Demographics and Economy in Israel

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The Swedish economist Knut Wicksell wrote at the beginning of the twentieth century that any basic book on political economy must begin with a chapter on population. Despite the importance of demography, Wicksell noted that it is often neglected in favor of other issues (Strøm & Thalberg, 1979). For years, the State of Israel has had the highest fertility rate among OECD countries. While many developed countries employ diverse measures—including immigration—in order to cope with manpower shortages and to support the economy, natural fertility in Israel is so high that it creates the opposite challenge for the economy. The "demographic anxiety" that characterized Israel in its first few years, which stemmed from being a small population surrounded by enemies that was forced to cope with military and economic challenges requiring significant population resources, no longer exists. The Israeli economy is now stretched by the effects of high natural population growth in a small country, along with technological changes that impact the labor market. This article examines demographic developments and their economic consequences in Israel according to recent trends and forecasts for the coming years.

Keywords: Economy, GDP, GDP per capita, birth rate, fertility rate, public investment, population growth, standard of living, pension, private expenditure, economic challenges, infrastructure, education, density.

Demography in Israel

The Israeli model of recent years is unique by any measure. The combination of an advanced and developed economy and a high birth rate is not common in the modern world. Demographic concerns were among the main shapers of the State of Israel when it was established in 1948. At the time of the declaration of independence, there were only about 800,000 residents in the State of Israel, some of whom had immigrated from Europe just a short time before, carrying the horrors and terrible losses of the Holocaust. The small country faced enormous challenges, first and foremost militarily, as fewer than a million people were forced to contend with a hostile environment of tens of millions. The trauma of the Holocaust, with the destruction of a third of the Jewish people, added another weighty layer to the anxiety.

This initial context rendered the growth of the population as a strategic, existential necessity, which was expressed in a policy that emphasized coping with quantitative demographic inferiority as an important component of Israeli policy in general and Israel's defense doctrine in particular, as expressed in "Ben-Gurion's Seminar" (Ben-Israel 2013). Social norms advocating large

families, a policy encouraging a high fertility rate through grants, and encouraging Jewish immigration to Israel were the most prominent aspects of the State of Israel's attempt to decrease the quantitative population gaps vis-à-vis the Arab countries. In effect, security and economic considerations pushed for a policy of increasing natural growth via immigration and a high fertility rate (Krampf 2015).

Discussions on the encouragement of Jewish immigration as one aspect of promoting population growth, usually focus on the security and settlement aspects that were fateful to the existence of the Jewish people, and rightfully so. However, in the long term, the importance of population increase is also felt in the economic sphere. The understanding was that in the short term, coping with waves of immigration and an increasing birth rate would make things difficult for the new country and add to the existing economic challenges. Welcoming hundreds of thousands of Jews, many arriving empty-handed, and providing workplaces and food, would be a burden for any country in the world; all the more so for a small, young country that was coping with existential threats from the moment it was established. However, in the long term, the growth of the population is also an economic goal in and of itself, as increasing manpower in factories and increasing high-quality human capital are as important as the need for boots on the battlefield. Thus population growth was also the need of the hour from an economic perspective.

The Israeli case of an advanced and developed economy with the natural increase of a developing country is unique, and it may not be sustainable over time, thus necessitating a reassessment of the policy of encouraging a high birth rate in Israel.

Today, 75 years after the establishment of the State of Israel, we can clearly see that Israeli demographic policy has been very successful. At the beginning of 2023, the Central Bureau of Statistics (CBS) announced that the population of Israel at the end of 2022 was 9.656 million people. In that year Israel's population grew by 2.2%. The sources of growth are quite interesting, with 62% natural increase and 38% immigration—mainly Jewish immigration from various diaspora countries (CBS 2022b). A growth rate of about 2% has been maintained for a long period and it is a figure that stands out and is unprecedented in the developed world, as well as the undeveloped world. For comparison, Sri Lanka and Myanmar (formerly Burma) are two other countries that declared independence in 1948. In Sri Lanka there were about 7 million people at the time of independence, while in Myanmar there were about 17 million people. As of 2022, about 22 million people live in Sri Lanka, while about 54 million live in Myanmar (United Nations n.d.). That is, the population of each of those countries tripled during this period, while Israel's growth was much greater, at 12 times. It should be noted that population growth in Sri Lanka and Myanmar matches population growth in the world, whose population grew 3.5 times from 1948 to 2022, but the level of economic development in each of them is much lower than in Israel—which further highlights the gap between the countries. According to the UN human development index, which examines the development of countries comparatively, using metrics such as education, income, and mortality, in 2021 Israel's level of development was very high, ranking 22 out of 191 countries. Sri Lanka ranked 73, while Myanmar was ranked 149 (HDI n.d.).

Israel in 2023 is a completely different country than it was in 1948. Numerically it is no longer tiny. According to World Bank figures, in 2021 Israel's population placed it 97th in the world out of over 200 countries (World Bank n.d.c). Economically, the population's growth contributed greatly to a dramatic increase in GDP growth over the years, as is expressed in the same database. Israel's GDP in 2021 was 488 billion dollars, placing it 26th in the world (World Bank n.d.b).

The quantitative and qualitative growth of Israel's population is a critical component that has significantly contributed to the country's impressive economic growth since its establishment. However, it may also be true that what was necessary for many years to serve the society and economy as a catalyst for this growth, could become a burden on the economy in the coming years. We must examine the positive impacts of population growth on the economy in the past while soberly looking at its potential future impacts, which will not necessarily continue the positive trend that has existed so far. The Israeli case of an advanced and developed economy with the natural increase of a developing country is unique, and it may not be sustainable over time, thus necessitating a reassessment of the policy of encouraging a high birth rate in Israel. But first, we will present a theoretical framework that will illustrate the importance of demography to the economy.

Demography and Economics

The implications of demography for economics are numerous, diverse, and weighty. Demography is much more than fertility rate, mortality, and the age of the population. The literal meaning relates to the characteristics of the population and is thus connected to a very broad range of economic contexts. A demographic economic analysis includes birth rates, mortality rates, and the age of the population, but it must also include references to the characteristics of each of them. For example, the age of the population is not a permanent variable, as it has various contexts in accordance with a certain point in time, place, and needs. A demographic economic analysis examines the population according to gender, religion, skills, rural or urban, consumer patterns, and more. Hence, it appears that demography is in effect the main shaper of the economy and influences the economic development of every country and its balance of payments (Roy 2021).

Until the industrial revolution and ensuing technological changes, demographic concepts were largely underdeveloped, as population growth was almost the only path to economic growth. The population was an essential resource for increasing the workforce via increasing human capital, which is an important resource for the development of the economy. The view that population growth supports economic growth and with it an increase in the standard of living, in effect encouraged further population growth.

According to the "Malthusian trap," every improvement in the standard of living would encourage excess births, which would counterbalance the additional production with additional demands, thereby maintaining subsistence at the lowest threshold.

At the end of the eighteenth century, the English economist Thomas Malthus related to demography as the most important variable in economics. His approach is rooted in a pre-industrial world where the earth was the main source of profit. Thus, more people working in agriculture could increase the total profit. According to the "Malthusian trap," every improvement in the standard of living would encourage excess births, which would counterbalance the additional production with additional demands, thereby maintaining subsistence at the lowest threshold. Malthus' theory of catastrophe is founded on the assumption that the world's population grows exponentially, while the food supply grows linearly. Therefore, a larger population will increase general production but reduce per capita production. Each increase in per capita production will bring about an improvement in the standard of living that will be expressed in a higher birth rate, and hence again there will be a decline in per capita production. The only way out of this trap is via significant technological changes to boost food production faster than

population growth. This is exactly what occurred a short time after Malthus' prophecies of doom (Aghion et al. 2021).

During the 200 years that have passed since then, the industrial revolutions and the technological improvements that they brought about, have changed everything. Expedited processes of urbanization, educational opportunities, the integration of women in the labor market, and many other processes, including enormous investment in human capital that contributed to improvements on the level of the population—all of these prevented the fulfillment of the theory. Over the past 50 years, the world's population has doubled—from 4 billion people at the beginning of the 1970s to 8 billion people in 2022. In the same time period, global production increased 28 times, from 3.5 trillion to 100 trillion dollars.

The impressive growth of the last 200 years has fundamentally changed the demographic characteristics of the world's population. The industrial era sharply lowered the birth rate of the developed world in light of the secondary importance of manpower for producing capital, combined with other processes such as women's education and their integration in the workforce. If in the nineteenth century a woman could expect to give birth to six children during her life, in the middle of the twentieth century a woman gave birth to five children, and at the beginning of the twenty-first century the global average was 2.5 children per woman (Lee 2003). This sharp drop is not accompanied by a decline in the world's population, but by an increase that stems from other processes. The dramatic changes and developments in science and medicine have increased longevity. A man born in the middle of the nineteenth century lived for about 30 years on average, a man born in the middle of the twentieth century lived for 50 years on average, while a man who will be born in the middle of the twenty-first century is expected to live more than 70 years (Lee 2003). The new demography of the industrial era requires that countries prepare accordingly, for example by raising the retirement age.

The view that industrialization and progress sharply lower the fertility rate while increasing longevity is expressed well in Warren Thompson's paradigmatic 1929 model. The American demographer precisely predicted the balance that would emerge in countries, between the death rate and the birth rate in industrialized societies, due to progress and technological, scientific, and economic changes. Thompson's demographic transition model (DTM) comprises five stages, each of which relates to the industrial stage that society is in and its impact on the birth rate, death rate, and population growth (Roy 2021). These are the five stages according to Thompson:

1. The pre-industrial stage—characterized by a high birth rate due to the importance of manpower to the economy, but without knowledge and technology; also by a high death rate at a young age.
2. Fast population growth—in the second stage, society begins to experience industrialization and economic development that improves the quality of life. This is expressed in a greater supply of food and improved medicine and hygiene. All of these create conditions that decrease incidents of death caused by sickness or hunger. Meanwhile, the birth rate remains the same as in the pre-industrial stage, which creates an imbalance and fast population growth.
3. The population growth starts to balance out—as part of the industrial development of the society and the improved quality of life in the second stage, the birth rate starts to decline. This is due to social and economic processes—for example, greater exposure to education, which brings women into the world of employment. Meanwhile, the death rate continues to decrease, leading to stable population growth.
4. Stabilization of the population—in the fourth stage, the birth rate is low but so is the death rate. In this situation, significant population

growth is not expected but rather very slow growth, and if it declines, society moves to the fifth stage.

5. Population decline—the fifth stage stems from a very low birth rate and low death rate, which together lead to population decline over time.

Most developed countries nowadays are in the fourth and fifth stage, while developing countries are in the second and third stage. Population growth to power the economy is less important than in the past. Today, families do not need to give birth to five or six children for the sake of economic output, but this does not mean there is no stage at which the economy will be affected by a birth rate that is too low. Today it is customary to place the necessary replacement level at 2.1 children per family. Without immigration, any level lower than this will decrease the population and could create a shortage of productive workers. Today the average in the developed world is 1.62 (Roy 2021), which forces developed countries to balance this through the immigration of workers and to deviate from the fifth stage in Thompson's model.

For example, Japan and Germany have been in the fifth stage for years, given a death rate that is higher than the birth rate. But Germany has succeeded in returning to the fourth stage thanks to immigration, while Japan, which refuses to take in immigrants, is stuck in the fifth stage. This situation could harm the local economy, because fewer and fewer young people are forced to provide for a growing senior population. The result of the fifth stage—a decreasing population—for the economy, can be destructive. Along with population contraction, in recent years Japan has also experienced a decline in GDP and GDP per capita (IMF n.d.). In effect, immigration is the quickest solution for a low birth rate and for the economic problem that it causes for developed countries. Today, one out of every ten residents in an OECD countries was born in another country. Given the low birth rates, these countries take in millions of immigrants each year in order to avoid a fate like Japan's. For example, in 2022 they absorbed 6.1 million immigrants (OECD n.d.e).

In this context, Israel is a fascinating test case, as it is one of the only countries that does not match any of the stages of Thompson's models, and in general constitutes an interesting demographic anomaly.

In recent years, no country is in the first stage of Thompson's model; they have all experienced various levels of industrialization, which reduces the birth rate, increases economic growth, and changes the path of historical development that Malthus predicted. However, despite the impressive defeat of the Malthusian trap, the consequences of this fast population growth combined with tremendous economic growth are not always positive. First, with respect to the population density on earth. The population has grown ten times since Malthus' prophecy, while the earth's area remains the same; second, such fast growth requires maximum exploitation of natural resources such as water, and damages them; third, air pollution and climate change. These threaten the development of agricultural crops and food in certain areas and even threaten human settlement in other areas that may become too hot, thus further reducing the areas of the earth that can be settled.

All of these and more illustrate the limits of the earth, challenge continued growth, and threaten the continuation of the positive trend. It may be that what was desirable and even necessary in the nineteenth and twentieth centuries is becoming one of the biggest question marks of the twenty-first century, as the continuation of this rate would be quite destructive. In this context, Israel is a fascinating test case, as it is one of the only countries that does not match any of the stages of Thompson's models, and in general constitutes an interesting demographic anomaly.

High But Changing Birth Rate—A Curious Contribution to the Israeli Economy

The birth rate in Israel is high and is unusual by any measure for one main reason—it is always high and is almost unaffected by economic changes, which in any other place would affect birth patterns. In the years when Israel was a developing country, the birth rate was high, and in the years when Israel made the transition to an industrialized and advanced country as presented in Thompson's model, the birth rate remained high. In the years when there were economic crises, the birth rate was high, and even economic crises that were accompanied by military tension, such as the years of the Second Intifada, did not change the birth rate in Israel, which remained high. In effect, since the end of the 1970s, the fertility rate has hovered around three children per family and has not been affected by events (Macrotrends n.d.). Also during the COVID-19 crisis, a rare health crisis that led to serious economic damage, the birth rate in other countries decreased but in Israel it remained high (Matthews 2021).

Aside from the high birth rate, Jewish immigration from the Diaspora has been a main component in the high rate of population growth in Israel over the years. About one fifth of Israel's current residents were not born in Israel (OECD n.d.a). Over the years, Israel has benefited from Jewish immigration, which has greatly contributed to economic growth. A large portion of the immigration to the State of Israel since its establishment was of highly skilled people with means and education. It is difficult to express this immigration's contribution to production over the years in numbers, but it can be partially expressed via the human capital that came from the former Soviet countries in the 1990s. In 1989, before the waves of immigration, there were about 15,000 doctors and 30,000 engineers in Israel. From 1989 to 1993 alone, about 12,000 doctors and 60,000 engineers immigrated to Israel (Katz 2022).

For many years the combination of a high birth rate and the immigration of human capital to Israel advanced the local economy. David Ben-Gurion's view that a qualitative human edge should be created to combat the quantitative advantage of Israel's hostile neighbors, proved itself in both the military and civilian spheres (Even 2021). Today the army relies on qualitative technological superiority that stems from an advanced economy and investment in education, research, and development. But nothing lasts forever, and it could be that 2% annual population growth cannot continue in such a small and crowded country as Israel.

The accelerated growth since the state's establishment has made Israel one of the most densely populated countries in the world in general, and among developed countries in particular. The problem worsens if we take into account that there are desert areas in the southern Negev that are much harder to settle, unlike more densely populated countries like the Netherlands, South Korea, and Hong Kong that do not suffer from a similar problem. Furthermore, the severity of Israel's small physical size is intensified by the fact that it is surrounded by hostile countries, which is very different from a country like the more densely populated Netherlands, whose residents enjoy free access to the neighboring countries.

The current demographic trends do not bode well: A continued population growth rate of 2% per year means that Israel's population will grow 75% by 2050, when it will be over 15 million people.

Referring solely to the average number of births presents a partial picture of the economic contribution of natural increase to Israel's economy, as each sector's contribution to GDP is different. Therefore, the demographic forecasts of the various groups should be examined in accordance with their participation in the labor market. As part of a comprehensive survey that the CBS performed in 2017, a study was conducted that examined demographic trends

Table 1. Area, population, and density[1]

	Israel	Ranking out of 38 OECD countries	World ranking out of 200 countries*
Area (km^2)	**22,072**	**# 37** Only Luxembourg is smaller	**# 150**
Population (millions)	9.6	# 23	# 97
Population density (no. of residents per km^2)	**426**	**# 3** after South Korea and the Netherlands	**#26****

* According to UN figures there are 233 countries and territories, 200 of which have a population of more than 100,000 residents, and 172 of which have a territory of over 1,000 km2

** According to the World Bank

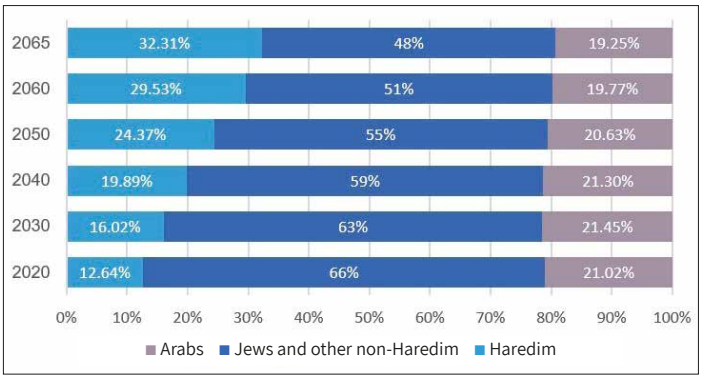
Table 2. Israel compared to OECD countries

	Israel	OECD average	Rank in OECD
No. of children per woman	2.9	1.6	# 1
Population growth rate[2]	**1.9%**	**0.5%**	**# 3** After Iceland and Luxembourg

in Israel until 2065 (CBS 2017). The study divides Israel's population into three main groups: non-Haredi Jews, Haredim, and Arabs. According to the forecasts, the most dramatic change that will occur by 2065 will be among Jews and not among Arabs, as many mistakenly think. Despite the high birth rate among Israeli Arabs in the first years of the state, it should be noted that education and an improved economic situation have shifted the fertility rate in the Arab community. The fertility rate of Arab women today is comparable to that of Jewish women and is in a downward trend, which is strengthened as women acquire higher education and integrate into employment. If in 1975 the average woman from the Arab community gave birth to six children during her life, in recent years the average has stabilized around three children (Heruti-Sover 2022). Consequently, Israeli Arabs, who currently constitute one fifth of the country's population, are expected to continue to constitute about one fifth of the population in 2065.

The phenomenon that is unique to Israel on a global scale is in the Jewish sector, not including Haredim, which constitutes the backbone of Israeli society and economy. The average in this category is over two children per secular or traditional woman and has been increasing since the 1990s. This is an unusual phenomenon, because in the developed world, as education and GDP per capita increase, the fertility rate decreases among the middle class. In addition, it would be wrong to conclude that secular women of a lower socioeconomic standing tend to give birth to more children, thus pushing the average up. According to CBS figures, in Israel,

Figure 1. The CBS' demographic growth forecasts



Source: The Author, according to CBS figures, 2017

even in the highest socioeconomic decile, the average woman is expected to give birth to 1.95 children during her lifetime (CBS 2022a).

The most anomalous birth rate in the State of Israel is that of the Haredi population. In recent years the average has been 6.65 children per Haredi family—a moderate decline from an average of seven children per family at the beginning of the third millennium. This figure explains the dramatic changes that the Jewish community in Israel can expect by 2065. Despite the relatively high fertility rate of non-Haredi women in Israel, the relative weight of this population in the overall population is expected to decline from two thirds to half of Israel's population. Furthermore, if current trends continue, in the 2040s the Haredi population is expected to constitute one fifth of Israel's population, in the 2050s Haredim are expected to be one quarter of the population, and in 2065 one third of Israel's population will belong to the Haredi community (CBS 2022a).

These figures, which indicate a transformation of Israeli society in the coming years, become significant when analyzing the integration of the various groups in the employment market. When dividing by sector, we can say that the beating heart of the Israeli economy is the Jewish sector, not including Haredim. This sector constitutes the largest portion of the population, the large majority of which is employed in the economy. According to CBS figures, this sector comprises two thirds of Israel's population. As of the time of writing, the employment rate is 87% of Jewish men ages 25-64 and 83% of Jewish women (CBS 2022a). Historically, Jewish men who are not from the Haredi sector have always maintained a high employment rate of over 80%, except during economic slowdowns, while the rise in the employment of Jewish women is a unique and fluctuating phenomenon. Their employment rate increased from 60% in the 1990s to 80% in the second decade of the twenty-first century (Fuchs and Weiss 2018). The training of women for the modern employment market has been an important component of Israel's economic development and its impressive growth in recent years.

Turning to the two other sectors that constitute about a third of Israeli society today, presents a picture that is far from optimal. As of 2022, the employment rate among the entire Haredi population was 66%, whereas the breakdown by gender indicates an imbalance. About 81% of Haredi women worked, a rate that is similar to that among non-Haredi Jewish women, while only half of Haredi men were employed (Knesset Research and Information Center 2022). Yet examining the trends of the entire sector raises hope that it is possible to increase the employment rate.

In the 1990s the employment rates of men and women were similar, more or less: less than half of Haredi women and Haredi men were employed. At that point we see the first divergence by gender, as there was a jump in the employment rate among women while the employment rate among men declined below 40% at the beginning of the twenty-first century, before returning to its previous level at the end of the second decade (Knesset Research and Information Center 2022). The same phenomenon that characterizes Haredim exists in the Arab sector, except that the genders are reversed: men are employed at much higher rates than women. As of 2022, the employment rate among Arab men ages 25-64 was 77%. This indicates a recovery from the decline during the COVID-19 crisis, when their employment rate dropped below 70%. In general, the employment of Arab men has stayed at the same level since the beginning of the twenty-first century. In contrast, the employment rate among women was only 45%. This is a much lower figure, but it is important to note that it is a significant improvement over past figures. In fact, the employment rate among Arab women ages 25-64 doubled within two decades (Shaked 2022). Moreover, in the near future, the Arab population's increasing exposure to higher education is expected to improve not only their

employment market participation rate but also the quality of employment, as many in the Arab community are acquiring education that will enable them to improve their occupational status.

There is no doubt that the high and anomalous birth rate in Israel, combined with the waves of Jewish immigration, have very positive aspects. Israeli culture, which consecrates the values of family and community and tries to strengthen the sense of the collective for the sake of a shared future, is reflected well in the high birth rate. Even during a difficult time like the COVID-19 crisis, when the birth rate in the world decreased further due to concerns for the future, Israel saw no such trend. This expresses a level of social resilience and the belief that together we can overcome the difficulties and challenges that we face (Weinreb 2021).

The contribution of high birth rate to the economy is well-known, as young people are considered the engine of innovation and creativity and bring economic growth (Wagner 2012). An economy that rests on a young population ensures the flow of youthful and fresh energy into the employment pool. In a country like Israel that relies heavily on innovation and entrepreneurship, this has tremendous importance. But continued growth at the current pace brings enormous challenges that, without policy, will quickly turn into negative economic results. The economist Dan Ben-David has been warning about these trends for years. In many articles he has emphasized that the extreme combination of the current demographic trends and the continuation of current trends in the education of Israel's children in general and the Haredi population in particular, poses an existential danger to Israel. He argues that the lack of a core curriculum and continuing the policy of government funding for Haredim under the current conditions, are leading Israel to a demographic point of no return (Ben-David 2019). Ben-David's arguments have been heard for years in academia, in the media, and in other forums, but without a change in policy, his gloomy forecasts may come true.

The Consequences of Demographic Changes for Israel's Economy

Economic growth is the first variable that it is important to examine in the context of demographic growth. The average growth rate of the Israeli economy in the past 20 years is 3.5% (IMF n.d.). This represents success on a global scale and is even more impressive when compared to other developed countries. It reflects the dynamism and creativity of the Israeli market and its ability to maintain a high growth rate despite the major changes that the world's economy has gone through in the era of globalization. But in addition to the adaptations that the Israeli economy has made, this growth should be examined in comparison with other developed countries, including from the perspective of demographic growth, which in turn affects economic growth. Average annual growth of 2% places the economic growth picture in a different light, as the annual growth per capita is only 1.5%. For example, in 2019, before the COVID-19 crisis, the Israeli economy grew by 4.2%—a rate that is higher than the average of the past 20 years, placing Israel fifth among OECD countries. But the population growth rate that year was 2%—which lowers the per capita growth to 2.2% and pushes Israel outside of the top 10 in the chart of GDP per capita among OECD countries (World Bank n.d.b). In fact, half of the growth in that year is attributed only to population growth.

The standard of living in Israel will increase at a very low rate if Israel maintains a per capita growth rate that is significantly lower than the nominal growth rate. Furthermore, normally the rate of increase in growth per capita does not exceed 2% but is around 1-1.5% (World Bank n.d.b). This means that many portions of the population in Israel will not see any improvement in their situation, and it could even worsen. The major differences in the working populations in Israel are expressed in

the sixth Diversity Index, which was published in 2022 by the Equal Employment Opportunities Commission in the Ministry of Economy and Industry and presented a multi-year comparison of the working populations in Israel during the years 2015-2020. According to the report, during these years and despite the improvement in the integration of the Haredi and Arab sectors in the labor market, these sectors did not experience an increase in wages in most industries (Diversity Index 2022). As for the employment of women, according to the report, the wage gaps between women and men continued to decrease, but to a moderate extent.

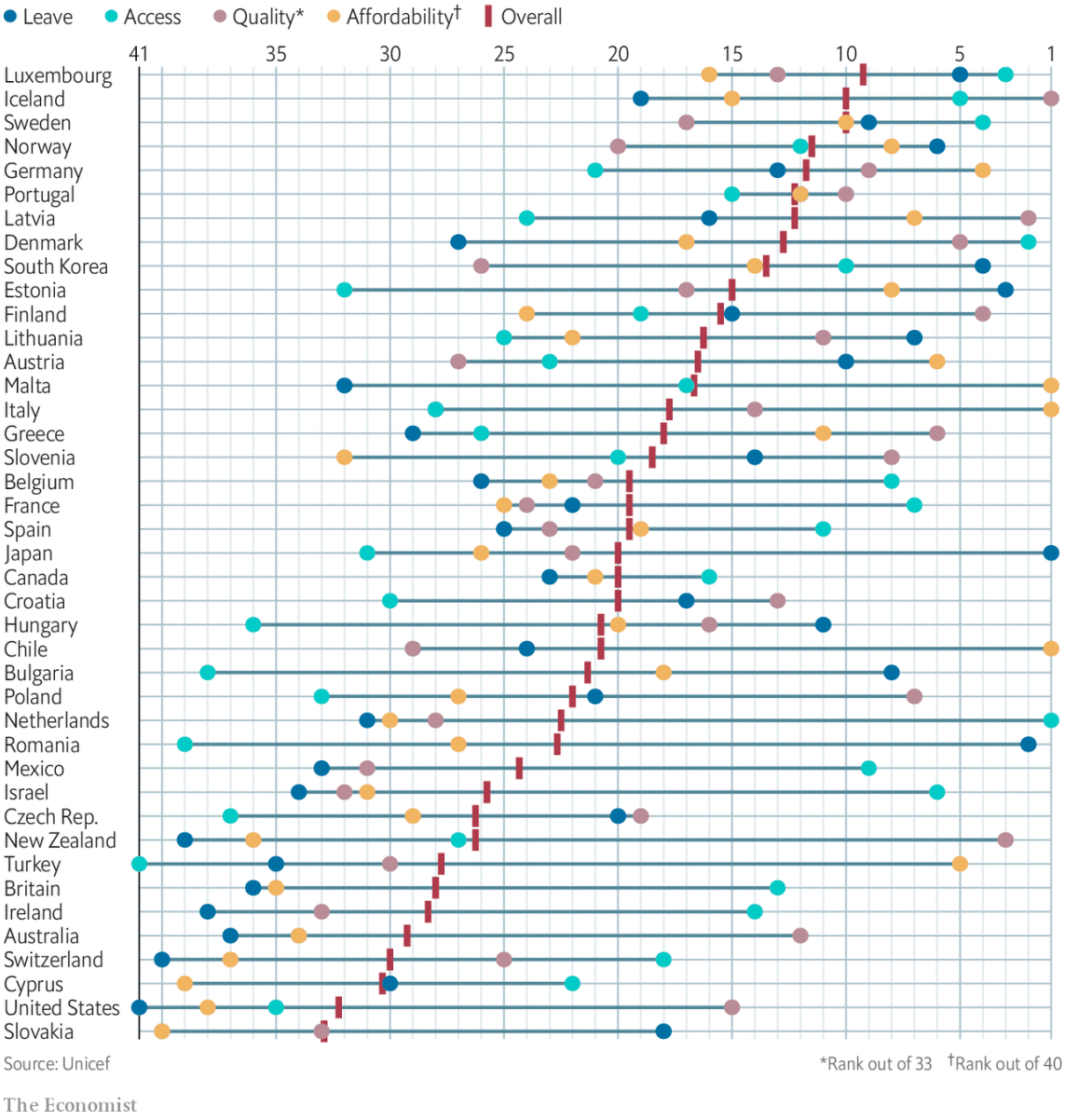
The Israeli high-tech industry is an interesting case study, which illustrates the gaps between the various groups in society and the unequal distribution of the fruits of growth. A report published by Israel Advanced Technology Industries in cooperation with Deloitte in February 2023, sheds light on the industry's contribution to the economy in general, and to growth in Israel in particular. According to the report, the high-tech industry is responsible for more than half of Israeli exports (67 billion dollars in 2021) and its total contribution to GDP was over 300 billion NIS (a fifth of GDP), but its contribution to growth during the years 2017-2021 was 45%. In effect, about half of GDP growth in Israel as described above comes from the high-tech industry (Avital 2023).

The non-Haredi Jewish population is the beating heart of the Israeli high-tech industry and it can take the credit for these impressive figures. A Ministry of Economy report from May 2022 presents the slow integration of the Haredi and Arab populations into the high-tech industry. According to the findings, about a tenth of Israelis are employed in the high-tech industry, and the distribution by sectors does not represent the overall population of Israel. The percentage of Haredi young people (25-35 years old) who are employed in high-tech is 5.9%, while only 4.4% of those employed in high-tech are from the Arab community (Cohen Kovacs 2022). The findings reveal that the two populations that together constitute more than a third of Israel's population constitute only about a tenth of workers in the "engine of the Israeli economy," which is responsible for half of its growth. This is an important illustration of the critical way that we should treat per capita growth figures in Israel. The big differences among the working populations in Israel, certainly between them and those who are not employed, could lead to a deepening of the polarization between the various groups in society, which is already suffering from serious socioeconomic tensions.

Seemingly small differences in growth rates create a big difference over the long term. For example, if the birth rate in Israel were to decrease to 0.5% per year instead of 2%, this would lead to the doubling of GDP per capita by 2050, compared to only 35% growth if we continue on the current path (Trajtenberg 2018). Additionally, if GDP per capita were to grow by 2.5% per year, there would be a much greater chance of reducing the levels of poverty and inequality in Israel, as there would be more resources per capita for these purposes.

The population growth rate with respect to GDP demands a discussion on the size and composition of the state budget vis-à-vis existing trends. The stabilization plan that was presented in 1985 put an end to the lost decade in the Israeli economy, which reached a climax with three-digit inflation in the 1980s, and welcomed a significant period of responsible fiscal policy. From that point on, Israel's economic policy has sought to reduce the stage budget and to shrink government. This policy was justified in the 1980s and constituted an important component of the stabilization plan, which succeeded in bringing the economy out of the economic crisis. This policy's contribution to the success of the Israeli economy is significant, but the policy continued aggressively even when the economy thrived: massive privatization processes, cuts to social services, and a decline in government intervention in the economy. The result of the process is that the extent

Figure 2. Ranking of Developed Countries by Level of Childcare Support



Source: Gromada & Richardson 2021

of government involvement in the economy decreased below 40% of GDP—less than the OECD average, and far below the average in the developed countries of the European Union (OECD n.b.d).

As a result of this process, a large portion of the services that were previously provided by the government have been imposed on households in recent years. Health, education, and welfare stand out in this process, which still continues today. The large social protest movement in the summer of 2011 expressed a public attitude that the government had not fulfilled its role and had not provided citizens with the services that would enable them to have a good quality of life without an overdraft at the bank. Today young working populations feel that they need to pay much more from their

On one hand, the state encourages people to have children, including through universal child allowances that are ineffective, and on the other hand, the state disclaims responsibility for granting services to these children and easing the burden on their parents.

own pocket in order to provide their children with the quality of life that the government provided in the past. People in Israel also look towards other developed countries overseas with jealousy. A 2021 UN report examined 41 developed countries according to the level of support provided for childcare. Four different categories were examined: the number of vacation days offered to new parents; the ease of access to early childhood education; the quality of teaching; and the accessibility of childcare according to its cost. The countries that led the table were of course Western European countries, which are known for quite generously subsidizing and enabling excellent conditions for young parents. In contrast, out of 41 countries examined, Israel comes in 31st place (Gromada & Richardson 2021). The situation in Israel is much worse than in European countries, as without proper support, working parents are forced to pay out of pocket for educational frameworks for their children. These frameworks cost tens of thousands of shekels per year for children up to age 3, and afterwards the state ostensibly funds them, but in practice, supplementary frameworks such as afternoon childcare or private lessons (because of the crowdedness in classrooms in Israel, students often do not manage to complete everything within the limited time frame) also require large sums.

It is easy to say that Western European countries suffer from low birthrates, so encouraging more births is a necessity. But the State of Israel has also encouraged people to have children since it was established, which leads to inconsistent policies: on one hand, the state encourages people to have children, including through universal child allowances that are ineffective, and on the other hand, the state disclaims responsibility for granting services to these children and easing the burden on their parents. This is expressed throughout the length and breadth of government expense categories related to children, including maternity leave.

The inconsistency becomes even more striking when examining objective comparative metrics between all of the OECD countries. For example, when examining the number of students per teacher, the State of Israel is close to last place among developed countries, with an average of 21.4 children per teacher—almost twice the OECD average (OECD n.d.d). This is also the case for schools in Israel, as the shortage of classrooms in the education system and the large number of students per class have become a trademark of the education system and led to the "sardines protest" in 2015 to lower the number of students per class. According to a report published by the Knesset Research and Information Center in 2020, the gap between schools in Israel and schools in the rest of the OECD countries is large and is not expected to decrease soon due to the high birthrate. Today the average in developed countries is 21 students per class, compared to over 26 students in Israel (Knesset Research and Information Center 2020).

The bleak conclusion of this short paper is that a continuation of the current trend of the state budget with respect to GDP and the population growth rate will lead to continued deterioration in the education system, and in turn to additional burdens on young families. The continuation of this trend will also increase the gaps in Israeli society, as the upper echelons compensate for the overloaded education system by funding private lessons in many subjects. The substantive inequality that stems from this is expected to grow in the coming years. This trend exists against the backdrop of the tremendous upheavals of the current

technological era and the changes that artificial intelligence will bring to our world.

The potential for artificial intelligence to replace a large portion of occupations in the coming decades requires adaptation and adjustments. The positions relevant for the future will be those that require higher levels of skills. Such a world demands specific training geared towards high-level and high-quality skills, and thus greater investment in human capital first of all via the education system, and not the minimal investment that exists today. All of this requires investment, adaptation, and changing patterns in order to prevent the emergence of a large mass of working age people that is a burden on a small, educated, highly skilled section of the population.

Government budgets that are shrinking with respect to GDP in the face of increasing needs, partly as a result of population growth, affect many sectors, and aside from education, healthcare also stands out. Private healthcare in Israel has been flourishing in recent years, at a time when public expenditure on medical care remains lower than the average in developed countries (7% of GDP vs. 10%) (Taub Center 2018). The shortage of hospital beds and recurring protests by doctors have become regular news items in recent years, given the increasing congestion in the public system. The way to compensate for this, which is already occurring in practice, is the acquisition of private insurance that provides proper services. For example, expenditure on private insurance out of total household expenditure on health increased from 18% in 2000 to 37% in 2018 (Taub Center 2018). This process is very similar to what has happened in the education system: those with financial means can compensate for the government's weakness via private expenditure, which further emphasizes the inequality in Israel.

Furthermore, the increase in the number of people retiring is also going to burden the already overburdened public system, thus increasing private expenditure for supplementary health services for those who can afford them. In this metric too, Israel is trailing behind other developed countries. Expenditure on retirement constitutes only 4.6% of GDP, compared to an average of 7.7% in the OECD countries (OECD n.d.c). It should be noted that the high birth rate combined with the increase in the number of people retiring creates a situation in which a shrinking tier of people of working age[3] (15-64) is forced to carry the burden of funding seniors and children. This metric is called the dependency ratio, and in the past decade alone, it rose from 61% during the social protest movement in 2011 to 67% in 2021 (World Bank n.d.a). This means that for every 100 people of working age, there are 67 people under the age of 15 or over the age of 64. However, the situation is Israel is much more serious, because not everyone in the 15-64 age group actually works.

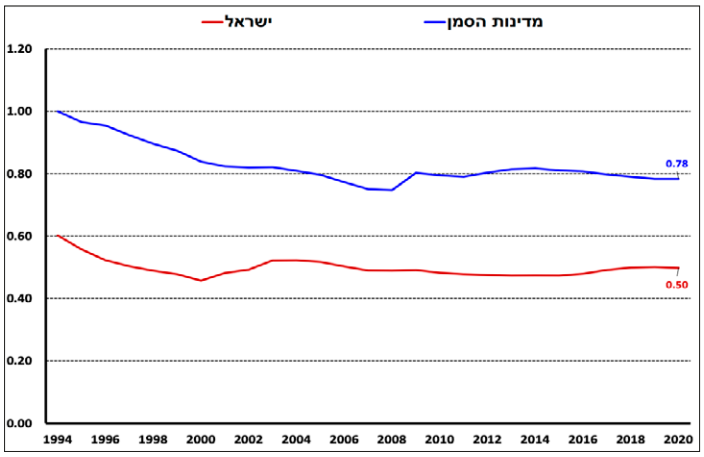
The fast population growth also affects the housing market, which was at the heart of that same social protest movement in the summer of 2011. The starting point is already non-optimal when you take into account the size of the country and the fact that about a third of it is desert that is difficult to settle. The high rate of natural increase has created considerable demand for homes for new households and for more spacious homes due to the large number of children, and it contributes decisively to the expansion of the gap between the demand and supply of homes—a gap that is difficult to reduce. Given that the areas designated for construction are limited to begin with, in particular in high-demand areas in the center of the country, it is no wonder that a very serious housing crisis has emerged in the last few years, which has left most young families without a reasonable housing solution. The state's attempts at intervention in recent years have included several government programs—from zero VAT for first-time buyers, to Mechir Lemishtaken (a national program that promotes affordable housing units for young families)—but they have not succeeded in creating the

hoped-for change. Furthermore, the increasing divorce rate in Israel has created demand for smaller homes that are almost nonexistent, due to the natural tendency to build bigger homes for families with children. This characteristic increases the demand for homes and intensifies the crisis.

In addition to the direct impacts of population growth, there are also "external impacts" that worsen with time. The small physical space in which people are constantly being added will lead to heavy economic costs. Despite the attempts to improve public transport, road congestion continues to take a toll on the Israeli economy. The total annual cost of overcrowded roads is as high as 40 billion NIS. The cost of traffic congestion is estimated at 22 billion NIS, the cost of car accidents is estimated at 9 billion NIS, and in addition, there is a cost of over 7 billion NIS that stems from the damage caused by air pollutants and greenhouse gases (Ministry of Environmental Protection 2021). According to some estimates, without massive investment in public transportation and if the current growth rate continues, the economic cost of road congestion will be about 70 billion NIS in 2030 (Cohen 2020). Today we are in the midst of a transportation crisis, due to very low government investment in this field compared to the resources needed for it. If in the past people could leave for work "before the traffic" and return "after the traffic," today it's basically impossible to avoid the jams during reasonable hours.

This also raises a critical question for the country's future: Can Israel maintain a first-world standard of living with a third-world birth rate?

Figure 3. Public Capital to GDP Ratio, 1994-2020



Countries with Similar Characteristics to Israel: Austria, Denmark, Finland, the Netherlands, and Sweden.

Source: OECD (Government Expenditure by Function, Gross Capital Formation and Investment Grants), CBS.

Some of the national challenges resulting from population density have of course led to innovation and technological renewal and will help cope with the situation—consider the Waze app for example—, but broadly speaking, the negative consequences of the continuation of current trends outweigh the positive. The competition for every piece of land and the congestion in hospitals and classrooms are felt every day. So is the reduction of public spaces, and leisure sites in open natural areas in Israel almost always involve close contact with tens of thousands of other visitors. Under these conditions, trips abroad (Ben-Gurion Airport has also become too small to contain the number of travelers) simply to escape the crowdedness create challenges on the national level for the coming years. If this is the state of affairs at the beginning of 2024, with about 9.7 million people, what will it be like in 25 years, on the State of Israel's 100th anniversary, when the country's population is expected to be 15 million people? (Trajtenberg 2018). This also raises a critical question for the country's future: Can Israel maintain a first-world standard of living with a third-world birth rate?

Conclusion

The Israeli model of recent years is unique by any measure. The combination of an advanced and developed economy with a high birth rate is uncommon in the modern world, but according to most economic indications, a continuation of the model is not sustainable. This conclusion stems not only from the uniqueness of the

Israeli phenomenon: a country that enjoys an annual 2% GDP growth rate per capita while population growth is also about 2% per year, in contrast to western countries where it is generally less than 1%. It also stems from Israel's natural conditions, which will make it very difficult to maintain the economic achievements under changing conditions of growing population density. The small territory of Israel combined with the growth in the population of groups whose contribution to the economy is minor, will make it difficult to continue to improve residents' quality of life each year, if current trends continue. In order to enjoy the "demographic dividend" and avoid a scenario in which population growth burdens and harms the economy, the State of Israel should focus on two spheres. One is preparing for the current situation in which current population growth will continue in the short term and require suitable preparations. In the other sphere, the state should plan how to reduce the population growth rate from 2% to a target of 1% per year.

In the first sphere, the state should prepare for the population increase expected in the coming years. For example, the state should avoid a situation in which overcrowding harms productivity, which is already relatively low compared to OECD countries. This means first and foremost investing in public capital stock, which contributes substantially to productivity and to GDP per capita. Public capital stock is public investment in infrastructure assets over time (Eckstein et al. 2022). In the State of Israel, the figures are usually lower than those of developed countries in general, and comparable countries in particular. Israel's population growth demands greater investment in infrastructure—paving roads, railroads and more—as it is not currently built to cope with this growth. But aside from the fact that investment is not keeping pace with population growth in Israel, it is also not close to that of other countries that face a similar problem. The lack of greater investment in infrastructure in the coming years will lead to a further decline in productivity in Israel. An important study conducted in 2022 shows that increasing investment in public capital by 2% per year from 2023 to 2030 can increase GDP growth by 0.5 percentage points (Eckstein et al. 2022). This study shows how increasing the debt-to-GDP ratio in the short term considerably reduces the negative potential consequences of the massive natural increase. At the same time, an effort should be made to encourage greater integration of populations in the Israeli economy, such as Haredi men. This effort requires professional training and education to integrate into the modern employment world, which will also provide essential high-level skills that are suitable for high-quality employment.

In the second sphere, there is a need to moderate population growth in Israel, because the current trends are difficult to maintain. This requires, first of all, an understanding that continuing to encourage a high birth rate, which has accompanied the State of Israel since its establishment, is not essential like it was in the past, and could even lead to economic harm. This recognition can help with the adoption of suitable policy measures to moderate population growth. Israel is in a situation in which, unlike other developed countries, maternity wards are full every day. In addition, Israel is in a good situation because it can learn from countries that have failed in attempts to reduce the birth rate by means of dramatic measures like China's one child policy. The measures needed in this sphere are gradual and mainly educational, health-related, and economic. Encouraging employment and education among women, education on proper family planning in accordance with needs and financial means and reducing child allowances, are only a small set of measures that are in the state's toolkit but not being used. These are not tools that will lead to demographic contraction in Israel, as this would have negative consequences for the economy, but the idea is to cut the population growth rate, which

currently stands at 2%, in half, in order to prevent a level of population density whose economic consequences for the individual could be similar to those of demographic contraction.

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Sources

Aghion, Philippe, Céline Antonin and Simon Bunel, S. 2021. *The Power of Creative Destruction.* Harvard University Press.

Avital, Yaniv. February 26, 2023. "New Report: High-Tech Earners Are Responsible for a Third of Income Tax in Israel." *Geektime.* http://tinyurl.com/y8wcwh6z

Ben-David, Dan. September 8, 2019. "Demography and Illusions: The Elections Are on the Question of Whether Israel Will Exist in 2 Generations." *Ynet.* http://tinyurl.com/25ehbfwp

Ben-Israel, Isaac. 2013. *Israel's Security Concept*. HaUniversita HaMeshuderet.

CBS. May 21, 2017. *Forecast for the Population of Israel by 2065.* Press release. http://tinyurl.com/4w2zbtbz

–. February 21, 2022a. *Birth Rate and Fertility in Israel 2020.* Press release. http://tinyurl.com/5b4n8zz9

–. December 29, 2022. *Israel's Population at the Beginning of 2023.* Press release. http://tinyurl.com/4xscjrf8

Cohen, Adi. November 30, 2020. "The Economic Cost of Traffic Jams Will Be 70 Billion Shekels Per Year in 2030." *TheMarker.* http://tinyurl.com/5n6rnpr2

Cohen Kovacs, Gilad. 2022. *Integrating, but Slowly: Trends in the Employment of Haredim, Arabs, and Other Groups in the High-Tech Industries.* Ministry of Labor. http://tinyurl.com/3zk84c3s

The Diversity Index: Representation and Wages in the Private and Public Labor Market – Multi-year Comparison. Sixth edition (2022). Equal Employment Opportunities Commission, Ministry of Economy and Industry, CBS, Department of Sociology and Anthropology, Tel Aviv University. http://tinyurl.com/mus2wsnm

Even, Shmuel. 2021. "Israeli Demography at the Outset of a New Decade: National Implications." *Strategic Assessment* 24(3): 28-41.

Eckstein, Zvi, Benjamin Bental and Sergei Sumkin. 2022. *Invest in Order to Grow with Increased Debt.* Reichman University, Aaron Institute for Economic Policy and Taub Center. http://tinyurl.com/mu2dumuw

Fuchs, Hadas and Avi Weiss. 2018. *The Labor Market: Overview.* Taub Center. http://tinyurl.com/yc4ckruf

Gromada, Anna and Dominic Richardson, D. 2021. *Where do Rich Countries Stand on Childcare?* UNICEF Office of Research. https://www.unicef.org/innocenti/media/5431/file/UNICEF-Where-Do-Rich-Countries-Stand-on-Childcare-2021.pdf

HDI – Human Development Index (n.d.). United Nations Development Programme. http://tinyurl.com/4f3r8x2k

Heruti-Sover, Tali. October 25, 2022. "The Arab Womb is Defeating Us? This Is Not Only Racism, It's an Embarrassing Mistake." *TheMarker.* http://tinyurl.com/bdjhyt6h

IMF– International Monetary Fund (n.d.). *IMF Data Mapper.* http://tinyurl.com/y9drpa6r

Katz, Ori. 2022. *Blue and White Money: The Israeli Economy Between Success and Missed Opportunities.* Kinneret Zmora Dvir.

Knesset Research and Information Center. 2020. *Data on the Average Number of Students per Class in the Education System* [written by Assaf Wininger]. http://tinyurl.com/54ht8793

Knesset Research and Information Center. June 13, 2022. *Employment of Haredim—Overview* [written by Merav. Peleg-Gabai]. http://tinyurl.com/ch8mvup5

Krampf, A. 2015. *The National Sources of the Market Economy: Economic Development During the Period that Shaped Israeli Capitalism*. Magnes.

Lee, Ronald. 2003. *The Demographic Transition: Three Centuries of Fundamental Change. The Journal of Economic Perspectives,* 17(4): 167–190. DOI:10.1257/089533003772034943

Macrotrends. n.d. *Israel Fertility Rate 1950-1924.* http://tinyurl.com/pc2prj3k

Matthews, Sara. 2021, June 23. *COVID-19 Accelerates Existing Decline in Fertility Rates.* NewSecurityBeat. http://tinyurl.com/y3ryp44c

Ministry of Environmental Protection. February 1, 2021. *External Costs of Road Transportation in Israel: Air Pollutants and Greenhouse Gases.* http://tinyurl.com/3v8e7fud

OECD (n.d.a). *Foreign-born population.* OECD Data. http://tinyurl.com/bdczk86d

– (n.d.b). *General government expenditures*. OECD iLibrary. http://tinyurl.com/4ztwz2tn

– (n.d.c). *Pension spending*. OECD Data. http://tinyurl.com/5n7vyb7p

– (n.d.d). *Students per teaching staff*. OECD Data. http://tinyurl.com/3sh9nt3x

– (n.d.e). *International migration flows to OECD countries and labour market outcomes of immigrants at record highs.* http://tinyurl.com/uehuukjk

Roy, Amlan. 2021. *Demographics Unravelled: How Demographics Affect and Influence Every Aspect of Economics, Finance and Policy.* John Wiley & Sons.

Shaked, Moran. December 11, 2022. *The Israeli Employment Service: The Workforce Participation Rate of Arab Women of Prime Working Ages Has Been Steadily Increasing.* Funder. http://tinyurl.com/2nc9crej

Strøm, Steiner and Bjoen Thalberg. 1979. Introduction to Knut Wicksell's "The Theory of Population, its Composition and Changes." In *The Theoretical*

Contributions of Knut Wicksell, edited by Knut Wicksell, 122. Palgrave Macmillan.

Taub Center. 2018. *What Is the Price of Health – And Who Is Paying For It?* http://tinyurl.com/ysw5bcc7

Trajtenberg, Manuel. 2018. "Israel's 'Demographic Reversal' – Economic Aspects." In *Crowded Future – Israel 2050*, edited by Meital Peleg Mizrachi, 6-9. The Israel Forum for Population, Environment, and Society. http://tinyurl.com/2c6s37tz

United Nations. n.d. *World Population Prospects*. https://population.un.org/wpp/

Wagner, Tony. 2012, *Creating Innovators: The Making of Young People who will Change the World*. Scribner.

Weinreb, Alex. 2021. "Demographic Trends in Israel: An Overview." In *State of the Nation Report 2021*, edited by Avi Weiss, 264-276. Taub Center for Social Policy Studies in Israel. http://tinyurl.com/vbd9wnah

World Bank. n.d.a. *Age Dependency Ratio*. http://tinyurl.com/y6upfkhw

World Bank. n.d.b. *GDP*. http://tinyurl.com/yrs244zt

World Bank. n.d.c. *Population*. http://tinyurl.com/y6mjbe3c

Notes

1 As of summer 2023 and based on Trajtenberg 2018.

2 The figures represent the year 2019 before the COVID-19 pandemic. Without 2022 figures, the figures from 2020-2021 do not accurately represent various trends, given the limitations on movement in the world during those two years.

3 According to the customary OECD definition, the working age is 15-64.