the 25–64 age group is at a record level of about 78% and the rate of unemployment is at a historic low of about 3.5%. The increase in employment spanned all of the sectors, levels of education, and age groups; however, the rate of increase was highest among groups with low earning potential. Eckstein, Larom, and Lifshitz (2018) show that the main factor in the growth of employment is the government policy to increase work incentives for all workers and employment programs, which are targeted to raise employment among the low-income individuals. The increase in employment was accompanied by an increase in the labor income and disposable income of all households and in particular those with potential earnings below the median. As a result, in recent years there has been a decrease in the share of population with gross income less than 50% of the median, and a decrease in the poverty rate.33 Nonetheless, three population segments are still at a low rate of employment: ultra-Orthodox men, Arab women, and people with disabilities.

The recommendations below are based on the report of the aforementioned Committee for Advancement of Employment by 2030, which was chaired by Professor Eckstein, with the aims of increasing employment among populations that are underrepresented in the labor market, improving the skill levels of workers and matching skills to demand, and adapting government policies for the future labor market.

The committee recommended ambitious employment rate targets for the three population segments indicated above, as well as specific employment-enhancing programs that would support their integration and advancement. As mentioned, labor productivity (output per workhour) in Israel is low and the economy faces a major challenge to raise it. The main sources for the improvement in productivity are human capital, private capital, and infrastructure, and the recommendations of the committee focus on increasing human capital, in particular among individuals at the lower half of the income distribution, by means of improving skills and employment experience.[34] The recommendations of 2030 Employment Committee are of two types: recommended employment targets according to population segments, which relate to the rate of employment and the quality of employment as measured by wages; and recommended programs to achieve the targets, including information and guidance frameworks, training in order to increase labor skills, and other means. The recommendations focused on population segments and locations for which there was a broad consensus on the existence of market failures and the need for government

involvement, to create an supportive environment such that target rates could be reached in 10 years.

TABLE 2: EMPLOYMENT TARGETS FOR THE VARIOUS SEGMENTS OF POPULATIONS

	2018	Target for 2030, 25–66 age group
Ultra-Orthodox men*	50.2	65/70
Arab women	38.2	53
The disabled (over 20%)	41.9	51
Ultra-Orthodox women*	76.1	81
Arab men	76.3	83
Non-ultra-Orthodox Jews (men and women)	85.0	86

Many of the ultra-Orthodox men and women are employed in part-time work. Figure for 2018 is for the 25–64 group; target for 2030 is for the 25–66 age group. Ultra-Orthodox according to the definition of the National Economic Council. Disabled according to the definition of the National Insurance Institute; figure is for 2016.

The employment targets by segments of the population are in Table 2. In the case of ultra-Orthodox men, the goal is to return to an upward trend in employment and to accelerate the rate of increase; the achievement of this target is to a large extent depends on eliminating legal barriers and economic disincentives that hinder the integration of young ultra-Orthodox men in the workforce and in particular to remove barriers so as to facilitate the full integration of ultra-Orthodox men above the age of 22 in the workforce.

In the case of Arab women, the achievement of the target assumes that the rapid increase in the level of education of Arab women will continue and perhaps will even increase in intensity and in parallel barriers to their integration in the workforce will be eliminated, with emphasis on investment in improving their employment skills and promoting fluency in Hebrew. Research presented at the committee emphasized the lack of fluency for speaking, reading, and writing in Hebrew as the most important barrier of their employment. The target for people with disability is new and reflects the importance that the committee attributed to their integration in the workforce. The achievement of these employment targets is expected to increase the employment rate of the 25–66 age group to 80.4% by 2030, which would place Israel in the top five of OECD countries at today's employment rates.

The committee also recommended setting targets for job quality, with the emphasis on ambitious targets for raising the wages of population segments that already achieve high rates of employment but earn low wages due to lack of skills and other factors. In the case of ultra-Orthodox women, achieving the target will require focus on increasing hours worked by revising incentives and opportunities. For Arab men, the focus should be on increasing their skills, particularly knowledge of Hebrew. It is important to mention that raising the quality of their employment opportunities would likely indirectly affect their rate of employment, by, among other things, reducing the phenomenon of early retirement. In addition, the committee recommends setting an employment quality target for women as a whole, in order to fully realize their employment potential, with emphasis on integration within professions with high productivity.

The quality targets have been set in terms of the nominal monthly wage in order for them to serve as an operative working tool. These targets will be examined once every three years and will be revised if necessary. In addition, the committee set a target to reduce the proportion of workers aged 25–66 who earn less than the minimum wage to 5% of all workers by 2030 from the current level of about 10%. This target will cut the prevalence of the phenomenon — particular among Arab and ultra-Orthodox workers — in half. The achievement of all the aforementioned quantitative and qualitative employment targets is expected to reduce the rate of poverty.

4.2 Enhancing skills and human capital

The analysis of the productivity gap shows that the gap in human capital is primarily characteristic of individuals in the lower half of the income distribution, who in general lack an academic education. Therefore, the recommendation of the Aaron Institute focuses on non-academic post-secondary vocational training and technological education. In addition, in recent years, a number of major reforms have been implemented in the elementary and secondary schools, and their outcomes should be evaluated in the coming years. There are still serious problems in the Arab education system, in particular the low level of financing relative to the Jewish education system. This problem is being worked on as part of the Aaron Institute program for enhancing the Arab population's wellbeing (see Section 4.5).

4.2.1 Reform of vocational and technological education

The vision of the 2030 Employment Committee, as presented above, also included a reform in vocational and technological training. This new system would be the primary mechanism for improving productivity and wages among individuals in the lower half of the income distribution.[35] This vision is also based on international research findings that the returns for one year of high-quality post-secondary vocational training are not lower than those for a year of academic education, conditional on the innate abilities of the students.[36]

The committee supported the implementation of the government decision regarding the reform of the technological education system. This reform was aligned with the committee's recommendations and included: shortening the total amount of hours by revising the curricula with consultations with employers; reworking the technician's program into a single academic year; setting a threshold for the size of a technological college; and increasing the budget. The committee viewed the vision to improve the vocational training system as an extension of this decision.

The main targets of the proposed reform are the unemployed and jobseekers among the target segments of the population that have not yet entered the workforce; young people who are first entering the workforce and do not choose to pursue an academic education; and workers in professions which evidence suggests are becoming obsolete, who could be on the verge of being laid off. Improving and reinforcing the system according to the guidelines of the reform, while aiming at these target audiences, is expected to bring about a significant increase in the quality and quantity of skills and thus will achieve the aforementioned quantitative and qualitative employment targets.

The proposed reform in vocational training was based on the following guidelines:

- **A holistic approach.** Vocational training should be the starting point of a career path without a "glass ceiling." The system should, among other things, provide an extension of technical studies in the relevant domains, as well as facilitating continuation onto an academic education.

- **Achieving a qualitative criterion.** The qualitative criterion for training of more than 400 hours will be to achieve a return of at least 6% in real wages two to three years after graduation. [37] The percentage return is in terms of the expected and actual wages for the graduates in comparison to equivalent workers — from the same segment of the population with same abilities — who had not undergone the training. The qualitative criterion for shorter training will be a return of at least 4%.

- **Meeting demand.** Vocational studies for professions that are in demand in the economy should be reinforced and expanded, while existing training programs that do not meet the qualitative criterion above should have their budgets reduced or event canceled. Professions that are in high demand and in which wages are rising should be the focus, including professions for which the system does not currently offer training. Consultation with employers will help determine demand for revision of the curriculum, and the curriculum should be reviewed on a periodic basis such that graduates' knowledge continues to fit the market's demand.

- **Employer internships.** For all training programs of considerable length, employer internships should be included as part of the curriculum.

- **Combining general human capital studies and soft employment skills.** This is to ensure that the participants will be successful in the labor market in the long term and that they will have the possibility of developing and updating their skills during their careers. These skills should include Hebrew, English, math, digital capabilities, and the like.

- **An accreditation continuum.** Implement the construction of a chain of courses where applicable, such that every student entering the system will be able to envisage their professional development path.

The committee recommended that with the implementation of the proposed reform and given that the relevant subsidized training programs meet the rate of return criterion, the number of participants in these training programs should be expanded relative to their number today. In order to implement these guidelines, the system should be built according to the following principles:

- **A supervisory system (non-administrative) on the basis of qualitative criteria.** The training institutions should have the flexibility needed to rapidly update the material being taught according to the changing demand for skills in the economy. This should be based on a high degree of independence in constructing the curricula and conditional on the graduates passing an external exam at the end of the training.

- **Economies of scale.** There should be a learning continuum and incentivization for integration between the technological and academic colleges.

- **An improvement in the image of the VET system.** This could be accomplished by connecting it with technical and academic colleges, among other things.

- **Competition between the training institutions.** This would help ensure the quality of studies and placement of graduates, as well as relevance of studies to the labor market.

- **Guidance for participants according to their prior skills and preferences and the demand in the labor market.**

- **Cost-based budgeting conditional on rate of return, certification, and integration in employment.**

- **Centrally coordinated implementation of the reform.** From a professional perspective and in order to support a uniform pedagogy and accreditation continuum and ensure a high-quality service for students and employers, the optimal implementation of the reform requires the coordination of all government VET programs and the Vocational Training Department at the Ministry of Labor regarding curricula, budgeting, etc.

4.3 Investment in public infrastructure

The lack of public stock of capital, as was shown above, emphasizes the need to increase public investment in order to enhance labor productivity. According to the estimates of the Aaron Institute,[38] increasing the stock of capital per capita to the level in the benchmark economies within about 15 years will require additional investment of about NIS 600 billion in 2017 prices. Closing the substantial gap that is most apparent in public transportation requires a substantial increase in government investment from about 2% of GDP per year currently to about 3.7% of GDP per year in the near future.

**FIGURE 5: PUBLIC INVESTMENT IN ISRAEL AND THE BENCHMARK ECONOMIES, 1995–2015 (percent of GDP)**
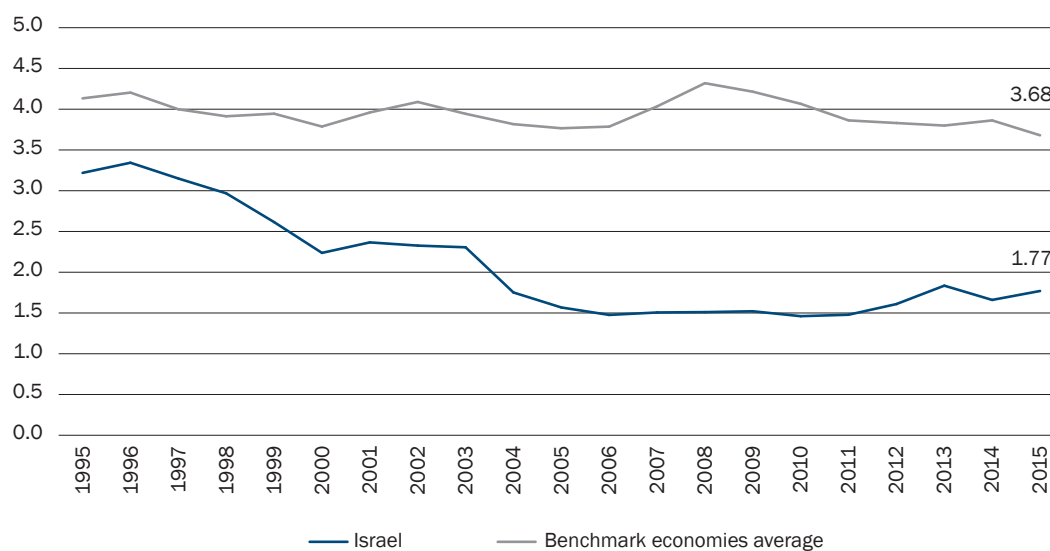
Source: IMF and calculations by the Aaron Institute.

Such an addition cannot of course come from existing sources in the budget under the present fiscal rules and therefore we recommend that the additional investment would be financed by increasing the deficit to 3.5% of GDP for a period of 15 years.

This addition, which represents a deviation of 0.6% from the official deficit target of 2019 budget law, will finance the required increase in investment, where a significant portion of the projects will be carried out according to the Public-Private Partnership (PPP) and Build-Operate-Transfer (BOT) methods, such that the addition to the budget will be needed primarily to finance the interest on the investment. According to our simulation, the expected growth in productivity can increase the rate of economic growth by about 1 percentage point, and achieve a path of annual real growth of 4% (Figure 6). According to this path, the increase in the debt-to-GDP ratio as a result to increasing the deficit will be minimal — only about one-half of a percentage point at the end of 15 years. Care should be taken that any addition to the deficit will be allocated to investment in transportation infrastructure, which raises productivity by a maximal amount and relatively quickly.[39] Economic research has shown that the effect of transportation infrastructure, through its agglomeration effects and economies of scale, can be significantly higher than indicated by a standard cost-benefit analysis based on the shortening of travel times (Venables, 2007). An econometric study by the OECD,[40] which looked at the return on investment in public capital, found that at the low level of public capital that exists in Israel the expected return is particularly high. According to the study, an increase of 1% of GDP in annual investment can raise GDP by about 5% in the long term, if the investment is carried out in the correct manner.

FIGURE 6: GROWTH IN PRODUCTIVITY IN COMPARISON TO THE BENCHMARK ECONOMIES ACCORDING TO VARIOUS SCENARIOS
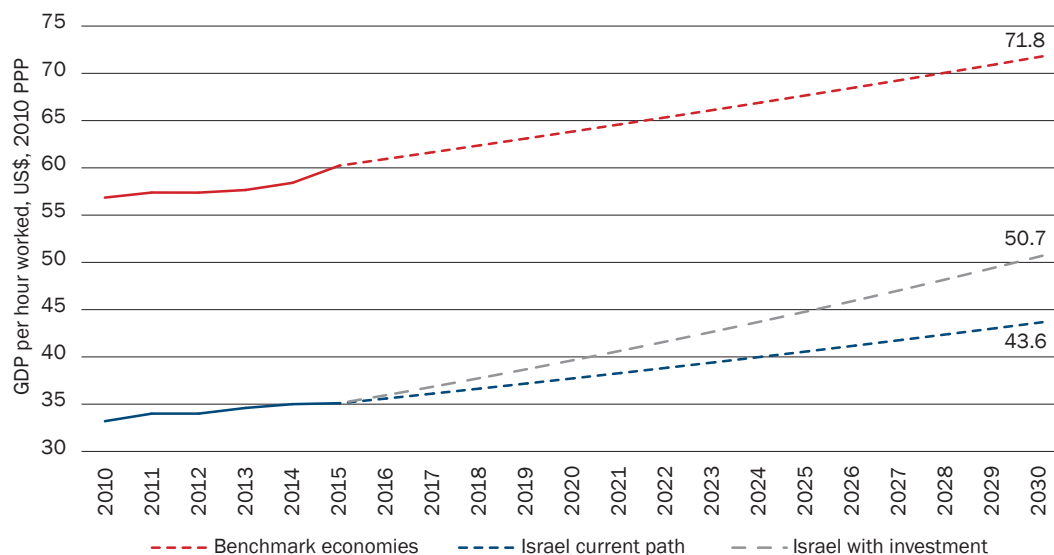
Source: OECD and calculations by the Aaron Institute.

The importance of investment in transportation infrastructure, and particularly in the mass transit system in the Tel Aviv metropolitan area (the "Metro"), is now clear to policymakers, and the government is progressing in the planning of the system. Moreover, it is also clear that investment on this scale cannot be implemented under the existing budget rules. Therefore, the question arises of how to finance the investment without breaching the deficit target and significantly raising the debt-to-GDP ratio. The estimated cost of the proposed Metro system in the Tel Aviv metropolitan area is about NIS 150 billion, distributed over about 15 years. Of course, even if the financial decision on the construction of the system is made today, it will take at least five years until the beginning of work on a significant scale.

In order to ensure that the operation of the system is as efficient as possible, the government should establish a metropolitan transportation authority for the area, as is the practice in developed countries. The establishment of such an authority, which has been under discussion for more than a decade, is necessary for the efficient operation of the transit system as a whole, not just the operation of the Metro, and the authority should be created as soon as possible. Without such an authority, the Metro system will not be able to function efficiently. Furthermore, a government company should be designated to manage the construction, management, and operation of the Metro, and Metro-specific legislation is needed in order to involve all of the public sector entities in the project.

In modern economies, most economic growth originates in cities, and the Israeli economy — like other modern economies — is becoming increasingly reliant on the service industry, which is in need of agglomeration benefits in order to achieve high level of productivity. Therefore, the Metro project has macroeconomic significance for economic growth. It is clear that the main beneficiaries of this project are businesses, landowners and residents of the Tel Aviv metropolitan area in general and those along the route of the Metro in particular. This fact should determine how the construction is financed, as is the case in many developed countries. Thus, we suggest that the financing of the Metro construction come from three main sources:

1. **Additional tax revenues.** As mentioned, the creation of the Metro system will stimulate economic activity in the Tel Aviv metropolitan area and will of course raise the value of land along the Metro route. The residents of the metropolitan area will also benefit from a superior transit system. There is no justification that the additional tax revenues resulting from the increase in economic activity (including improvement taxes, municipal taxes, etc.) should go to the residents of the Tel Aviv metropolitan area in the form of increased resources available to the local authorities within the Dan region, while the burden of financing will fall on all of Israel's citizens through the general tax collection. Therefore, the additional tax revenues should first and foremost be allocated to the financing of the system's construction. It should be emphasized that the proposal does not involve raising the rate of taxation on businesses, but rather the use of the additional real-estate tax revenues as a result of the increase in economic activity.

2. **The sale of state-owned land along the Metro route.** The transfer of state-owned land (whether zoned or unzoned) that is designated for residential or commercial and industrial use along the Metro route to the government company responsible for the project can provide the initial capital needed by the company in order to issue bonds that are backed by the flow of revenue from the sale and improvement of land over the years. This will also help to develop the urban infrastructure along the Metro route and particularly around Metro stations.

3. **Direct costs from the state budget.** Some direct costs to the state are inevitable given the state guarantee of the government company's debt. In addition, some of the construction will be according to PPP, such that the same company that builds the Metro will also operate it.

The cash flow from tax revenues and the sale of land will enable the government company to issue bonds in the amount needed for construction. The aforementioned method of financing will make it possible to build the system without raising distortive taxes, while the capitalization of the benefit from the Metro and the resulting revenues will facilitate financing with a minimal effect on the debt-to-GDP ratio.

4.4 Advancing businesses by reducing the bureaucratic burden

The low level of private capital per workhour in Israel results in a high effective cost of capital for the business sector, as was seen in the analysis of the productivity gap presented in Section 3. Among the factors behind the high cost of capital for the private sector is the bureaucratic burden. International indexes of bureaucracy, such as the World Bank's Doing Business[41] and others, give Israel a low ranking relative to most benchmark economies. On the Doing Business index, which compares bureaucratic processes in 10 categories, Israel's ranking continues to worsen, with the benchmark economies widening the gap relative to Israel, and even in categories where Israel is ranked higher than the benchmark economies the gap is narrowing.

Israel's ranking according to the bureaucratic indexes is a warning sign with respect to the low efficiency of the regulatory and bureaucratic system. An inefficient bureaucracy increases uncertainty in doing business and constitutes a tax on business activity that hinders entrepreneurship and reduces the economy's ability to compete, its growth rate and its standard of living. We would mention that the regulatory indexes, including Doing Business, are only a partial reflection of the bureaucratic burden since the alternative cost incurred by stakeholders due the time devoted to bureaucratic activity is not taken into account in the calculation of these indexes. The reduction of the bureaucratic burden is possible only by means of identifying and mapping bureaucratic obligations, by measuring their costs and improving their efficiency. Essentially, the systematic measurement of the bureaucracy's cost is the necessary starting point on the way to reducing the bureaucratic burden.

The Standard Cost Mode (SCM) has been adopted as a uniform methodology for measuring the cost of bureaucracy, by both the OECD (in 2005) and the EU (in 2007). The SCM statistic computation model was developed to provide a simple and consistent method for measuring the cost of bureaucracy that is imposed by the government. The model is based on the breakdown of legislation into information obligations and the measurement of time and cost required fulfilling each required regulatory obligation. Developed countries that have adopted this mechanism for reducing the cost of bureaucracy and have adopted the measurement of the bureaucratic burden by means of the SCM model are characterized by higher productivity levels relative to Israel, their service sectors are better able to compete, and they achieve a higher ranking than Israel on indexes of competitive ability and ease of doing business. Without adopting the SCM model for measuring the cost of bureaucracy, Israel will find it difficult to close the gap in the quality of its public administration with the developed countries. The reason is simply due to our claim that without detailed measurement of costs and benefits it is impossible to actually implement required and efficient regulation with minimal costs for business such that business in Israel could compete globally.

To this end, the Aaron Institute's Sergei Sumkin has proposed a reform to deal with the bureaucratic burden. This reform includes the creation of a special government unit in charge of reducing the bureaucratic burden based on targets that are based on SCM in comparison to the benchmark countries. This unit should be given independence and power by legislation to force different regulators to reduce excess regulation and bureaucratic burden. In addition, there is a need to also form an independent unit that does the regulatory impact analysis to justify the regulatory decisions of the government.[42]

4.5 Economic advancement of the Arab population

The Aaron Institute's economic plan for the Arab population (Tehawkho, 2019) is aimed at advancing the Arab population in Israel and improving its integration within the national economy. The goal of the program is to examine and identify the main barriers to the economic development of the Arab population, in order to formulate concrete policy recommendations that will enhance growth and reduce poverty.

Israeli Arabs constitute about one-fifth of the population in Israel, but half of poor households. The average Arab household contribution to GDP is less than one-half of that of the average non-ultra-Orthodox Jewish household. The gap in productivity between Arabs and the rest of Israelis mainly stems from the gap in human capital with large gaps in investment of all types, a lack of urban planning, and other discriminatory policies by the public and the private sectors as contributing factors. The advancement of a productive economy that is inclusive of Arab citizens of Israel and greater integration within the economy is crucial in order to raise the standard of living among the Arab population and in order to stimulate economic growth. It is important to mention that economic growth is expected to slow in coming years without a substantial increase in the productivity of the economy as a whole and an increase in employment and productivity among the vulnerable segments of the population, such as the Arab sector.

The monthly income of an Arab household in Israel is about one-half of a Jewish non-ultra-Orthodox household (NIS 10,912 vs NIS 22,849). About 56% of the gap originates in differences in the hourly wage, which in turn is mostly due to the substantial gaps between the wages of Arab men and those of Jewish non-ultra-Orthodox men. The rest of the gap is due to differences in workhours, primarily the low rate of employment among Arab women.

A breakdown of the factors responsible for the gap in household income shows that 50-70% of the gap stems from barriers to the acquisition of human capital, i.e. years of schooling and quality of education, while the rest is due to barriers in realizing human capital potential upon entry into the labor market. Therefore, at this stage our policy research focuses on acquisition of human capital and in particular we have examined two issues in depth: increasing matriculation rates in Arab education and improving the access to higher education.[43] The disparity in matriculation between the Arab education system and the Jewish non-ultra-Orthodox system stands at about 20%. In contrast, in the Druze education system — in which the rate of matriculation was similar to that in the Arab system in 2000 — managed to reduce the gap and in recent years has achieved a higher rate of matriculation than the Jewish education system. The research that we carried out indicated that special programs for reducing disparities in the rate of matriculation among the Druze high schools played a significant part in this success. We found that the "Start" program, which focuses on investing in the weakest students in a high school, increased matriculation rates in Druze high schools by 6 percentage points. As a result of this program, matriculation in the Beit Gan (a Druze village in northern Israel) high school has increased to 100% during the last five years. Moreover, data from many schools indicates that the programs have generated a substantial social improvements in Druze society including a reduction in crime rate among teenagers. We recommend examining the possibility of expanding these programs, and in particular the "Start" program to other Arab high schools as part of the effort to raise matriculation rates and high school completion.

The weakness of the Arab education system has implications for the abilities of high school graduates to enter higher education. The proportion of Arabs entering higher education is lower than that of Jews and is particularly low among Arab men. In 2018, only 16% of Arab men in the relevant cohorts began studying toward a bachelor's degree in Israel, as compared to 45% of non-ultra-Orthodox Jews. On the other hand, an increasing number of Arabs are choosing to study outside Israel, and particularly at the American University in Jenin in the West Bank, which is currently attended by over 6,000 Arabs from Israel. This is more than the number of Arab students attending Haifa University, the Israeli university with the largest number of Arab students. Our analysis shows that the main reason for the large number of Israeli Arabs studying at the university in Jenin — where the courses are taught in English and the tuition can be up to NIS 30,000 annually — is the lack of places in Israeli universities in medical and paramedical studies. Therefore, we recommend increasing the supply of places in the paramedical courses in Israel by expanding the existing faculties or creating a new institution that will specialize in this field. Increasing the number of Arab students studying in Israeli institutions rather than abroad will enable supervision by the Council for Higher Education over the quality of the studies, will reinforce integration with the Jewish population and will improve fluency in Hebrew and thus will facilitate the integration of graduates in the labor market and will also contribute to economic growth.

5. FISCAL POLICY AND CIVILIAN EXPENDITURES

The decline in Israel's defense expenditures and related interest payments in recent years as a percentage of GDP has enabled the government to fix civilian expenditures as a percentage of GDP, despite the reduced relative size of overall government spending. Our analysis concludes that apart from increasing spending on public infrastructure, the size of the government should be fixed at its current level. As defense expenditures decline, it will be possible to increase civilian spending. The deficit can be increased to a level of about 3.5% of GDP and the addition to the budget should be allocated to investment that will increase productivity.

There are those who call for a substantial increase in social welfare expenditure financed by increased taxes and government expenditure in terms of percentage of GDP, to the levels prevailing in Western Europe. As can be seen from Figure 7, the standard of living in Israel, as represented by the purchasing power of the average (full-time equivalent) wage, is not low relative to the level of productivity in the economy. Productivity and the standard of living are closely related, and it is not possible to provide a genuine solution to Israel's social problems without first raising productivity in the economy to the levels of Western Europe.

FIGURE 7: PRODUCTIVITY AND WAGES IN THE OECD COUNTRIES, 2017, US$ 2010, PPP
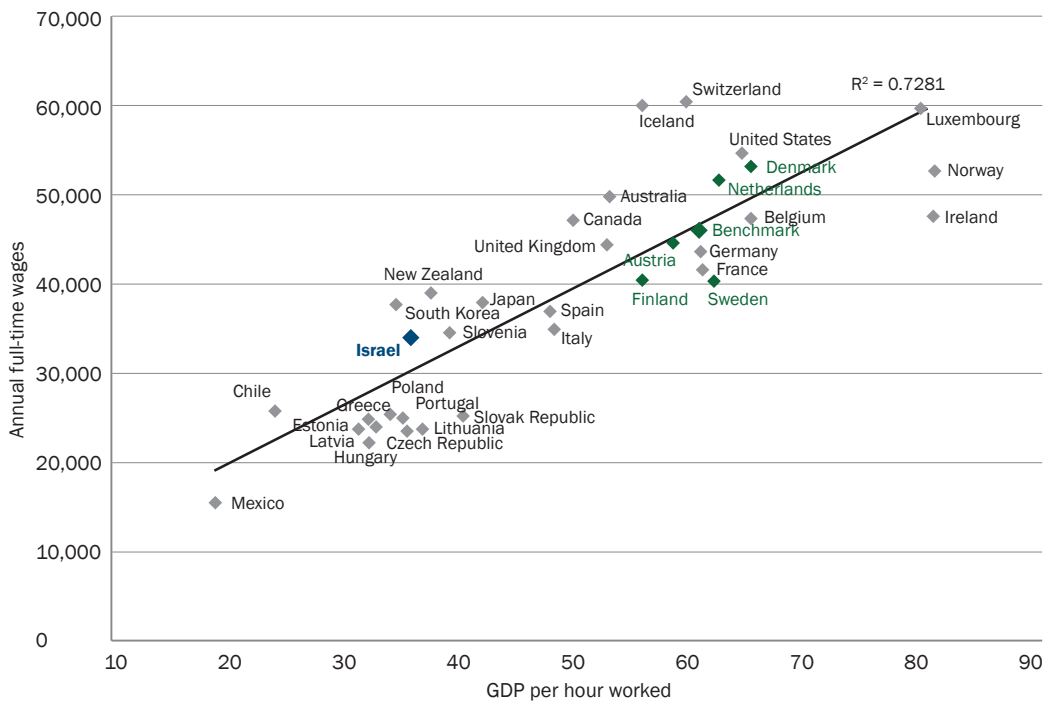
Source: OECD and calculations by the Aaron Institute.

Social welfare expenditures in Israel have remained unchanged as a percentage of GDP for the last decade. The comparison to other countries also suffers from distortions due to different pension system. In many European countries, pension expenses are recorded in full as government expenditure; however, and although national pension saving is very high in Israel (particularly after the passage of the Obligatory Pension Law in 2008), pension expenditures — which accounts for over 3% of GDP — are not recorded as a government expenditure. The reason for this is that employment pensions in Israel

(the second layer which is managed as a cumulative fund) is privatized and managed by private investment institutions. Moreover, in most of the OECD countries employment pensions are managed by state funds (usually as a rights fund) either exclusively or partially, and pension payments are measured as government expenditures. Also in Israel there are pension payments that are recorded as a government expense in the case of budget-financed pension funds (which were discontinued in 2001); however, a significant portion of this expenditure — budget-financed pensions in the defense sector — is recorded as a defense expenditure. In addition, the excess cost above market rates of the designated pension bonds (amounting to about one-half of a percent of GDP) is recorded as an interest expense.

Our analysis concludes that measures to raise GDP through investment — while maintaining the size of the government relative to GDP and the real level of defense expenditure and interest payments — will lead to freeing up of budget resources for civilian expenditure. Indeed, this is a solution for the long-term challenges faced by the Israeli economy. Yet, increasing current expenditure at a time when Israel is still distant from the level of GDP per capita and the standard of living prevailing in the leading Western countries is not the correct approach.

APPENDIX A: THE DISTANCE TO FRONTIER METHOD

The distance to frontier (DTF) method was developed by the World Bank in order to compare indexes measured in different units. The DTF method answers the question of how close a result in a particular domain is to the best result, which is accomplished using a uniform index from 0 to 100, where the country with the best result receives 100 and that with the worst result receives 0, and the rest receive a score according to the relative distance to the best result.[44] This kind of ranking enables a weighting of the indexes with different units and makes it possible to rank each country according to its results.[45]

Public sector inputs and policy

The public sector inputs represent the government investment in areas that contribute to the economy's performance. The two main problems with public sector inputs are the ease of doing business and the situation of physical infrastructure and primarily transportation infrastructure.

- **Ease of doing business.** The cost of capital for the private sector, which is reflected in a low capital-to-output ratio, is an important factor in explaining the productivity gap between Israel and the benchmark economies and the bureaucratic burden is the main underlying cause of this gap (see also Eckstein and Lifshitz, 2017 and Section 3 of this paper). In a series of policy papers,[46] we proposed solutions to the problem and first and foremost the creation of a designated unit for advancing businesses in Israel, which will be given similar powers to those of parallel units in advanced Western countries. Without such a designated unit, there will be no long-term commitment by the government to reduce bureaucracy and improve regulation, despite the will and the attempts to improve the current situation. We hope that the renewed efforts in this direction by the accountant general of the Ministry of Finance, together with the prime minister's office and the Budget Branch, will finally achieve genuine progress.

- **Physical infrastructure.** The importance of public infrastructure and in particular transportation infrastructure in increasing productivity in the economy has not been a central topic in public discourse until recently. We raised this issue at a roundtable held in December 2016 ("The Contribution of the Government to Low Productivity in the Economy"[47]) and also in Eckstein and Lifschitz (2017) and at the Aaron Institute Conference in 2017. Recently the issue has been given greater attention in the annual reports of the OECD and the International Monetary Fund (IMF).

- **Investment in human capital.** The investment by the government in this area is somewhat lower than in the benchmark economies. It appears that the gap in this type of investment stems mainly from the level of education in the Arab population and of non-academic vocational and technological training, rather than the total resources devoted.

- **Employment policy.** Israel's employment policy also suffers from a lack of investment in employment programs; nonetheless, the flexibility in the labor market is greater than in the benchmark economies.

TABLE A1: ISRAEL'S SCORES AND THE AVERAGE OF THE BENCHMARK ECONOMIES FOR THE LAYER OF PUBLIC SECTOR INPUTS

	Israel	Benchmark economies
Tax system	69.93	61.48
Ease of doing business	36.31	64.41
Employment policy	51.24	56.23
Physical infrastructure	42.53	55.76
Investment in human capital	31.79	34.63

Outputs

The outputs layer represents the performance of the economy in various domains that contribute directly to growth and the reduction of poverty. These components are the factors of production in the economy's production function, which are influenced by the government's activities as presented in the second layer ("inputs and policies"), but are not directly determined by them and in that sense they can be viewed as outcomes of government activity.

- Capital and investment and human capital. R&D in Israel enjoys a high level of investment. The economy maintains a broad base of talented workers. However, relatively low level of openness of the economy, which is reflected in the low ratios of imports and exports to GDP, reduces the outcome in this area. The level of capital in the economy, both private and especially public, and the low level of investment and human capital, as reflected on international tests, constitute a major factor in the productivity gap between Israel and the benchmark economies and therefore this is an issue that should be urgently resolved.

- The ability to compete and employment. These layers of output are the Israeli economy's relative strong points, but should continue to receive attention. It is important to mention that due to the lack of appropriate international indexes, the low participation of ultra-Orthodox men and Arab women is not reflected in Israel's score.

TABLE A2: ISRAEL'S SCORES AND THE AVERAGE OF THE BENCHMARK ECONOMIES FOR THE LAYER OF OUTPUTS

	Israel	Benchmark economies
Ability to compete	52.44	49.21
Employment	82.68	72.74
Capital and investment	19.16	43.47
Human capital	56.52	76.45

APPENDIX B: DATA ON CAPITAL AND INVESTMENT LEVELS

Figure B1 presents the level of private capital per workhour in the business sector in comparison to the OECD countries and the benchmark economies. The graph shows that the level of private capital is very low in Israel — only 38% of that in the benchmark economies and 55% of the OECD average, which includes countries poorer than Israel. This dismal picture remains unchanged even when the business sector is divided into production industries (agriculture, manufacturing, mining, and construction) and commerce and services, with the level of private capital remaining at about 38% of that in the benchmark economies.

FIGURE B1: THE LEVEL OF PRIVATE CAPITAL PER WORKHOUR IN THE BUSINESS SECTOR, IN DOLLARS
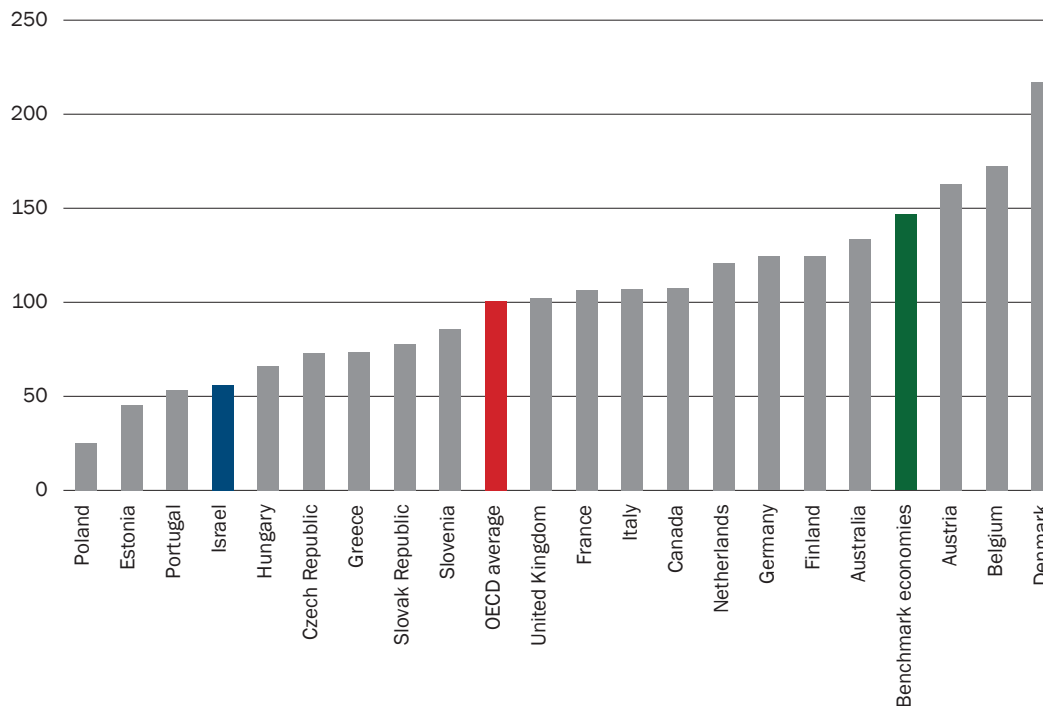
Source: OECD and calculations by the Aaron Institute.

An examination of private investment per workhour in Israel and the benchmark economies explains the gaps that have emerged (Figure B2). Private investment in Israel is equal to only 54% of that in the benchmark economies. The low level of investment, alongside the growth in employment in the past decade, have eroded the level of private capital per workhour. Thus, the level of capital in 2016 was lower than in 2006 ($56 vs $61 in constant 2010 dollars) which already then was low (only 47% of the level of public capital in the benchmark economies).

FIGURE B2: INVESTMENT IN PRIVATE CAPITAL PER WORKHOUR IN THE BUSINESS SECTOR, 2000–16
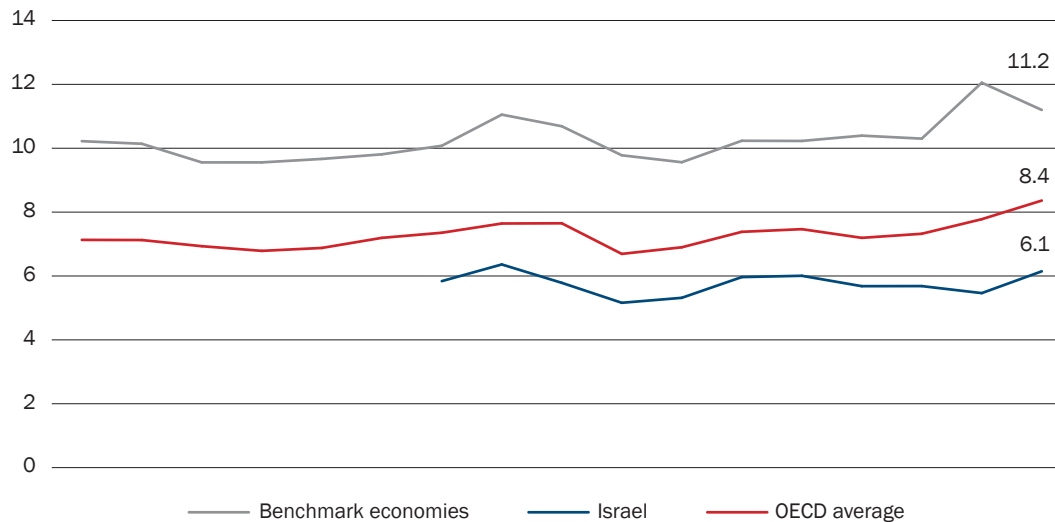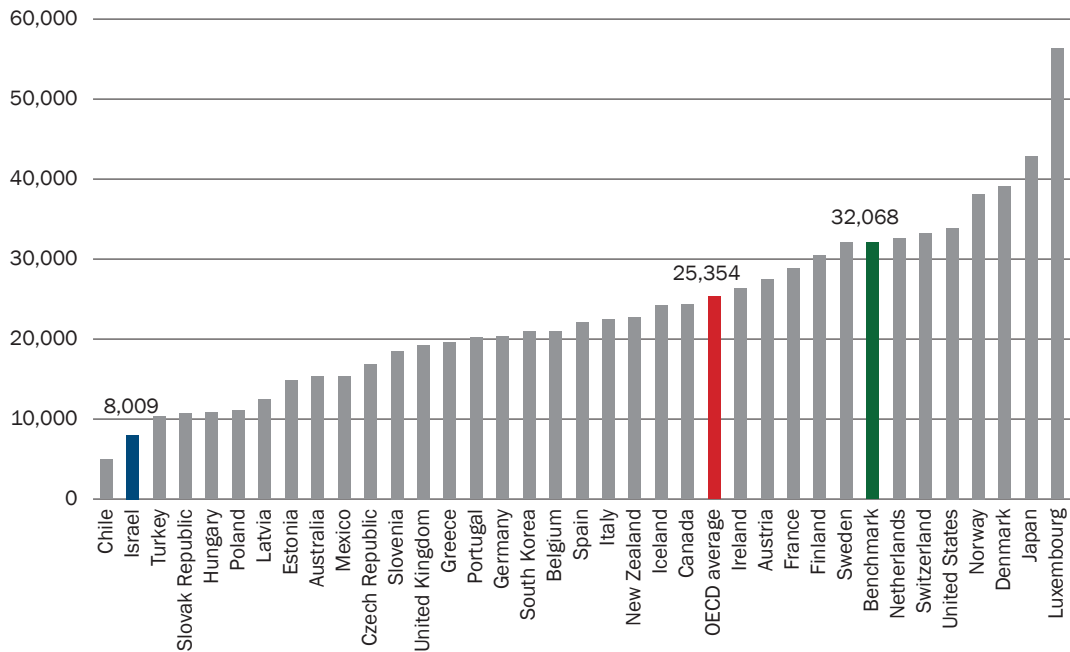

Source: OECD and calculations by the Aaron Institute.

Figure B3 shows the level of public capital per capita (ICT and non-ICT) in Israel, in the benchmark economies and in other countries, where 75% of the public capital is transportation infrastructure.[48] The level of public capital per capita in Israel is particularly low and is the second-lowest among the OECD countries, after Chile. According to the economic literature on the contribution of public capital to productivity, most of the contribution originates from transportation infrastructure. Comparing the level of capital measured in each country is problematic, but there are also direct measures of transportation infrastructure, such as commuting time and the Logistics Performance Index (LPI) of the World Bank, all of which show that the situation of transportation infrastructure in Israel is far from optimal, which is consistent with the data on public capital.

An examination of public investment in Israel shows that the level of government investment in Israel in terms of percent of GDP is less than half of the investment in the benchmark economies (1.7 vs. 3.68%). Special attention should be given to Sweden, with a rate of population growth and growth characteristics the most similar to those of Israel and which places emphasis on investment in public capital. Due to the government's low level of investment over the years, the level of public capital per capita is lower in 2015 than it was in 1995. The level of public capital in Israel, which in 1995 was about two-thirds of that in the benchmark economies, is currently (data for 2015) about one-quarter of the level in the benchmark economies.

**FIGURE B3: THE LEVEL OF PUBLIC CAPITAL PER CAPITA, IN DOLLARS**

Source: IMF, OECD, and calculations by the Aaron Institute.

For this analysis, we chose to explicitly represent public capital per capita in digital infrastructure (ICT) as a factor of production in the production function. As mentioned, the economic research indicates that investment in ICT has a substantial effect on economic growth. During a visit by Aaron Institute researchers to Sweden, Swedish policymakers emphasized that the substantial investment in digitization of the public sector had a direct effect on growth. Government investment in ICT advances the digitation of the public sector and its efficiency and in this way improves the economy's level of innovation, since the business sector then updates its digital infrastructure in order to facilitate an efficient interface with the public sector. This result is especially evident in the commerce and professional services industries. The positive externalities of the government investment in digital infrastructure are a point of emphasis in OECD publications as well.

An examination of the level of public capital in ICT in Israel shows that the "start-up nation" is in a dismal situation. The amount of the government's ICT capital per capita in Israel is only 42% of the average in the benchmark economies. If present trends continue, this gap is expected to widen since the level of investment in Israel is about one-third of that in the benchmark economies. If we consider ICT capital per workhour, the picture becomes even graver since the proportion of workhours in the public administration sector in Israel is double that in the benchmark economies (11.5% of all workhours in Israel vs 5.73% in the benchmark economies). The level of public ICT capital per workhour in public administration is 18% of that in the benchmark economies and among the lowest in the OECD (Figure B4).

FIGURE B4: ICT CAPITAL PER WORKHOUR, PUBLIC ADMINISTRATION SECTOR
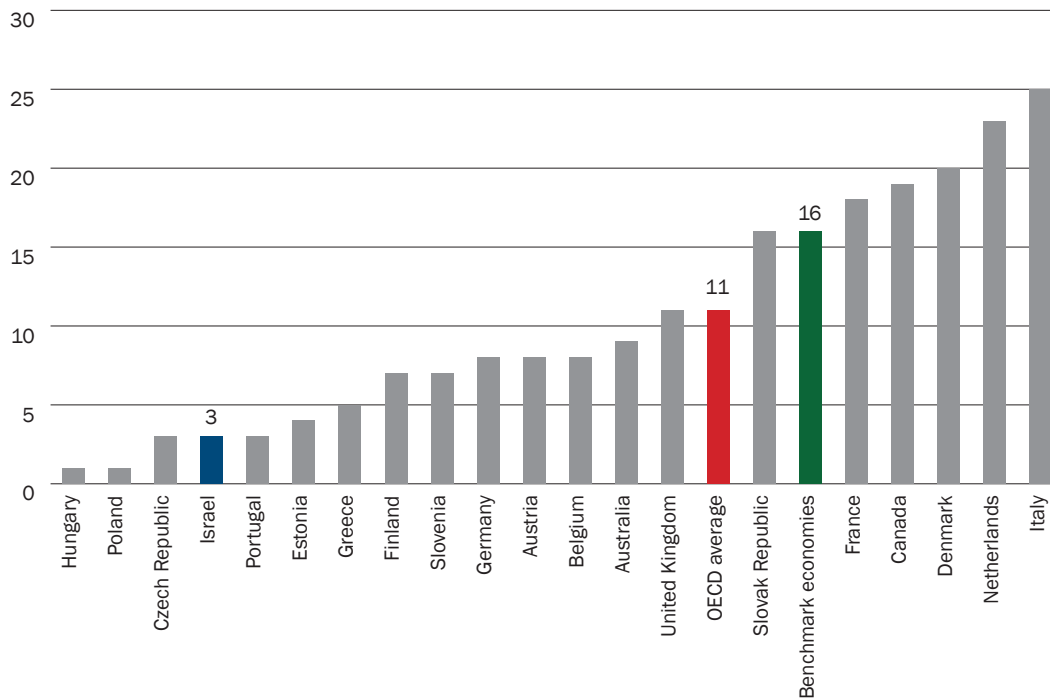
Source: OECD and calculations by the Aaron Institute.

It is worth mentioning that in general the public sector in all of the developed countries are characterized by low productivity (output per workhour) relative to other sectors, such as manufacturing and commerce and services. In general, the sectoral contribution to the economy-level productivity gap is based on the size of the productivity gap in each sector and on its size in terms of workhours relative to the benchmark economies. In Israel, GDP per workhour relative to the benchmark economies is 0.55 in the manufacturing industries, 0.64 in the services and commerce industries and 0.27 in public administration (0.42 in the public services sector as a whole). As part of the breakdown of the productivity gap in Section 3, we have not considered the public activity sector but rather the productive business sector; however, these sectors contribute to the economy-level productivity gap since the productivity ratio of the public sector in Israel relative to the benchmark economies is lowest relative to the other sectors, while at the same time the weight of this sector in Israel is high relative to the benchmark economies. Part of the gap is, as mentioned, due to the low level of public ICT capital.

In the case of human capital, and following Hazan and Tsur (2017) and Hanushek, Ruhose, and Woessmann (2015), we define an index of human capital that is based on both years of schooling and the average score on PIAAC:

Equation B1: $H = e^{\{rS + wT\}}$

where *r* is the return on one year of schooling, *S* is years of schooling, *w* is the return on one standard deviation from the average skill level and *T* is the skill level in the country,[49] in terms of standard deviation from the average. The return on a year of schooling is taken to be 10% and the return on one standard deviation in skill level

is given a conservative value of 10%. There are various methods of estimating the gap from the data. The one we have chosen provides a relatively low estimate of the gap and is apparently a lower bound. We will use this index as a proxy for workers' human capital.[50] According to this index of the level of human capital, workers in the benchmark economies scored 12% higher than Israeli workers.

FIGURE B5: INDEX OF HUMAN CAPITAL IN THE BUSINESS SECTOR
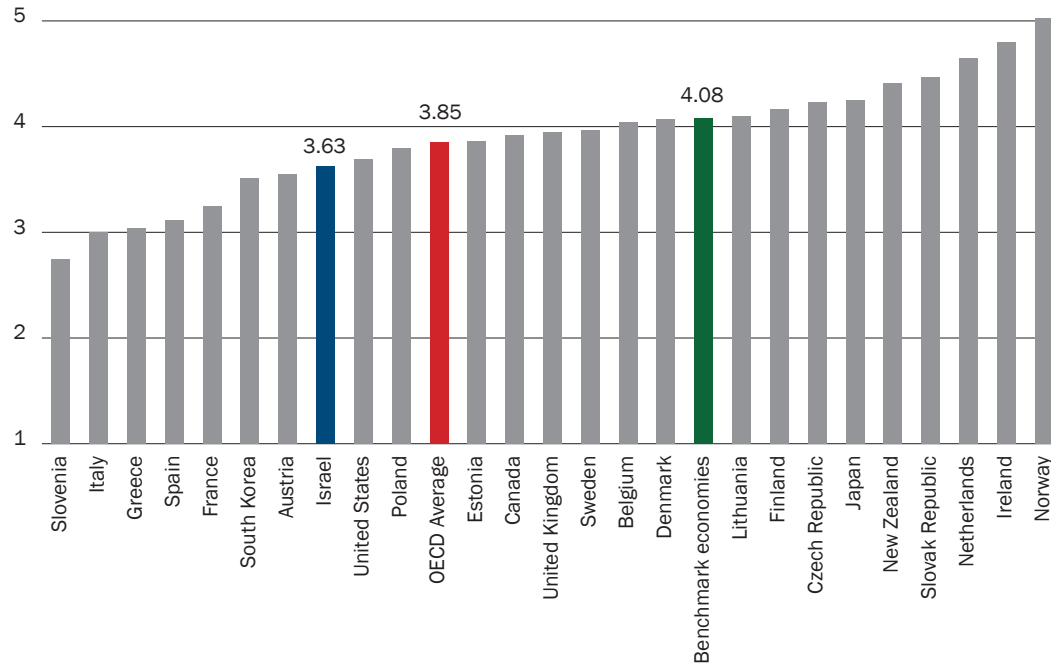
Source: OECD and calculations by the Aaron Institute.

APPENDIX C: THE DISAGGREGATION FORMULA

As above, we assume that the production function of the economy is as follows:

$$Y = A \left(\frac{G_n}{N}\right)^{\beta\gamma} \left(\frac{G_c}{N}\right)^{\beta(1-\gamma)} K^\alpha (HL)^{(1-\alpha)}$$

or in terms of output per worker:

$$\frac{Y}{L} = A \left(\frac{G_n}{N}\right)^{\beta\gamma} \left(\frac{G_c}{N}\right)^{\beta(1-\gamma)} \left(\frac{K}{L}\right)^\alpha H^{(1-\alpha)}$$

We substitute the expression for the firm's optimal level of capital per worker (Equation 2) to obtain the following:

$$\frac{Y}{L} = (\alpha)^{\frac{\alpha}{\alpha-1}} \cdot (A)^{\frac{1}{1-\alpha}} \cdot \left(\frac{G_n}{N}\right)^{\frac{\beta\gamma}{1-\alpha}} \cdot \left(\frac{G_c}{N}\right)^{\frac{\beta(1-\gamma)}{1-\alpha}} \cdot (r)^{\frac{\alpha}{\alpha-1}} \cdot H$$

or:

$$ln\frac{Y}{L} = \frac{\alpha}{\alpha-1} ln\alpha + \frac{1}{1-\alpha} lnA + \frac{\beta\gamma}{1-\alpha} ln\left(\frac{G_n}{N}\right) + \frac{\beta(1-\gamma)}{1-\alpha} ln\left(\frac{G_c}{N}\right) + \frac{\alpha}{\alpha-1} lnr + lnH$$

We denote by Δ the gap between the benchmark economies and Israel and it is then possible to disaggregate the gap:

$$\Delta ln\left(\frac{Y}{L}\right) = \frac{1}{1-\alpha} \Delta ln\, A + \frac{\beta\gamma}{1-\alpha} \Delta ln\left(\frac{G_n}{N}\right) + \frac{\beta(1-\gamma)}{1-\alpha} \Delta ln\left(\frac{G_c}{N}\right) + \frac{\alpha}{\alpha-1} \Delta ln\, r + \Delta ln\, H$$

APPENDIX D: FISCAL POLICY IN ISRAEL, 2018–19

An analysis of the State Budget for 2018–19

In this appendix, we analyze the State Budget approved for 2019 and the usage of the 2018 budget. The State Budget for 2017–18 was approved as a two-year budget and the 2019–20 budget is also expected to be. At the moment, the highlights of the budget are not known, but it appears that without a cut in expenditure or an increase in taxes, the government will exceed the deficit target. The analysis will concentrate on both the budget framework and an attempt to understand the national priorities. The main objective of the analysis is to determine whether the budget is suited to the current condition of the economy and whether it is advancing the economy towards long-term goals of growth, increased productivity and a reduction in poverty.

The highlights of the budget analysis are as follows:

- In 2018, the government maintained budget discipline and met the deficit target but the deficit rose from 2% in 2017 to 2.9%. The debt-to-GDP ratio rose from 60.5% of GDP to 61%. In contrast, the deficit in 2019 is increasing to a level of 3.6% for the year and according to forecasts there is a shortfall of NIS 10 billion in order to reach the deficit target of 2.9%.

- The reduction in the debt-to-GDP ratio in recent years is part of an ongoing process to improve the fiscal situation of the government; however, the ratio is still high and efforts should continue to reduce it according to the target set by the government. The government was able to meet the deficit target in 2018 with the help of one-time revenues. Without the necessary revisions in the amount of 0.7% of GDP by either raising taxes or reducing expenditure, another reduction in the debt-to-GDP ratio will not be possible. During 2018 and 2019, the output gap was and continues to be positive and the economy is essentially at full employment. In our opinion, there is no economic justification for a deficit that is not the result of investment in continued growth, by means of structural reforms and increased public investment (which is currently only 2% of GDP).

- Government expenditure relative to GDP in 2017–18 grew in terms of percent of GDP relative to 2015–16 and the weight of civilian expenditure grew even more (to about 32% of GDP) due to the decline in debt servicing and in the weight of defense expenditure. This is in addition to the increased share of civilian expenditure during the last decade (up until 2015) of about 1% of GDP, in parallel to the decline of about 3 percentage points in the size of the general government, to somewhat less than 40% of GDP.

- The proportion of direct taxes within total tax revenue fell back to its level in 2015 in terms of percentage of GDP, as a result of the reduction in the corporate tax in 2018. During the period 2015–17, direct taxes rose from about 11.7% of GDP to 13.3%, an increase of 1.5 percentage points. In contrast and as a result of the reduction in the corporate tax, direct taxes fell back to 11.8% of GDP in 2018. During this period, indirect taxes fell from 10.8% of GDP in 2015–16 to 10.4% in 2017–18, a drop of 0.4% of GDP.

- The downward trend in the weight of defense expenditure is continuing and in 2018 it fell to 5.1% of GDP, which was lower by 0.2 percentage points than in 2017. If the

2019 budget remains as is, the weight of defense expenditure will drop to 4.95% of GDP. In addition, a significant portion of the defense budget is "revenue-dependent expenditure" and does not come under the permitted expenditure ceiling according to the expenditure rule. This "non-transparent" method for the defense budget is not an acceptable practice and creates distortions.

- There is a serious lack of infrastructure for both housing and transportation, and notwithstanding the government's commitment to increase expenditure on infrastructure in the 2019–20 budget, investment grew from 2% of GDP to only 2.15%. Thus, there is still a gap of 1.6% of GDP in investment in infrastructure between Israel and the benchmark economies and a much larger increase is needed in investment in infrastructure.

- Most of the increase in forecasted expenditure in 2019 is due to an increase in social welfare payments as a result of a greater number of beneficiaries; an increase in investment in infrastructure; an increase in education expenditure; subsidization of the Buyer's Price program[51]; and an increase in wages of public sector employees.

- As a result of the increase in government expenditure and the decrease in tax revenues, the government's structural deficit reached 4.2% of GDP. Israel's structural deficit is high relative to the OECD and is the result of a pro-cyclical policy. Therefore in the event of low growth and increased unemployment, the government deficit can be expected to rise to an even higher level and an increase in the debt-to-GDP ratio will likely be the result.[52]

The budget framework for 2018–19

As mentioned, 2018 ended with a deficit of 2.9% which was similar to the deficit target set by the government; however, this was thanks to one-time revenues. The low deficit relative to the approved budget reflects higher-than-forecasted revenues (namely, higher tax collection and one-time revenues). The early estimated of growth by the Bank of Israel for 2019 and 2020 was 3.3 and 3.5%, respectively. GDP is growing at the rate of potential GDP but the accumulated deficit for 2019 is growing at a rate of 3.8% per year. A downward trend in the debt-to-GDP ratio is part of the long-term process of improvement in Israel's fiscal situation. However, it appears that in 2018 the downward trend came to a halt, even though the economy is at full employment. Without cutbacks in government expenditure or an increase in taxes the debt-to-GDP ratio will rise in 2019.

The forecasted growth for 2019, on which the budget is based, is 3.1% (in contrast to the updated Bank of Israel forecast of 3.3% of GDP). The economy is at full employment with a positive output gap, according to the IMF report published in May 2018.[53] Even though the economy is growing at the boundary of potential output, the government is maintaining an expansionary policy and is not exploiting the growth in order to increase public investment or to reduce the deficit.

The government's revenues in the original proposed budget for 2019 was NIS 356.7 billion but it is expected to be only NIS 350 billion, thus creating a shortfall of NIS 6.7 billion. If the growth assumption is not realized, tax revenues will drop and the shortfall will grow. The expenditure ceiling of the 2019 budget is NIS 396.9 billion but the revised forecast is NIS 400.7 billion, a gap of NIS 3.8 billion. The deficit ceiling specified by law for 2019 is 2.9% of GDP or about NIS 40.2 billion; however, the deficit is expected to be about NIS 50 billion, a difference of about NIS 10 billion.

TABLE D1: THE STATE BUDGET FOR 2017–19, HIGHLIGHTS (CURRENT, IN BILLIONS OF NIS)

	2017	2017 (usage)	2018	2018 (usage)	2019	2019 (revised forecast)
Expenditure	359.4	360.8	376.4	377.5	396.9	400.7
Revenues	322.7	336	337.9	338.6	356.7	350
Deficit	36.6	24.8	38.5	38.9	40.2	50
Deficit in percentage of GDP	2.9%	2%	2.9%	2.9%	2.9%	3.6%

Source: Data for usage is from the Accountant General Branch; the proposed State Budgets for 2017–19; and calculations by the Aaron Institute.

The state of the economy

The economy is currently characterized by growth above potential output; a stable labor market and close to full employment; inflation somewhat above the lower boundary of the government's target range; and a surplus in the current account of the balance of payments. The main challenges facing the economy are to support continued growth by increasing the employment targets and improving total productivity by means of structural reforms and increased public investment, and in particular investment in infrastructure. With respect to trade, the challenge facing the economy will be the strengthening of the exchange rate if the expansionary policy continues in the United States and especially in Europe where weak growth is expected in 2019–21. The rates of increase in productivity were weak during 2015–17 (0.2, 0.5, and 0.7%, respectively).

GDP and growth

The Bank of Israel forecast for growth in 2019–20 indicates that growth is stable at around 3.3% (3.2% and 3.5% in 2019 and 2020 respectively). Economic growth remains strong despite the strengthening of the real exchange rate in 2018. While in 2017–18 the growth of Israel's trading partners improved, the risks to global growth have increased and according to the revised forecast of the IMF the rates of growth of Israel's main trading partners in 2019–20 will be lower than in 2017–18, during which the European and U.S. economies enjoyed high levels of growth. Furthermore, during those years (2017–18), the rates of growth were positively affected also by the growth in private consumption (3.9%) and a reduction in taxes. In 2019, the rate of growth in private consumption is expected to slow (to 3%). GDP grew at a rate of 3.3% in 2018 and the Bank of Israel is expecting growth of 3.2% by the end of 2019 and 2.5% in 2020.

TABLE D2: HIGHLIGHTS OF THE ECONOMIC SITUATION AND THE BANK OF ISRAEL FORECAST AS OF APRIL 8, 2019, PERCENT

	2017	2018	2019	2020
Real growth in GDP	3.3	3.3	3.2	3.5
CPI	0.3	1.1	1.5	1.6
Bank of Israel interest rate	0.1	0.25	0.5	1
Private consumption	3.3	3.9	3	3
Investment in fixed assets (without ships and planes)	3.1	1.4	3	2-
Public consumption (without defense imports)	4.3	3.5	3.5	2.5
Exports (without diamonds and start-up)	5.7	4.4	4	6

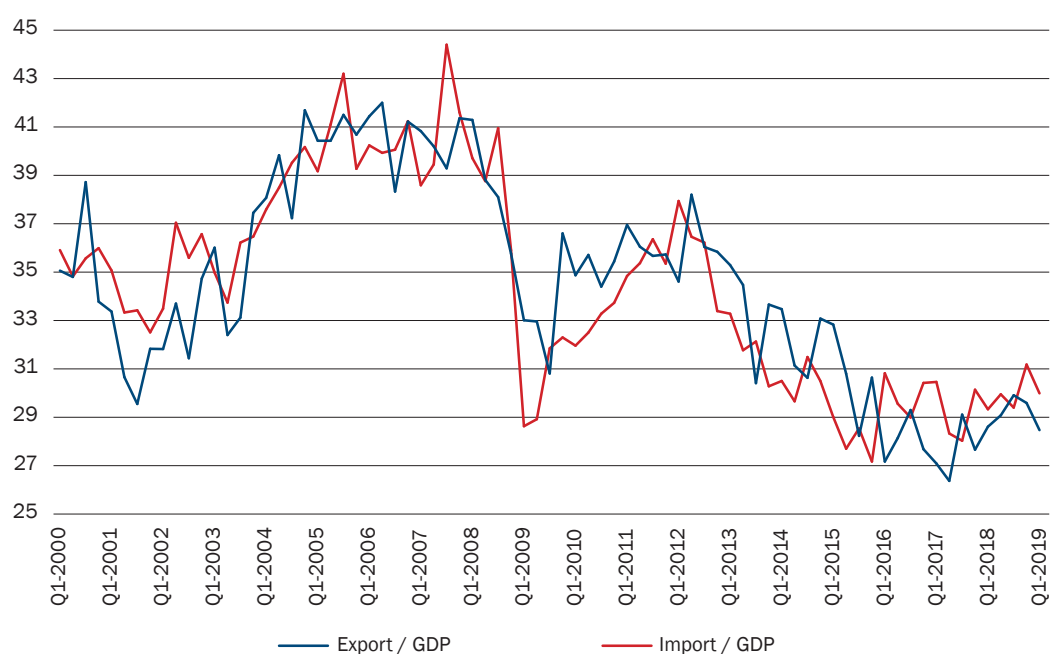*Source: Central Bureau of Statistics and the Bank of Israel forecast.*

Inflation

The consumer price index rose by only 0.8% in 2018, even though the economy was at full employment and wages were rising. In 2019, inflation has been stable at around 1.2%, which is in the lower part of the range for price stability and is lower than inflation in the other OECD countries.

Employment and unemployment

During 2018, the rate of labor force participation in the 25–64 age group reached 80%, where the rate of employment reached a record high of 77.5%, the highest rate in the OECD. Unemployment dropped to and remained at 3.5%, but according to Bank of Israel forecasts unemployment is expected to rise to 3.7% during 2019–20. The forecasted rate of unemployment is still very low in historical terms and also in comparison to most developed countries. The rate of job vacancies rose by 2% and the average real wage rose by 2.7%.[54]

Balance of payments

During the past decade, there has been a surplus in the balance of payments, which has supported the appreciation of the shekel. Between 2015 and 2017, the appreciation of the shekel led to a worsening of Israel's terms of trade, but in 2018 the appreciation of the shekel came to a halt. The surplus in the balance of payments led to a decline in the weight of exports. The drop in the ratio of imports to GDP is correlated with the drop in the ratio of exports to GDP. We believe that the economy needs to be further opened up to trade by reducing import barriers with the goal of increasing the ratios of imports to GDP and exports to GDP, which have been declining since 2007.

FIGURE D1: IMPORTS AND EXPORTS AS A PERCENTAGE OF GDP (1998–2018)

Source: Central Bureau of Statistics and calculations by the Aaron Institute.

Analysis of government revenue and expenditure

Revenue

Total state revenues in 2018 totaled about NIS 338.6 billion as compared to a forecast of NIS 337.9 billion. Total tax revenues in 2018 stood at 23% of GDP, a decline of 1.6% of GDP relative to tax revenues in 2017. In 2017, tax revenues were almost 1% of GDP above the forecast as a result of one-time revenues (tax collection campaigns and acquisition of Israeli companies). In 2018, the corporate tax was reduced by 2% and there were no acquisitions of Israeli companies that generated significant tax revenues; as a result, the drop in tax revenue as a percentage of GDP was expected and the direct tax burden dropped by 1.4%. The deficit in 2018 met the deficit target of 2.9% of GDP; in contrast, the deficit in 2019 is growing at a rate of 3.8% of GDP, well above the deficit target of 2.9% of GDP.

The data for state revenues for 2018 show that an increase in wages and the positive business cycle are positively affecting revenues, which grew in nominal terms by 6.3% in the first quarter of 2018 relative to the first quarter of 2017. In contrast, there was no growth in revenue in the first quarter of 2019 relative to the first quarter of 2018. The halt in the growth of tax revenue as a percentage of GDP is a signal that there is no reason to further reduce taxes except in the case of a cut in expenditure or a breach of the deficit target.

The data show that the reduction in direct taxes (the corporate tax) reduced state revenues in 2018–19. The revenue from VAT fell somewhat in 2016, rebounded in 2017, and maintained its level relative to GDP in 2018 as a result of the increase in consumer spending. Therefore, it appears that meeting the deficit target in 2019 is dependent on continuing growth in consumer spending.

TABLE D3: CHANGES IN THE TAX SYSTEM

	Direct tax: corporate tax	Indirect tax: VAT
Old tax rate	26.5%	18%
New tax rate – 2016	25%	17%
Change in new tax rate 2018	23%	17%
Total change 2016–18	3.5%	1%

Source: Ministry of Finance.

Apart from one-time revenues, actual growth was higher than the forecast, primarily due to an increase in the activity of households and companies, the increase in wages and employment, and increased global growth. These factors helped to maintain state revenue despite the tax reduction. Nonetheless, the deficit is expected to be more sensitive to a drop in domestic economic growth, a decrease in consumer spending or slower global growth. These events could lead to a breach of the deficit target in 2019 and a significant increase in the debt-to-GDP ratio.

Expenditure

According to the actual usage of the budget from 2005 till 2016, the weight of budget expenditure relative to GDP shrunk by 3.3% of GDP, where defense expenditure fell by 1.2% of GDP and debt servicing fell by about 2% of GDP. In the 2017–18 budget, public expenditure grew by 1.2% of GDP, primarily due to an increase in health and education expenditure. During 2017–18, the size of the general government is stable and stands at about 40% of GDP, and similarly in the case of the original 2019–22 budget, according to which social services grow by about 0.2% of GDP annually during this period.

Therefore, a cumulative deficit has been created in government expenditure for 2019–22. Without an adjustment in the form of a cut in expenditure or a reduction in taxes the deficit in these years is expected to be in the vicinity of 3.6% of GDP. Thus, it is not possible to maintain the level of social services and defense spending or to increase investment in infrastructure without raising taxes or a substantial breach of the deficit target and the transition to an upward trend in the debt-to-GDP ratio.

TABLE D4: EXPENDITURE 2019–22

Billions of NIS	2019	2019 forecasted	2020	2021	2022
Expenditure without provision of credit	397.4	400.7	417.4	434.1	450.2
Defense and law enforcement	87.3	—	90.4	92.4	94
Social services	178.8	—	189.2	199	211.5
Infrastructure	27.4	—	31.2	31.9	30.9
Administrative ministries	20.7	—	20.8	20.4	20.2
Other expenditure	31	—	31.6	33.5	33
Debt service	52.3	—	54.3	56.9	60.6
Expenditure limit	397.4	397.4	412	426.4	442.9
Gap	0	3.3	5.4	7.7	7.3
Deficit ceiling allowed by law	40.2	46.7	48.1	46	45.1
Expected deficit without adjustments	50	50	53.5	53.7	52.4
GDP	1389.22	1389.22	1454.05	1502.77	1577.28
Percent of GDP					
Expenditure without provision of credit	28.61%	28.84%	28.71%	28.89%	28.54%
Defense and law enforcement	6.28%	—	6.22%	6.15%	5.96%
Social services	12.87%	—	13.01%	13.24%	13.41%
Infrastructure	1.97%	—	2.15%	2.12%	1.96%
Administrative ministries	1.49%	—	1.43%	1.36%	1.28%
Other expenditure	2.23%	—	2.17%	2.23%	2.09%
Debt service	3.76%	—	3.73%	3.79%	3.84%
Expenditure limit	28.61%	28.61%	28.33%	28.37%	28.08%
Gap in percent of GDP	0.00%	0.24%	0.37%	0.51%	0.46%
Expected deficit	3.60%	3.60%	3.68%	3.57%	3.32%

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1   The commonly made comparison to the OECD average is not appropriate since it includes very weak economies and others that differ substantially from Israel's. Therefore, we looked at countries with a population and natural resources that are similar to those of Israel (Austria, Belgium, Denmark, Finland, Ireland, the Netherlands, and Sweden), but which are characterized by a higher GDP per capita and level of productivity than Israel's, as well as lower rates of poverty. This is in our opinion the correct comparison for Israel with respect to GDP targets and a comparative economic analysis.

2   The Program for the International Assessment of Adult Competencies (PIAAC) is a survey which measures adults' proficiency in key information-processing skills — literacy, numeracy, and problem solving. See "Survey of Adult Skills (PIAAC)," Organisation for Economic Co-operation and Development, http://www.oecd.org/skills/piaac/.

3   This analysis is based on OECD and IMF data and calculations by the Aaron Institute.

4   See Jorgenson and Vu (2016) and many others.

5   "OECD Digital Economy Outlook 2017," (Paris: Organisation for Economic Co-operation and Development, 2017) https://www.oecd.org/internet/oecd-digital-economy-outlook-2017-9789264276284-en.htm.

6   Sumkin (2020).

7   For further details, see Eckstein and Lifshitz (2017).

8   Tel Aviv, Jerusalem, Haifa, and Beer Sheva.

9   For further details, see Tehawkho (2019).

10   Social welfare expenditures include unemployment benefits, healthcare coverage, higher payments for the disabled, etc. All of these have zero or negative impact on employment and productivity.

11   The rate of employment among the 25–64 age group is currently about 78% and is expected to rise to about 80.4% by 2030.

12   For further details, see Eckstein and Larom (2016).

13   For further details, see Eckstein, Lifshitz, and Larom (2018).

14   For further details, see Alex Weinreb, Dov Chernichovsky, and Aviv Brill, "Israel's Exceptional Fertility," (Jerusalem: Taub Center for Social Policy Studies in Israel, December 23, 2018), http://taubcenter.org.il/israels-exceptional-fertility-eng/.

15   The pyramid is based on a similar one constructed in Ireland. See "Ireland's Competitiveness Challenge 2019," (Dublin: National Competitiveness Council, December 2019), http://www.competitiveness.ie/publications/2019/ireland-s-competitiveness-challenge-2019.pdf, 2.

16   It is important to emphasize that the size of a category is not an indication of its importance or the preference it should receive.

17   This cell can also include personal security which is related to risks facing the individual and the economy as a whole.

18   Section 3 will present the result of a macroeconomic analysis that estimates the weight of each factor of production in explaining the output gap per workhour relative to the benchmark economies.

19   See Jorgenson and Vu (2016) and many others .

20   "OECD Digital Economy Outlook 2017," Organisation for Economic Co-operation and Development.

21   See EU KLEMS database, "EU KLEMS Growth and Productivity Accounts Release 2019," Vienna Institute for International Economic Studies, https://euklems.eu/.

22   Note that we refrain from estimating the parameters on a per-country basis as we specifically assume that the same technology is available to all developed countries, and are focused on finding the gaps in the means of production. Thus, we calibrate all the required parameters based on available data in literature as described in the paper.

23   Robert C. Feenstra, Robert Inklaar, and Marcel P. Timmer, "The Next Generation of the Penn World Table," *American Economic Review* 105, no. 10 (2015): 3150-3182, www.ggdc.net/pwt.

24   "Survey of Adult Skills (PIAAC)," Organisation for Economic Co-operation and Development.

25   The expression obtained for the cost of capital after solving is:

26   In countries that have more activity in industries that are not intensive in private capital, the cost of capital in the aggregate data will appear to be higher.

27   Taken from the statistical appendix of the "2018 Annual Report of the Bank of Israel" [in Hebrew], (Jerusalem: Bank of Israel, March 31, 2019), https://www.boi.org.il/he/NewsAndPublications/RegularPublications/Pages/DochAppPartH2018.aspx.

28   A value on the low end of the elasticities obtained in relevant papers (Baxter and King, 1993).

29   "EU KLEMS Growth and Productivity Accounts Release 2019," Vienna Institute for International Economic Studies.

30   Simulation equations are detailed in Appendix C.

31   These recommendations are under discussion as part of the recommendations of the Committee to Improve Productivity in the Commerce and Services Industry which is led by the Ministry of the Economy and the Aaron Institute. The Committee is expected to complete its work during the first half of 2020.

32   These sources for the cost of investment (apart from depreciation) have been higher in Israel than in the benchmark economies. Currently, the most prominent among these sources are the cost of excess regulations in doing business and the corporate income tax, although the tax has been reduced significantly since 2004.

33   Note that the poverty rate is the share of net-income per household adjusted for number of children.

34   This group relates to individuals whose skill levels are below half the median and includes both workers earning a wage below half the median and individuals that are not working and whose potential earnings are below half the median and in particular those who are not acquiring an academic education.

35   For a definition of "under half the median" see the footnote above.

36   See, for example, Jacobson, LaLonde, and Sullivan (2005), Dearden, Reed, and Van Reenan (2006), and Sala and Silva (2013).

37   For training of longer than 1000 hours, a higher return will be required accordingly.

38   Eckstein and Lifshitz (2017).

39   In case of actual increase of the debt to GDP above the projected path, the government should adjust taxes and other sources of income to prevent the deviation from being permanent (see discussion below for the Metro project).

40   Fournier (2016).

41   "Doing Business 2020," The World Bank, https://www.doingbusiness.org/.

42   For a full description of the reform, see Sumkin (2020).

43   For further details, see Tehawkho (2019).

44   Mathematically, a country's score will be the difference between its score and that of the worst country divided by the difference between the score of the best country and that of the worst country, multiplied by 100. For example, if on a certain index the score of the highest country is 250, that of the lowest country is 50 and that of the country being ranked is 100, then the DTF will be 100*(100-50)/(250-50)=25. All of the indexes are available from the "Data Center of the Aaron Institute" [in Hebrew], www.idc.ac.il/he/research/aiep/pages/data_page.aspx.

45   The full list of Israel's indexes and scores and those of the benchmark economies appear in Eckstein and Lifshitz (2017).

46   Hilef and Goldhammer (2016), Eckstein et al. (2016), and Sumkin (2020).

47   See the summary of the roundtable and the material presented there at "Government's contribution to low productivity in the economy" [in Hebrew], Aaron Institute for Economic Policy, https://www.idc.ac.il/he/research/aiep/pages/lowgrowthgovtcontribution.aspx, as well as the *Yedioth Ahronoth* article on the presented research: Sever Plotzker, "Research: Low productivity in Israel - because of government" [in Hebrew], *Yedioth Ahronoth*, December 26, 2016, https://www.yediot.co.il/articles/0,7340,L-4898975,00.html.

48   In this context, the index of public capital is its value per capita since it looks at all of public capital used to provide service to all citizens, and in particular transportation services.

49   is essentially the Penn World Table index of years of schooling.

50   When looking at the correlation between human capital and the level of productivity in the various countries, the average result on the PIAAC exam has a high correlation with productivity while an index based only on years of schooling is not correlated with productivity.

51   A government program in which government land for residential buildings is auctioned at a subsidized price and developers bid by promising to sell the apartments at the lowest price.

52   "2018 Annual Report of the Bank of Israel," Bank of Israel.

53   "Israel: 2018 Article IV Consultation-Press Release and Staff Report," (Washington, DC: International Monetary Fund, May 1, 2018), https://www.imf.org/~/media/Files/Publications/CR/2018/cr18111.ashx.

54   "2018 Annual Report of the Bank of Israel," Bank of Israel.

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