TAUB CENTER
FOR SOCIAL POLICY STUDIES IN ISRAEL

The Herbert M. Singer
Annual Report Series

STATE OF THE NATION REPORT

Society, Economy and Policy in Israel

2022

Editor: Avi Weiss

The Herbert M. Singer Annual Report Series

State of the Nation Report

Society, Economy and Policy in Israel 2022

Avi Weiss, Editor

Taub Center for Social Policy Studies in Israel

Jerusalem, December 2022

Taub Center for Social Policy Studies in Israel

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The Taub Center is an independent, nonpartisan, socioeconomic research institute based in Jerusalem. The Center conducts high-quality, impartial research on socioeconomic conditions in Israel, and develops innovative, equitable and practical options for macro public policies that advance the well-being of Israelis. The Center strives to influence public policy through direct communications with policy makers and by enriching the public debate that accompanies the decision making process.

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Center address:
15 Ha'ari Street, Jerusalem, Israel
Tel: 972 2 567 1818 Fax: 972 2 567 1919
Email: info@taubcenter.org.il Website: www.taubcenter.org.il
Printed at Printiv, Jerusalem

Policy Program Fellows

Economics

Benjamin Bental (Chair), Yarom Ariav, Gilad Brand, Adi Brender, David Brodet, Doron Cohen, Naomi Feldman, Reuben Gronau, Jack Habib, Moshe Mandelbaum, Dan Peled, Assaf Sarid, Haim Shani, Eytan Sheshinski, Shmuel Slavin, Avia Spivak, Michel Strawczynski, Shlomo Yitzhaki, Ben Zion Zilberfarb

Education

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Labor

Einav Aharoni-Yonas, Hagai Atkas, Rani Dudai, Gil Epstein, Mark Feldman, Daniel Gottlieb, Nitsa Kasir (Kaliner), Yaakov Loupo, Miki Malul, Guy Mundlak, Dalia Narkiss, Tali Regev, Dmitri Romanov, Moshe Semyonov, Ofer Setty, Sigal Shelach, Arie Syvan, Yossi Tamir, Aviad Tur-Sinai

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A Message from the Board Chair

As Chair of the Board of Directors of the Taub Center for Social Policy Studies in Israel, I am proud to present the Singer Series *State of the Nation Report 2022*. Once again, this year's State of the Nation Report is a powerful testament to the breadth and depth of the research carried out by the Taub Center's extraordinary team of social scientists. In the following pages, the Center's researchers explore with their accustomed rigor: the achievements as well as short-comings of Israel's education system; the fact that, several recent improvements notwithstanding, the nation's welfare system may not be adequate to meet the challenges posed by deepening economic inequality and inflationary pressure; and the details of Israel's labor market, including the pandemic-driven shift to remote work. Particularly interesting is the Center's deep dive into the performance of the Israeli health care system during the COVID pandemic. These several papers reveal that, while the system performed quite admirably, its ability to serve the country's population as well in the future is imperiled by the combination of an aging population, a looming nursing shortage, and a shortage in health care facilities (particularly in the periphery). As is typical of the Taub Center's work, this suite of papers explores the past in order to provide Israel's public and policy makers with the data and analyses needed to plan and prepare for a better and more equitable future.

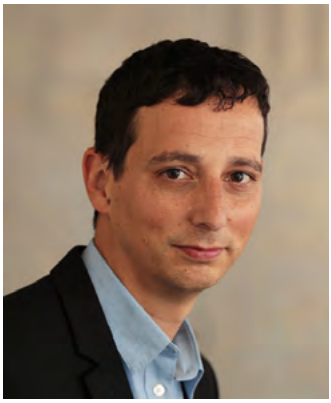
This year marks the Taub Center's 40th anniversary, and to celebrate this milestone, we took the opportunity to spend a wonderful evening with supporters and colleagues. After four decades of work, the Center's leadership is still busy assessing how it can expand the scope, nature, and reach of its research in the coming decades to best serve the country. The Taub Center has already committed to creating a center for demographic research that will be the only one of its kind in Israel, and is considering other programmatic expansions. I am deeply honored to serve such an outstanding, forward-thinking, and essential organization as its Board Chair.

Happy reading and good health to all!

Jim Angell

Chair, Taub Center Board of Directors

A Message from the Director General



Even more than in previous years, the *State of the Nation Report 2022* finds the State of Israel at a critical juncture from a social and economic perspective. In the coming months, the government is expected to pass a budget that will have a major impact on socioeconomic policy in Israel for the coming years and potentially even for decades. The State of the Nation Report presents a comprehensive and current picture of the challenges and opportunities facing Israeli society and will be of interest to members of the government, Knesset members, senior government officials, and the public at large.

The talented and creative team at the Taub Center works to provide policy makers with valuable and up-to-date information which can assist them in the formulation of Israel's socioeconomic policy. The variety of areas in which the Center is active — health, social welfare, education, the labor market, the economy, demography, and early childhood — makes it possible for our researchers to offer a comprehensive and multidisciplinary survey of the main issues facing Israeli society. The Center's political neutrality, alongside the high academic level of its researchers, make it possible for us to provide reliable and insightful content.

Even as this report is being published, we are already working to create the foundation to ensure that the next report is even better. We are currently considering options to add the area of environmental quality and we are adopting advanced tools for the necessary gathering of data and its analysis.

The staff of the Taub Center invest major efforts in putting this report together. Without their commitment it would not be possible. To conclude, I would like to thank Suzie Path Benvenisti for her warm welcome and the pleasant and efficient handover of the reins and also the staff of the Center, and in particular Prof. Avi Weiss, for a rapid intake and our joint navigation of the way forward.

Nir Kaidar

Director General, Taub Center for Social Policy Studies in Israel

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Editor's Introduction

I once again find myself honored to bring you the Taub Center for Social Policy Studies in Israel's annual *State of the Nation Report* — the 2022 version of our Herbert M. Singer series — containing wide-ranging overviews of Israel's economy and society.

After three quite turbulent years, things in Israel have, to a large extent, returned to their pre-pandemic state of affairs, with the macro-economy and labor market fully recovering from the COVID-19 shock-waves, and with them the health, education, and welfare systems returning to some level of normalcy. The format of the book remains as it has been over the past few years, with six overview chapters on health, education, welfare, demographics, the labor market, and macroeconomics, and three additional new research papers — one focused on COVID-19 morbidity and two on marriages in Israel, one demographic and one with a focuws on the labor market — as well as ten executive summaries of papers released throughout the year. Including the executive summaries was first done last year, and, as we hoped, it accomplished two goals: it gave those who missed these publications an opportunity to learn of the work and to then download the complete study, and it served as a short reminder for those already acquainted with the research.

With COVID-19 moving from pandemic to endemic, I have chosen to begin the book by wrapping up what we have learned about our health system with one final (I hope) paper summarizing Israel's experience through this challenging period. *Kyrill Shraberman* carried out an international comparison of case-fatality rates from COVID-19. In his analysis he divides between two periods — the initial adaptation period from March 2020 through August 2020 when the number of deaths per confirmed cases was particularly high, and the routine period from September 2020 through May 2022, when the number of deaths per confirmed cases settled into a stable pattern in each country. The paper shows that after the initial adaptation stage, success in lowering the number of deaths was most strongly related to the wealth of the country — the higher GDP per capita the fewer deaths per capita. It also includes a new indirect measure of health systems' success. The paper demonstrates just how outstandingly Israel's health sector performed during this trying period.

As stated, the book presents executive summaries from studies earlier in the year. The first of these, authored by *Prof. Alex Weinreb* and released in March 2022, dealt with age-specific mortality rates (the death rate by age groups) and the life expectancy implications of COVID-19. The main conclusions from the research are that the COVID-19 pandemic largely froze the continuous rise in life expectancy that Israel had been experiencing since the 1960s. Nevertheless, there was a small improvement in life expectancy in 2021. This, too, is a tribute to the success of the public health system in Israel in dealing with the pandemic.

Having started with health but putting the pandemic behind us, the book continues with an overview of the Israeli health system by *Dr. Baruch Levi* and *Prof. Nadav Davidovitch*. This chapter focuses on some of the successes and shortcomings of the existing system, and particularly on concerns going forward. Thus, while life expectancy is particularly high (and rising, at least until COVID-19) and infant mortality particularly low (and falling), there are serious shortages in many fields that will weigh upon the system more heavily moving forward. For instance, while the number of physicians per capita is only a little lower than the average in the OECD, the percentage of those at or nearing retirement age is higher than in almost any other developed country. In addition, the number of nurses per capita is particularly low, as are the number of hospital beds and MRI machines, to give just a few examples. There are also significant geographic discrepancies that heavily favor those who live in the center of the country to the detriment of those in the periphery.

The health section concludes with two additional executive summaries. In the first, *Dr. Baruch Levi*, *Dr. Rami Adut*, and *Prof. Nadav Davidovitch* looked at school health services in Israel and how these have deteriorated over time. This paper, released in March 2022, shows that while school health services are an important and well-established part of the public health service in Israel, they suffer from a lack of clarity. Three factors stand out as the main axes on which to focus the discussion of school health services in general, and specifically on the role of the school nurse: challenges in service manpower, the integration of the school nurses within the public health services, and methods for evaluating and measuring the service. The fundamental problems of the school health services in Israel are, to a large degree, related to structural problems within the public health system as a whole, including the severe shortage of nurses on the national level. Improving school health services, whether in a privatized or nationalized format, is dependent first and foremost on solving these problems.

The final executive summary in this section is a paper from November 2022 by *Dr. Baruch Levi*, *Prof. Gabi Bin Nun, and Prof. Nadav Davidovitch* showing that since the passing of The State Health Insurance Law in 1994 a significant gap has developed between the cost of the basket as defined at the time the law was adopted and what is actually needed to maintain the level of health currently enjoyed by Israelis. The consequences can be seen in the quality of medical services and their accessibility. There has been a cumulative erosion in the value of the Health Services Basket, and there is heavy dependence on the state budget and on decisions made by frequently changing governments with their changing order of priorities. This has led to the growth of a large private healthcare market that has expanded significantly in recent years. The victims of this situation are Israeli citizens who are eligible for the Health Services Basket by law.

We turn next to the education system, starting with an overview paper in which *Nachum Blass* squarely challenges the generally held belief that the quality of Israel's education system is deteriorating. He shows that the education budget per student has been rising steadily, that grades have been increasing (even if they remain below those of their OECD counterparts), that the number of students per teacher has been falling, that the number of instruction hours per student is on the rise, that teachers are better educated and that there is a better match between the subjects that teachers specialized in and the subjects they are teaching. With this, he points to some significant shortcomings, among them the level of inequality across different ethnic groups and different socioeconomic groups, which, although lessening, is still quite substantial.

This is followed by two executive summaries of articles also written by *Nachum Blass* on special education, both published in April 2022. The first discusses the development of special education budgets and the division of the budget between the various special education frameworks (special education schools, special education classes in regular schools, and students with special needs integrated into regular classes). It also describes the factors affecting the size of the budget for special education and suggests ways to improve the budgeting methods. The second presents a historical overview of the budgeting of special education in Israel. The review shows that, contrary to the recommendations of various committees on the subject, the budget for students with special needs who study in a separate special education framework continues to be larger than that allocated to a student

with the same disability and with the same functional ability who learns in an integrated classroom in regular education. Blass explains what is required for the system to overcome this shortcoming, which is necessary to achieve the more desirable educational outcome of mainstreaming a larger share of special education students. For more on this subject, I invite you to visit the blog on the Taub Center website or scan the QR code:

The last executive summary in the education section of this book is for a paper by *Dr. Eyal Bar-Haim* and *Prof. Yariv Feniger*. This paper, published in May 2022, shows that in the 1990s tracking in high schools had long-run effects on students' academic achievements and on their earnings in the fourth decile of their lives. The researchers show that inequality in educational opportunity during that period created gaps in the labor market and that inequality remains substantial today, even after decades of educational reforms.

The book turns next to consider the condition of Israel's welfare state with an overview chapter by *Prof. John Gal*, *Shavit Madhala*, and *Ori Oberman*. They describe how, as the epidemic subsided and ceased to cloud the lives of most of the country's residents, some impressive steps were taken in various social fields, mainly in addressing the needs and rights of people with disabilities, in reducing poverty among senior citizens, in the care of senior citizens with difficulties in activities of daily living, and in improving accessibility to work grants. However, Israel's political instability, trends that indicate a renewed shrinking of the welfare state, processes in the labor market that create a basis for deepening inequality, and the threat posed to marginalized groups by rising prices, raise concerns that the lessons of the COVID-19 crisis have not been learned, and that a return to normalcy also means a return to the limitations of the Israeli welfare state and its inability to provide sufficient solutions to the social problems faced by its residents.

The welfare section of the book also includes two executive summaries of papers from the Taub Center's Initiative on Early Childhood Development and Inequality team. While these papers are not solely welfare oriented, they have important implications for welfare, as well as for most of the fields studied at the Taub Center, especially education and labor market outcomes.

The first of these studies, by *Dana Shay* and *Prof. Yossi Shavit*, published in November 2022, examines the effect of family income during a child's first thousand days (from pregnancy through age 2) on the child's academic achievements in the Meitzav exams (a standardized measure of academic performance) in Grade 5. The research findings show that belonging to the bottom quintile in the income distribution in the first thousand days of life has a negative and statistically significant effect on achievements, and belonging to the top quintile in the income distribution in this critical initial period of life shows a positive and statistically significant correlation. Family income at older ages does not usually have an effect, except in the years of the exams (when students are ages 10–11).

The second early childhood study, conducted by *Noam Zontag* and published in September 2022, looked into the employment characteristics of parents postpartum. Unsurprisingly, the research shows that due to maternity leave, the employment rate of mothers (and not of fathers) across all population groups declines substantially following a child's birth. Groups differ, though, in the timing of their return to work. Mothers with higher education return to work earlier than do mothers with lower levels of education, especially those without a Bagrut (matriculation) certificate. For families with additional children under the age of 6 lower levels of employment are also found among Jewish fathers, but this is not the case among Arab fathers.

This is followed by a demography overview by *Prof. Alex Weinreb* and *Kyrill Shraberman*. This paper is divided into two parts. In the first, shifts in core demographic components are investigated, including changes in fertility (by sector), mortality, and migration. One of the central findings is that for the first time in decades, Israel is facing a downturn in fertility rates in all subpopulations. The second part of the paper turns its attention to a select number of issues at the nexus of demography, environment, and climate change. Israel is an increasingly wealthy country in a climatologically sensitive region of the world, and it has the fastest growing population of any wealthy country. Both of these factors have implications for resource use, greenhouse gas emissions, and, therefore, the environment. The chapter briefly surveys two issues at the nexus of population and environment in Israel: land cover and environmentally-related premature deaths.

Next is a new paper on marriage and divorce trends in Israel by *Prof. Alex Weinreb*. The chapter documents some signs of change in marriage and divorce patterns, especially in the 2015–2019 period, that point toward Israel

becoming a less marriage-centered society. In all four religious subpopulations in Israel, both men and women experienced substantial reductions at peak ages of marriage and in the total marriage rate (TMR) in those pre-COVID years. This primarily reflects an increase in the share of people who are remaining single, although there is also increased cohabitation. A related shift is increasing divorce rates at younger ages among Muslims. This is consistent with the rising educational and employment prospects of Arab women, and the emerging gender gap between them and their male counterparts on these same parameters. Among younger Jews, in contrast, divorce rates have been falling, likely a function of lower marriage rates and more careful selection into marriage at younger ages.

Continuing with the marriage theme, the next paper moves us into the labor market section of the book by considering the effect of marriage on labor force outcomes. Specifically, *Michael Debowy*, *Prof. Gil S. Epstein*, and *Prof. Avi Weiss* investigate the existence in Israel of what is known as a *marriage premium* in which married individuals receive higher wages than single people even after accounting for the factors that usually affect wages, such as education and age. The study shows that indeed such a premium exists and is quite sizable — 30% for men and 20% for women. There is also an employment effect, as married men are more likely to work than unmarried men. These findings are shown to be commensurate with those found in other countries, as is the increase that has been realized in the wage premium for women.

We then turn to the labor market overview, written by *Michael Debowy*, *Prof. Gil S. Epstein*, and *Prof. Avi Weiss*. This paper surveys the changes in employment, hours worked, and wages in different industries, detailing the information by gender, population group, age, and geographic location. It also shows trends in higher education and professional training, and presents forecasts for the labor force. In an interesting *Spotlight* it demonstrates a significant spillover effect from wage increases in the high tech sector to the wages of workers in the rest of the labor force, an effect heretofore considered negligible or even completely absent.

Working from home is the subject of the following chapter, with an executive summary of a paper authored by *Noam Zontag*, *Shavit Madhala*, and *Prof. Benjamin Bental*, published in September 2022. While the share of people working remotely has been increasing in Israel and elsewhere for many years, the nature of the COVID-19 pandemic led to a meteoric jump in the prevalence of this practice. This was certainly the case during the various lockdowns, but

has persisted since, in some industries and occupations more than in others. In this paper the authors try to uncover who worked from home during the pandemic and what their characteristics were.

The last executive summary, by *Michael Debowy*, *Prof. Gil S. Epstein*, and *Prof. Avi Weiss*, looks at the top decile of wage earners in Israel. While there is much literature about those with low incomes, far less has been done with respect to those at the other end of the spectrum — the top 10%. In this study, published in August 2022, the authors address two main questions — what are the characteristics that get one into the top decile of wage earners, and what affects one's place within the top decile. The study differentiates between workers from different population groups and genders. It uncovers that while education level has a large effect on the likelihood to make it into this upper echelon, it has almost no effect on one's place within that decile.

The final chapter is an overview of Israel's macroeconomic state, co-authored by *Prof. Benjamin Bental* and *Dr. Labib Shami*. This chapter looks at economic growth since the pandemic began, tying it to changes in the labor market, and at the steps taken by the government and their implications. It also considers the enormous gap in productivity between those working in the high tech sector and those working in the rest of the economy, and ties it to the low levels of public and private capital. Finally, the chapter takes a careful look at prices in Israel, considering the effect of increasing prices on households at different socioeconomic levels, and sharpening our understanding of the high price level in Israel.

* * *

This year the Center celebrated forty years since its establishment in 1982. For forty years we have published research on a plethora of policy-oriented subjects, and we have done so while maintaining the quality of our research, its relevance and importance for Israeli policy and policy makers, and its political neutrality, keeping its work informative and useful for decision makers irrespective of their political affiliations. Our goal is to continue to be a light unto Israeli decision makers for the next forty years, and beyond.

The Center recently underwent a significant change; we said goodbye to our former Director General, and welcomed in a new one. Suzanne Patt Benvenisti, after more than a decade at the Center, has taken a new position as Executive Director in Hadassah, and I am sure that everyone at the Center joins me in

wishing her the greatest of success in her current and future endeavors and much happiness. Suzie, you are already missed. Nir Kaidar, our new Director General, comes to us after 16 years in civil service — 13 years in the Ministry of Health, where he served as Senior Deputy Director General and Head of the Strategic and Economic Planning Administration from 2014 to 2019, and in the Ministry of Welfare and Social Affairs where he served as Senior Deputy Director General and Head of the Strategy, Economic Planning, Research and Regulation Administration since 2019. Nir's enthusiasm and dynamism are unmissable and unmistakable, and in the short time he has been with us we have all felt the winds of change. This is an exciting and wonderful time to be at the Taub Center. We even have our very first playlist! Welcome, Nir, we are thrilled to have you with us.

Thanks to all my colleagues at the Taub Center for the outstanding work you continue to do. A special thanks to all those who have been instrumental in publishing and disseminating this book. First and foremost, to Ayelet Kamay and Laura Schreiber who labored day and night on editing, graphics, layout, and so much more. I do not envy you this time of the year! To Prof. Alex Weinreb and Prof. Gil Epstein for your invaluable assistance in reviewing the studies published in this book and throughout the year for content. To Anat Sella-Koren and her team who make sure that we get to where we need to be so that our findings can achieve their maximum effectiveness. To the researchers for the high-quality work you produce throughout the year. And, of course, to the Taub Center Board of Directors and General Assembly members who support us and our efforts, and especially to our Chair, Jim Angell.

Once again it has been a privilege bringing these studies to you, and, as in the past, I hope you find the content informative and useful. Rest assured, the Center will continue to carry out and publish the same high-quality policy-oriented research we have been carrying out for four decades, and will continue informing policy makers in Israel in an effort to advance the well-being of all Israelis.

Yours,

Prof. Avi Weiss

President, Taub Center for Social Policy Studies in Israel
Department of Economics, Bar-Ilan University

HEALTH

1

The COVID-19 Pandemic: The Case Fatality Rate

Kyrill Shraberman

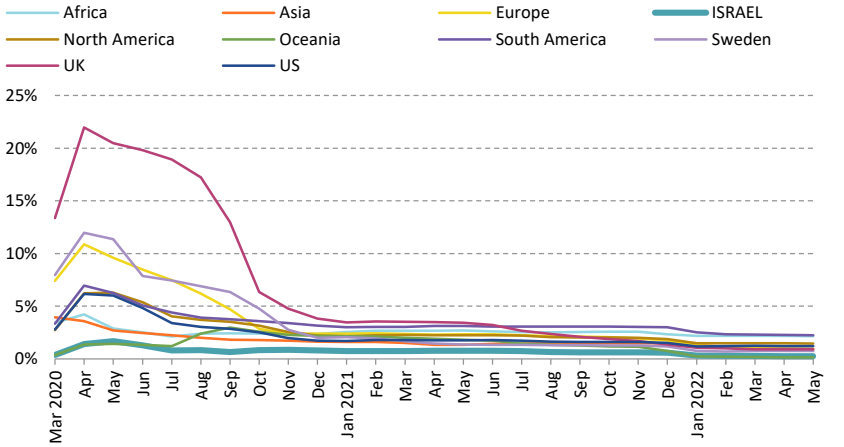
The waves of infection and death over the past two and a half years as a result of COVID-19, both in Israel and in other countries, is well known. Following every increase in morbidity and mortality there was a temporary flattening of the curve until there appeared a new variant of the virus which in turn led to a repetition of the process. In response to the waves of infection, at least during the second half of 2021, many governments adopted a kind of *accordion policy* which included preventive measures (limited entry into the country, restrictions on social congregation, lockdowns, etc.), although the timing and intensity of the measures varied significantly from country to country (Haug et al., 2020).

However, there is less known about the trends over time in the case fatality ratio (CFR), i.e., the rate of mortality due to the virus out of total confirmed cases. As can be seen from Figure 1, particularly in Europe, the CFR was higher at the beginning of the pandemic, although toward the fall of 2020, it fell to a level that characterized the rest of the world and stabilized there. From that point until the end of 2021, the CFR remained almost unchanged, regardless of the waves of infection. At the beginning of 2022, the CFR worldwide declined, due to the fact that the dominant virus variant at that point (Omicron) was more infectious but less fatal. These characteristics significantly raised the number of confirmed cases, but the number of fatalities increased much less.

Figure 1 describes the CFR out of total confirmed cases in Israel and other regions. It clearly shows that Israel is ranked in the lower part of the distribution. Beginning in July 2020, the CFR in Israel did not exceed 1%, which is less than half the average of Europe and North America. Essentially, for most of the pandemic period (until the end of May 2022), only three countries had a lower CFR than Israel (Iceland, Qatar, and the UAE). They were joined by Norway in March 2021 and New Zealand in October 2021 (see Appendix Figure 1), and several other countries in the early months of 2022.

* Kyrill Shraberman, Researcher, Taub Center for Social Policy Studies in Israel. I would like to thank Prof. Avi Weiss, Prof. Alex Weinreb, and Prof. Gil S. Epstein for their constructive comments as well as other researchers at the Taub Center for fruitful discussions

Figure 1. The fatality rate out of total confirmed cases in Israel and selected other regions



Source: Kyrill Shraberman, Taub Center | Data: Our World in Data, Johns Hopkins University

The main empirical goal of this research is to explain the variation in the outcomes of the various countries based on an analysis of the CFR's variance from March 2020 until May 2022 and then to examine where Israel stood after controlling for a variety of characteristics that were found to explain that variance. The study is based on a comparative analysis of the CFR in 96 countries (the selection of the sample will be described below).

The research provides two important findings. The first is specific to Israel: relative to other countries, Israel stands out in its superior outcomes during the pandemic. During most of the pandemic months and after controlling for the explanatory characteristics, the CFR in Israel was almost a standard error below the model's predicted average CFR. In other words, Israel showed better-than-expected results.

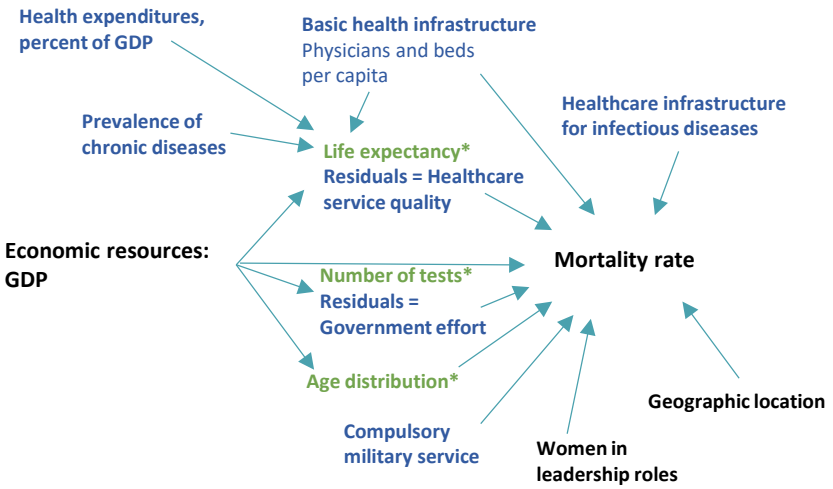
The second finding is more general. During the course of the pandemic, there were significant changes in the explanatory power of certain variables. In one group of variables, which includes the resources available to the government (GDP per capita) and quality of the healthcare system, the explanatory power rose. In the other, which includes compulsory military service and an index

of health security,[1] explanatory power declined. This pattern points to the importance of investment in public health and supports the assumption that rich countries have a greater ability to respond to crises, at least following the initial shock.

The model outline

Figure 2 presents the outline of the model. In order to estimate the dependent variable, i.e., the cumulative CFR, we used data on fatality and morbidity from the Center for Systems Science and Engineering (CSSE,) Johns Hopkins University.[2]

Figure 2. The model outline



Note: * indicates dependent variables in the first stage equations; blue text indicates components of health capital.
Source: Kyrill Shraberman, Taub Center

1 The Global Index of Health Security was developed by the Johns Hopkins Center for Health Security at the Bloomberg School of Public Health and the Nuclear Threat Initiative, in partnership with Economist Impact. The index, which was first published in October 2019, measures the preparedness for outbreaks of infectious disease in 195 countries. For further details, see Global Health Security Index.

2 We would mention that the quality of the data varies across countries. This will be discussed further on in this paper.

The decision to measure the cumulative CFR over time was based on two factors. The first is the variation in the waves of infection and deaths across countries; a model focusing on only one period, i.e., on the CFR in a specific month out of total confirmed cases in that month, does not provide a full picture of the variation over the entire pandemic. The second factor is related to the fact that there may be a disconnect between deaths and infections (Faes et al., 2020). Due to the persistence of the illness, some fatalities were liable to be recorded in the month following the infection, thus increasing the number of fatalities in the subsequent month and reducing them in the previous one to which they actually belong according to the date of infection. In order to avoid this bias, we use cumulative rather than monthly data. The models used to measure the CFR with lagged variables (number of fatalities in a given month or total confirmed cases in the previous month) did not yield meaningful results and weakened the model's explanatory power significantly.

The explanatory variables are divided into four main categories: economic resources, health capital, government effort, and political culture. Table 1 presents the descriptive statistics for each variable.

Economic resources: GDP per capita represents the country's average amount of resources, some of which are used to provide healthcare services, particularly in an emergency. It is important to mention that the relationship between GDP per capita and life expectancy is not linear. Thus, in countries with GDP per capita of more $20,000 (PPP), there is almost no connection. It can be assumed that the availability of resources in wealthier countries expands the possibilities for response and the room to maneuver for policy makers during an emergency (acquisition of equipment, the ability to borrow in international markets, and so on).

Health capital: This is one of the more important categories in the research and includes five components (marked in blue in Figure 2). The first four are direct indices, which commonly appear in the research literature, while the fifth is indirect.

1. Basic healthcare infrastructure: *Production* of indirect healthcare services that require a skilled workforce — physicians, nurses, and other hospital staff in hospitals with operating rooms who use a large variety of instruments and equipment (capital-intensive). In the absence of data on all of the infrastructures and human resources in the healthcare system, the variables used included number of hospital beds per 1,000 population and current expenditures on healthcare as a percentage of GDP.

2. Prevalence of chronic diseases in the population: From the beginning of the pandemic, it was clear that the risk of dying from infection was greater among individuals suffering from a chronic disease. Therefore, we used the most common indices for various chronic diseases, all of which are adjusted according to the population's age profile. The data source is the Global Burden of Disease (GBD) project at the University of Washington. Among the specific diseases are cardiovascular disease, diabetes, respiratory diseases, neurological diseases, gastrointestinal diseases, diseases related to malnutrition, and cancer.
3. Infrastructure for coping with infectious diseases: The Global Health Security Index (GHSI) was published in the autumn of 2019 and includes about 80 indicators of preparedness to deal with the outbreak of an infectious disease.
4. Availability of additional manpower: Beyond the regular manpower within the system, governments have available to them additional human resources due to compulsory military service. Military service trains ordinary manpower for discipline and the carrying out of assignments during an emergency. This type of manpower is temporary and some of them have undergone basic medical training.
5. Quality of the healthcare system: A classic index of health is life expectancy at birth, which is represented by the average length of a person's life by country. Essentially, in countries with high-quality healthcare systems, the expectation is that there is a higher percentage of chronic patients in their population (Gruenberg, 1977). Furthermore, additional factors affect life expectancy directly, such as the availability of medical infrastructure, the level of economic development, and environmental conditions (Linden & Ray, 2017; Weinreb, 2016). The model of life expectancy at birth, which controls for the prevalence of chronic diseases and other variables, essentially explains the variance in life expectancy that is the result of the variance in needs (the prevalence of chronic diseases) and the variance in the means available to the healthcare system in each country (economic variables). The unexplained part of life expectancy, namely the calculated errors, will reflect all of the factors and inputs that are correlated with life expectancy but are not controlled for as part of the model (including the skills of medical workers, the various medical practices, the frequency of diagnostic processes and their quality). Most of these factors can serve as

an indication of the quality of the healthcare system, since the calculated errors in the model can be easily interpreted. For example, if in a particular country there is a longer life expectancy than that expected given the prevalence of chronic diseases and the amount of resources available, then there are other factors in this country (apart from the factors controlled in the proposed model) which contribute to the increased life expectancy. In contrast, a shorter than expected life expectancy is evidence of factors that are negatively correlated with a long life.[3]

Government effort: The average weekly number of new COVID-19 tests per 1,000 population.[4] This is the only explanatory variable that does not remain fixed. Since rich countries are able to purchase more tests — the cost of a PCR test ranges from $15 to $60 — we used the calculated errors from the regression, which measures the effect of GDP per capita on the number of new weekly tests per 1,000 people. If more tests are carried out (positive calculated errors), it can be concluded that the country invested more resources in documenting the pandemic. We assume that there is a positive correlation between this investment and the general effort to control the pandemic and reduce the CFR. Furthermore, and as will be described further on, this variable has another important role, namely to control for differences between countries in the quality of data on rates of morbidity and mortality in general.

Women in leadership roles (political culture): This variable relates to the way in which policy makers evaluate information, make decisions, and implement them. In view of the large amount of literature on the differences between male and female leaders with respect to decision making and choosing policy measures (Paxton et al., 2021), particularly during the pandemic (Garikipati & Kumbhampati, 2021; Sergent & Stajkovic, 2020), an index of women in leadership roles was used.[5] That is, a dummy variable for whether a women had served in the country's most senior political position (prime minister in parliamentary systems or president in a presidential regime) for at least one year since 2000 was used. This variable can indicate two things: a political

3 For a ranking of countries according to the size of the calculated error in the regression of life expectancy at birth, see Appendix Table 2.

4 For further details on the number of weekly tests per 1,000 population, see the Appendix.

5 More general indices of regime type, such as Polity IV, did not contribute to the performance of the model.

culture in which leadership skills are more important than the identity of the leaders, such that the voters in countries with women leaders are more prepared to cooperate with the government; and the style of the leadership which is characterized by the choice of a lower-risk policy for a public response to an emergency, which is more characteristic of women than men (Charness & Gneezy, 2012).

There are two other important factors that are relevant in explaining COVID-19 fatalities. One is the percentage of the population over the age of 65. From the start of the pandemic, it was clear that the risk of death from the virus among the elderly was much higher than among younger patients (Liu et al., 2020). However, since there is a strong correlation between the share of the population aged 65 and over and GDP per capita, it is difficult to use these variables together in the same regression. Since the relative share of the elderly in the population is also correlated with medical infrastructure, such as current healthcare expenditure and number of hospital beds per 1,000 population, we used the calculated errors of a regression of the share of the population aged 65 and over on GDP per capita, the share of current healthcare expenditures in GDP, and the number of hospital beds per 1,000 population.[6]

The second factor is geographic location, which is measured by the geometric center point of each country with respect to latitude and longitude. This variable is meant to help identify gross environmental differences between countries that are the result of their unique location and very possibly also genetic differences, even if only on a partial level (Pickrell & Reich, 2014).[7]

6 For more on this see Appendix Table 3.

7 There are those who claim that a unique coding of antibodies to cytokines (proteins with a decisive role in the regulation of functioning and the multiplication of cells in the blood and immune system) and an error in the coding of proteins at the attachment sites of viruses are likely to increase the risk of becoming ill and dying from a serious disease (Bastard et al., 2020). Others claim that the population who originate from Southern Asia are more likely to experience the disease more intensely than other populations due to a genetic failure in the epithelial cells (tissue cells that cover the eternal surfaces of the body's organs and are found on the boundary between their external and internal environments) of the lungs, and the respiratory system in general, which leads to greater moisture and faster breakdown of the respiratory cell tissue (Downes et al., 2021). Finally, the phenomenon of discordant couples, namely couples who live together and only one of them is infected despite prolonged intimate contact, strengthens the claim regarding the effect of genetics on morbidity in general and on the seriousness of morbidity in particular (Castelli et al., 2021).

Table 1. Explanatory variables, descriptive statistics

Variable	No. of observations	Mean	Standard deviation	Minimum	Maximum
GDP per capita 2019 ($1,000 PPP)	96	31.04	22.797	1.22	113.94
GDP per capita 2020 ($1,000 PPP)	96	29.46	22.125	1.20	110.26
Acute care beds per 1,000 population (2015–2019, latest data available)	96	3.16	2.39	0.33	12.98
Current health expenditure, as a % of 2019 GDP	96	7.04	2.55	2.32	16.89
Share of population 65+ (%)	96	11.91	6.696	1.16	28.00
Life expectancy at birth (years)	96	76.89	4.88	62.42	84.36
Quality of healthcare	96	0.00	2.136	-6.22	6.16
Latitude (degrees)	96	26.39	24.381	-42.63	64.76
Longitude (degrees)	96	10.03	65.935	-109.43	177.97
Compulsory military service (18+ months of service)	96	0.22	0.416	0.00	1.00
Woman in leadership roles (for at least 1 year since 2000)	96	0.27	0.447	0.00	1.00
GHS index	96	48.51	13.81	23.20	83.50

Source: Kyrill Shraberman, Taub Center | Data: World Bank; Nunn & Puga, 2012; Global Health Security Index, October 2019

The full model

In view of the differences across countries in the quality of the data on rates of morbidity and mortality due to COVID-19, the analysis would ideally include only countries with reliable healthcare data (based on, for example, the World Health Organization Data Quality Index). However, since restricting the analysis to a small and varying sample of tests each month[8] would have significantly weakened the model's statistical power, we expanded the sample to countries for which there is data on the variables appearing in Figure 2 above. As a substitute for the World Health Organization Data Quality Index, we used data on the number of hospital beds per 1,000 population and thus limited the sample to 96 countries.

8 According to the World Health Organization, a *moderate* testing policy is 1–2 new tests per week per 1,000 population and an *adequate* policy is more than 2. Between March 2020 and March 2022, the number of countries adopting a moderate policy changed significantly and even more so in the case of those who adopted an adequate policy. For further details, see the Appendix.

As a result of the skew to the right of the dependent variable, we chose to estimate the model by means of a Gini regression, which makes it possible to overcome the bias resulting from asymmetry in the distribution (Yitzhaki & Schechtman, 2012, 2013),[9] rather than using an OLS regression.

Finally, the latest observations for the explanatory variables are for 2019, while the rate of fatality series begins in March 2020 and ends in March 2022. The use of past data for the explanatory variables makes it possible to avoid endogenous effects between CFR and these variables.

First stage: Estimating the indirect indices

Prior to estimating the full model, it was necessary to carry out a number of indirect estimations in order to deal with methodological issues and create instrumental variables. The estimation results for the models that measure the quality of the healthcare system and government effort, number of beds per 1,000 population and the share of the population aged 65+ will be described below.[10]

In the regression of life expectancy at birth, the explanatory variables explain 89% of the observed variance between countries. Appendix Table 2 presents a list of the 25 countries with the largest calculated errors and the 25 with the smallest calculated errors or in other words the 25 countries with the highest-quality healthcare services and the 25 with the lowest-quality healthcare services. As expected, Israel is in the former group.[11]

Among the other instrumental variable regressions, especially noticeable is the model of number of new weekly tests per 1,000 population. About 70% of the variance in the number of new weekly tests is explained by GDP per capita alone. The findings show that the wealthier a country is, the higher is

9 See the Appendix for further details.

10 See Appendix Table 3 for detailed results.

11 Specifically, the model found that an increase of 1% in the prevalence of cardiovascular disease in the population and diseases related to nutrition is correlated with a drop of 1.2 and 0.2 years in life expectancy, respectively. In contrast, it was found that every increase of 1% in the prevalence of various types of cancer in the population is correlated with an increase of 3.3 years in life expectancy. At first glance this is a surprising finding. However, the explanation is straightforward: the earlier that cancer is diagnosed, the higher will be the rate of cancer patients in the population, and, at the same time, the higher will be the survival rate the disease. Therefore, it can be said that early diagnosis contributes to an increase in life expectancy, which necessarily is an indication of a better healthcare system. The full results are presented in Appendix Table 3.

the number of new tests per week per 1,000 population. Here again, Israel has on average positive calculated errors, which indicates a larger than expected government effort given the country's GDP per capita.

Second stage: The CFR model over time

The findings of the analysis indicate that the pandemic can be divided into two main periods: the adjustment period which lasted from March 2020 to August 2020 (the two first waves of the pandemic) and the period of stability from September 2020 until the end of the sample period. Table 2 presents the results of the model for each month, from March 2020 until May 2022, with the goal of detecting changes in the relationships between the various explanatory variables and the rate of fatality during the period. It is important to note that there are differences in the model's explanatory power during these two years, although it is usually higher during the period of stability. Beginning in November 2021, the share of the explained variance did not fall below 65%, while during the adjustment period it did not exceed 60%. These differences are consistent with the slopes in Figure 1: the variation between countries in the rate of fatality within total confirmed cases declined over time.

During the adjustment period (March–August 2020), the connection between the rate of fatality and the two variables that are considered to be the most important — GDP per capita and the quality of the healthcare system — is usually not significant. Thus, in wealthier countries with better performance according to the public health indices, the rate of fatality from COVID-19 in May and June 2020 was not lower — at least not to a statistically significant degree — than in poorer countries or countries with lower performance in public health. Only in July and August 2020, towards the end of the adjustment period and the beginning of the period of stability, is there a return to the expected path according to these variables, such that they become significant and remained so until May 2022. In other words, it can be said that only after the initial shock at the outset of the pandemic and with the increased burden on hospitals was the response of countries to the pandemic affected by the country's quantity of resources and the quality of its healthcare system.

The link between the fatality rate and the three other components of health capital, i.e., government effort, percentage of the population over 65, and the country's geographic location, also changed over time. The GHSI coefficient was positive and significant from April 2020 until

November 2021 and was particularly high in the summer of 2020, which marked the end of the adjustment period. In other words, the higher a country is ranked according to the Global Health Security Index, the less successful it was in reducing the CFR up until the end of 2021. This finding is consistent with the poor performance measured by rate of morbidity and fatality reported at the beginning of the pandemic (Abbey et al., 2020; Aitken et al., 2020). It is very possible that when examining a country's preparedness to deal with an outbreak of an infectious disease, political and constitutional barriers may have been encountered in the attempt to implement policy measures that limit individual rights, such as freedom of movement and freedom to congregate.

A country's effort to deal with the pandemic — as reflected in the number of new weekly tests per 1,000 population — has a negative and significant connection to the CFR in most months of the pandemic. In other words, the larger the number of tests, the lower is the CFR. Due to a methodological difficulty, it is not possible to test the relation between the number of tests and the number of confirmed cases, although a possible and relatively direct explanation is that a large number of tests makes it possible to identify infected individuals at an earlier stage and therefore to prevent the deterioration of their condition and even their death.[12]

The relationship between the fatality rate and the share of the population over the age of 65 is positive, as expected, but is not statistically significant at any stage. It may be that other explanatory variables which are positively correlated with the share of the elderly in the population (see Table 2) weaken the connection of this variable with the fatality rate from COVID-19.

Finally, during the pandemic, there was a negative relationship between longitude and the CFR, and it was significant until December 2021. During the initial months of the pandemic, the connection between latitude and the CFR was also negative and significant. These two findings together indicate that the CFR was lower in the southeastern quarter of the globe, i.e., the Far East and Oceania. The fact that only the coefficient of longitude remains negative and significant until December 2021 points to the relative success of the countries in Southeast Asia, Australia, and New Zealand in coping with the pandemic, primarily when compared to the countries in the western half of the globe (and in particular the South American countries).

12 For further details on testing policy, see the Appendix.

With respect to the women in leadership variable, which is meant to control for political culture or which implies a greater chance of making decisions with low public risk, it was found that there is a negative and significant correlation between it and the CFR throughout the pandemic. In other words, the rate of fatality was lower in countries with a woman in the highest political office for at least a year during the past 20 years, particularly during the adjustment period but also during the period of stability. Essentially, *this is the only variable in the model which has a statistically significant correlation with the CFR over all 25 months of the sample*. A similar finding was arrived at in a parallel study of morbidity and mortality rates (Weinreb, forthcoming).

Unlike women in leadership, the correlation between compulsory military service[13] and the CFR was more limited. Thus, only during the adjustment period (summer–spring 2020) was the correlation negative and significant, while during the period of stability it was positive but not statistically significant. In other words, countries with compulsory military service were characterized by a lower rate of fatality at the beginning of the pandemic while during the period of stability they had no significant advantage over other countries. This finding strengthens the hypothesis that compulsory military service makes it possible to better deal with medical emergencies and emergencies in general.

13 Compulsory military service of at least 18 months.

Table 2. The estimation results for the fatality rate out of total confirmed cases at the end of every month, March 2020 to May 2022

	GDP 2019–2020 ($1,000 PPP)	Latitude (degrees)	Longitude (degrees)	Healthcare service quality: Residuals from life expectancy equation	GHSI: Readiness for infectious diseases	Government effort: New weekly tests per 1,000 population (residuals)	Share of those aged 65+ (residuals share equation)	Compulsory military service	Political culture: Women in leadership roles	Intercept	No of observations	GR^2 (coefficient GR^2)
March 2020	-0.08***	-0.01	-0.01	-0.33	0.03	0.37	0.09	0.11	-1.84*	5.60***	84	0.365
April	-0.05**	0.02	-0.03***	-0.10	0.10**	-0.12	0.01	-1.80**	-2.17**	2.34	95	0.386
May	-0.03	0.0388	-0.02***	-0.06	0.12***	-0.11	0.08	-2.12***	-2.33***	-0.01	95	0.468
June	-0.03	0.03**	-0.02***	-0.19	0.13***	-0.13*	0.10	-1.85***	-2.42***	-0.50	95	0.552
July	-0.03	0.02*	-0.01***	-0.25*	0.12***	-0.08	0.13	-1.48**	-2.23***	-0.45	96	0.581
August	-0.03**	0.01	-0.01**	-0.27**	0.10***	-0.06	0.14	-0.93*	-1.94***	-0.17	96	0.466
September	-0.04***	-0.002	-0.01***	-0.23**	0.08***	-0.02	0.09	-0.50	-1.44***	0.75	96	0.389
October	-0.04***	-0.01	-0.01**	-0.20**	0.05***	-0.03*	0.04	0.02	-1.07***	1.79***	96	0.461
November	-0.04***	-0.01	-0.01**	-0.19**	0.04**	-0.03*	0.03	0.16	-0.92***	2.11***	96	0.542
December	-0.04***	-0.004	-0.006**	-0.18**	0.04**	-0.03**	0.03	0.15	-0.78**	1.93***	96	0.524
January 2021	-0.05***	-0.001	-0.005**	-0.20***	0.04**	-0.02**	0.004	0.17	-0.72**	1.68***	96	0.557
February	-0.05***	-0.002	-0.005*	-0.23***	0.04**	-0.008*	0.005	0.12	-0.72**	1.66***	96	0.560
March	-0.05***	-0.001	-0.005**	-0.22***	0.04**	-0.006*	0.002	0.14	-0.72**	1.66***	96	0.587
April	-0.05***	-0.001	-0.005**	-0.23***	0.04**	-0.007**	0.01	0.19	-0.71**	1.74***	96	0.619
May	-0.05***	-0.001	-0.005**	-0.21***	0.04**	-0.008**	0.02	0.23	-0.74**	1.88***	96	0.612
June	-0.045***	-0.002	-0.005**	-0.20**	0.04**	-0.009*	0.008	0.21	-0.78**	1.91***	96	0.599
July	-0.05***	-0.005	-0.005**	-0.21***	0.04**	-0.009*	0.01	0.22	-0.79**	2.05***	96	0.630

Table 2 (continued). The estimation results for the fatality rate out of total confirmed cases at the end of every month, March 2020 to May 2022

	GDP 2019–2020 ($1,000 PPP)	Latitude (degrees)	Longitude (degrees)	Healthcare service quality: Residuals from life expectancy equation	GHSI: Readiness for infectious diseases	Government effort: New weekly tests per 1,000 population (residuals)	Share of those aged 65+ (residuals share equation)	Compulsory military service	Political culture: Women in leadership roles	Intercept	No of observations	GR^2 (coefficient GR^2)
August	-0.05***	-0.004	-0.004*	-0.20***	0.04**	-0.01**	0.009	0.27	-0.72**	2.08***	96	0.624
September	-0.05***	-0.004	-0.004	-0.21***	0.03**	-0.009**	0.02	0.30	-0.74**	2.18***	96	0.630
October	-0.05***	-0.005	-0.004*	-0.20***	0.03*	-0.01**	0.02	0.34	-0.76**	2.30***	96	0.637
November	-0.05***	-0.005	-0.004*	-0.20***	0.03*	-0.007**	0.02	0.32	-0.74**	2.42***	96	0.658
December	-0.05***	-0.005	-0.004*	-0.20***	0.02	-0.006**	0.02	0.34	-0.70**	2.52***	96	0.661
January 2022	-0.04***	-0.003	-0.002	-0.18***	0.01	-0.004**	0.01	0.39	-0.51*	2.33	96	0.676
February	-0.04***	-0.003	-0.002	-0.17***	0.01	-0.003*	0.009	0.31	-0.51**	2.39***	96	0.679
March	-0.04***	-0.004	-0.003	-0.19***	0.006	-0.003*	0.02	0.36	-0.48**	2.52***	96	0.721
April	-0.04***	-0.004	-0.003*	-0.18***	0.005	-0.006	0.01	0.35	-0.45*	2.51***	96	0.711
May	-0.04***	-0.004	-0.003*	-0.19**	0.007	-0.005	0.01	0.3	-0.45*	2.44***	96	0.699

Note: Significance levels: *p < 0.10; **p < 0.05; ***p < 0.01.
Source: Kyrill Shraberman, Taub Center | Data: Our World in Data, Johns Hopkins University; World Bank; Nunn & Puga, 2012; Global Health Security Index, October 2019; Global Burden of Diseases, 2019

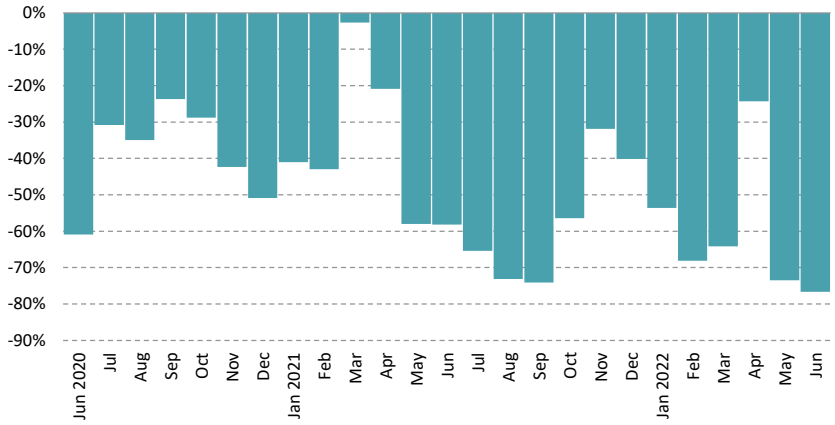
How much did Israel deviate from expectations during the pandemic?

In order to assess Israel's performance during the pandemic, it is important to differentiate between results due to characteristics like the population's age profile, the quality of the healthcare system, and GDP per capita on the one hand, and results explained by factors external to the model on the other hand. Figure 4 presents the calculated relative disparity between the actual and predicted fatality rate in Israel. The result of this calculation cannot be explained by the variables in the model, but it can provide an answer to the question asked above: How much did Israel deviate from expectations during the pandemic?

Overall, it can be said that Israel did surprisingly well. During all the months of the pandemic, the gap between the actual CFR and the CFR predicted by the model was negative. It is important to remember that the calculated gap is relative and dependent on the performance of the other 95 countries.

Figure 4. The gap between the actual and predicted rates of fatality in Israel

Standard deviation units



Source: Kyrill Shraberman, Taub Center | Data: World Bank; Nunn & Puga, 2012; Global Health Security Index, October 2019; Global Burden of Diseases, 2019

Conclusion

This study examined the variance in the fatality rate due to the pandemic out of total confirmed cases (the case fatality ratio — CFR) in Israel over a period of two years (March 2020 to March 2022) and relative to other countries. The model we constructed included a variety of explanatory variables, some of them direct, such as GDP per capita, a health security index, geographic location, women in a leadership role, and compulsory military service, while others were indirect, such as quality of the healthcare system and government effort. According to the results, the pandemic can be divided into two periods: March 2020 to August 2020, which we refer to as the adjustment period, during which the CFR was high worldwide; and September 2020 to March 2022, which we refer to as the period of stability, during which the CFR fell to and remained at a level that was specific to each country.

During the adjustment period, the variables that were correlated with a low CFR were compulsory military service, women in leadership, and geographic location. Compulsory military service apparently made available a reserve of a relatively well-trained workforce in response to the medical emergency and perhaps it also contributed to the compliance of the population with the restrictive policies that were adopted. According to the literature, women in senior positions of leadership tend to make decisions involving less public risk than their male peers and indeed the correlation between a woman serving in the highest political office during the 20 years prior to 2020 and the CFR was found to be negative and significant. Essentially, women in leadership is the only variable whose correlation was statistically significant throughout the period of the pandemic, although during the second period its correlation was weaker and its explanatory power declined. Finally, a statistically significant correlation was found between a country's geographic location and the CFR during the first period, apparently due to the closing of borders adopted by many countries. In the countries of Southeast Asia and Oceania, the observed CFR was lower. As in the case of other variables, the connection between geographic location and the CFR became weaker during the period of stability and its explanatory power declined.

During the period of stability, the correlation between the CFR and GDP per capita and that between the CFR and the quality of the healthcare system were negative and statistically significant. This finding implies that after the initial shock at the outset of the pandemic, a country was better able to care for confirmed COVID-19 patients if it had more resources and a high-quality

healthcare system (in terms of additional years of life expectancy which are not explained by the prevalence of chronic diseases or resources available to the state prior to the pandemic). The analysis also indicates that the explanatory power of variables with a statistically significant correlation with the CFR during the adjustment period diminished later on and in many cases so did their statistical significance. The share of the explained variance within the total variance of the CFR rose consistently during the entire pandemic: in March 2020, the model explained about 36.5% of the variance in the fatality rate, and this increased to 72.5% in March 2022.

The findings of the study indicate that the performance of the healthcare system in each country during the pandemic was influenced by the economic resources available to it prior to the onset of the pandemic and by the quality of its healthcare system. Therefore, in order to optimally respond to medical and general emergencies, a country should pursue a policy of sustainable growth and invest in its healthcare system and particularly in a skilled workforce.

In Israel, the fatality rate out of total confirmed cases was lower than expected. Since the model takes into account both the number of new tests per 1,000 population and GDP per capita, it is not possible to attribute Israel's performance to the relatively large number of tests carried out or its economic prosperity prior to the pandemic. The medical workers in Israel who constituted a human shield against the pandemic — which often meant personal risk and sacrifice — are indeed the real heroes of the pandemic and Israel's success can be attributed primarily to them.

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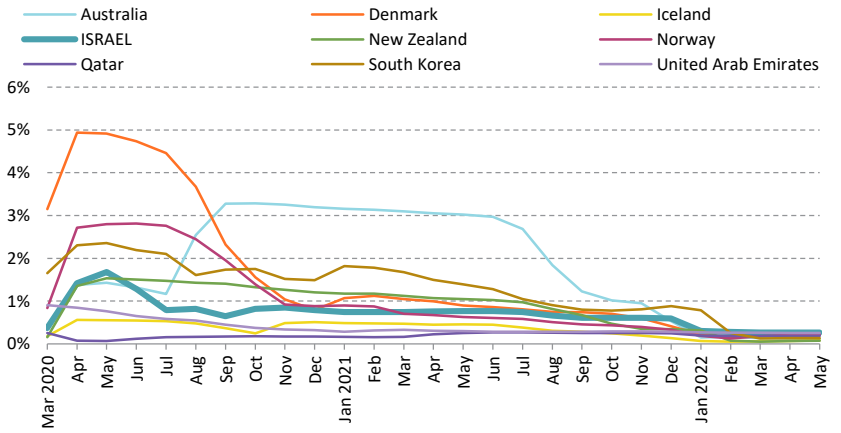
Appendix

Appendix Figure 1. Fatality rate out of total confirmed cases, selected countries



Source: Kyrill Shraberman, Taub Center | Data: Our World in Data, Johns Hopkins University

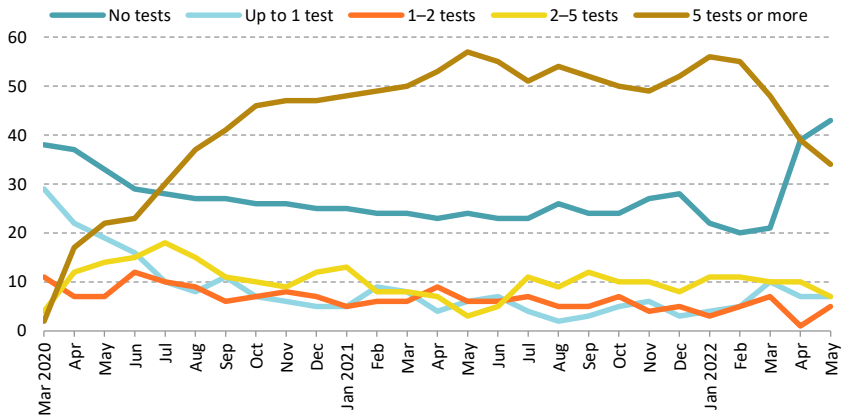
Testing policy

According to guidelines published by the World Health Organization in the summer of 2020 (WHO, 2020), the definition of testing policy is determined by the number of new weekly tests per 1,000 population. Thus, when the number is lower than 1, the policy is defined as *limited*; when it is in the range of 1 to 2 the policy is defined as *reasonable*; and when it is 2 or more the policy is defined as *adequate*. An examination of the weekly testing figures showed that there is a group of countries in which the number of new weekly tests per 1,000 population exceeded 5 and in many of them it was even higher. In this group of countries, the policy has been defined as *optimal for purposes of this study*. We would emphasize that this category is not that of the WHO and does not appear in their guidelines.

A mapping of all 96 countries and territories in the sample from March 2020 until November 2021 shows that the number of countries with an optimal testing policy was lower than at the beginning of the pandemic and rose gradually during 2020. In January 2021, this group of countries was already the largest and the drop in their number began only in February 2022, the period

that corresponds to the end of the Omicron wave. The number of countries that adopted an adequate testing policy remained fairly constant over time and thus also the number of countries that adopted a moderate, limited, or other type of policy. In view of the high cost of testing — the price of a PCR test ranges from $15 to $60 — and as indicated by the data, it can be assumed with a fairly high level of certainty that there is a close relationship between testing policy and GDP per capita. In order to avoid the bias that originates from correlation between these explanatory variables in the final model, we used the calculated error from the regression that explains the number of weekly tests per 1,000 population using GDP per capita.

Appendix Figure 2. Number of countries by testing policy, March 2020 to May 2022

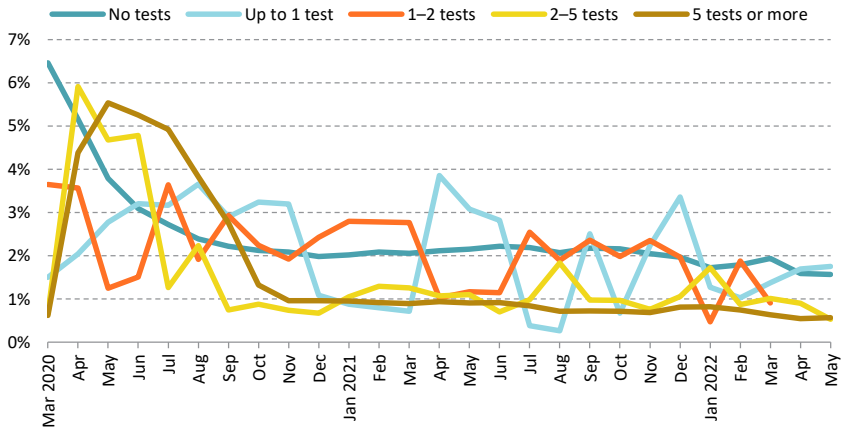


Source: Kyrill Shraberman, Taub Center | Data: Our World in Data, Johns Hopkins University

A mapping of CFR by testing policy (Appendix Figure 3) shows a downward trend in the CFR over time, regardless of which policy was adopted. As shown by the results of the model, government effort, i.e., the calculated error from the regression explaining the number of new weekly tests per 1,000 population by means of GDP per capita — indeed reduces CFR, but it is statistically significant primarily in the second period of the pandemic, when the number of countries adopting an optimal policy reached its peak. Furthermore, the coefficient itself was fairly small and therefore significantly reducing the CFR required a very

large number of tests. For example, in October 2020 to reduce the CFR by 1% required an average of 33 weekly tests per 1,000 population in the sample countries. Only in seven of the 96 countries was the number of weekly tests greater than that. In other words, there was only a relatively small number of countries who managed to reduce the CFR significantly by increasing their rate of testing. The main factor explaining the reduction in the fatality rate from COVID-19 was not a high rate of testing but rather the fact that patients were diagnosed at an early stage, which made it possible to lower the risk of deterioration in their situation and even their rate of death by providing them with appropriate care.

Appendix Figure 3. Fatality rate out of total confirmed cases, by testing policy, March 2020 to May 2022



Source: Kyrill Shraberman, Taub Center | Data: Our World in Data, Johns Hopkins University

Contribution of the variables to explaining the variance

In order to analyze the explanatory power of the variables in the model over the course of the pandemic, partial determination coefficients were calculated (partial R^2) using the least squares method for an estimation of the model. The main reason that a method based on least squares was chosen, and not a Gini regression, is the difficulty of interpretation of a Gini regression. It should be noted that the findings from the least squares analysis are less complete than a Gini regression, but despite this drawback, they indicate the main trends from the analysis that also are found using the Gini regression.[14]

The amount of resources available to the country (GDP per capita) and the quality of the healthcare system are the most important variables in the model. Appendix Figure 4 shows that during the first stage of the pandemic (May–October 2020), the explanatory power of the GDP per capita was only 0.3% of the variance, but at the beginning of the stability period the increase began, from 14.7% of the variance in November 2020 to a high of 31% by May 2022. A similar upward trend in the explanatory power was observed for the quality of the healthcare system variables: in May 2020, it was 0.2%, in November 2020, it was 4.8%, it rose to a level of 7.1% of the variance in March 2022, and to 8.5% by May 2022.

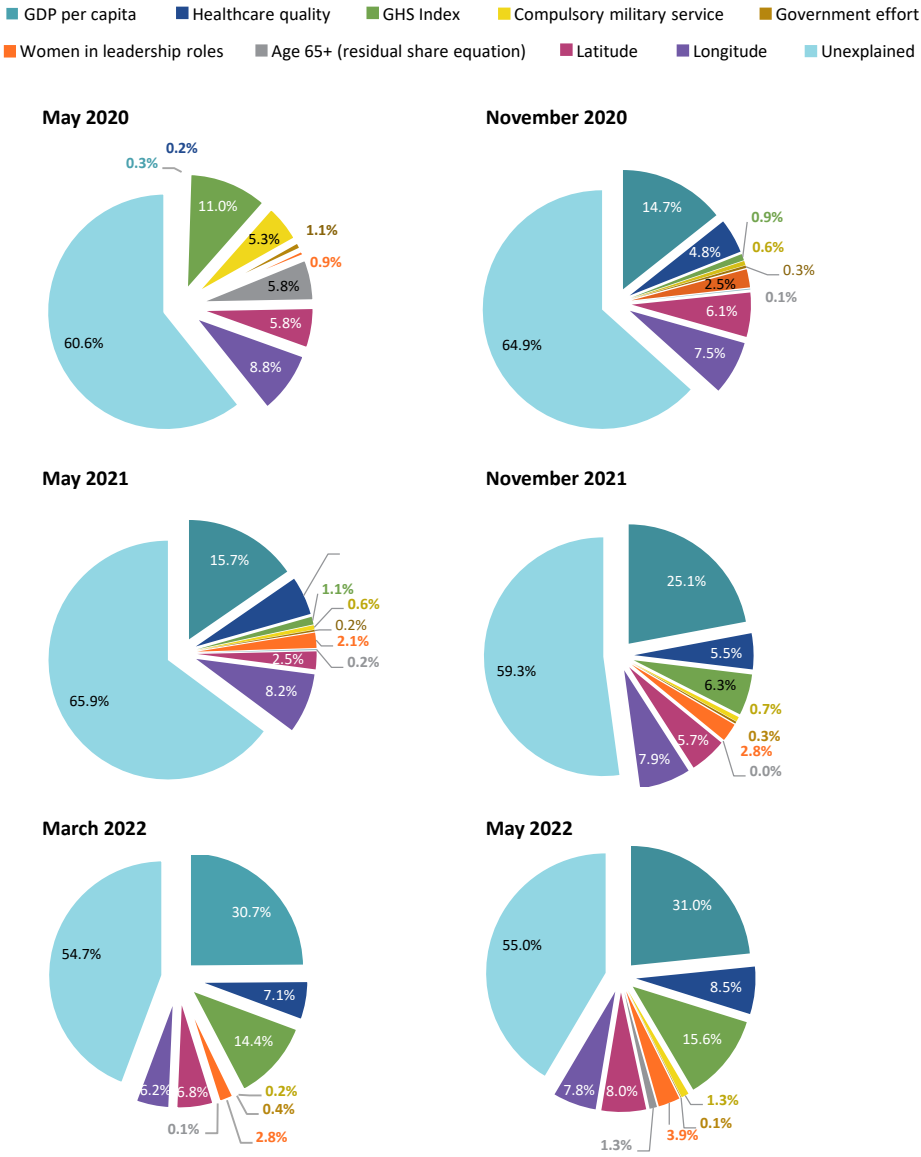
The variable whose explanatory power declined over time was compulsory military service. In May 2020, this variable explained 5.3% of the variance in CFR; by the beginning of the second period, though, the significance of its explanatory power decreased and nearly disappeared (0.6% of the variance in November 2020 and 0.8% in May 2022). This finding supports the conclusion that compulsory military service contributed to bringing down the CFR during the adjustment period, while during the later phase of routine and stability, it had little effect.

An additional variable that contributed to explaining variance is the global health security index (GHSI). In May 2020, the explanatory value of this variable was 11%, while in November 2020, it declined to 0.9%. Towards the end of the analysis period, it again had more of an influence. In November 2021, its explanatory value rose to 6.3% and, by May 2022, it reached levels of 15.6% of the variance.

14 For a more detailed explanation regarding similarities and differences between the two methods, see Yitzhaki and Schechtman, 2013, p. 21.

Variables of longitude and latitude were quite significant in the adjustment period and their values decreased somewhat during the routine period. In May 2020, latitude explained 5.8% of the variance and longitude about 8.8%. In May 2022, their explanatory power was 8% and 7.8%, respectively. A possible explanation for this result can be found in tourism and the timing of country's border closings. Countries whose economies depend heavily on tourism tended to try not to close their borders due to fears of serious harm to their economies. As a result, the spread of the virus was faster and resulted in a heavier impact on their healthcare systems, and, in the end, to a rise in the COVID-related mortality rate. Another possible explanation is that countries in the Far East and Oceania learned the lessons from their previous experience with the SARS pandemic in 2003 coupled with their greater enforcement capabilities.

Figure 3. Breakdown of the variance in the fatality rate according to the explanatory power of the model variables



Source: Kyrill Shraberman, Taub Center | Data: World Bank; Nunn & Puga, 2012; Global Health Security Index, October 2019; Global Burden of Diseases, 2019

Appendix Table 1. Normal distribution test: Life expectancy at birth and the fatality rate out of total confirmed cases

	No. of observations	Pr (skewness)	Pr (kurtosis)	Joint test Adjusted chi² (2)	Joint test Prob> chi²
Life expectancy at birth	96	0.0049	0.5098	7.55	0.0229
Incidence of death					
March 2020	84	0	0	53.38	0
April	95	0	0.017	20.32	0
May	95	0	0.1141	16.68	0.0002
June	95	0	0.0123	23.13	0
July	96	0	0.0016	29.31	0
August	96	0	0.0021	27.80	0
September	96	0	0.0013	28.12	0
October	96	0	0.0001	33.45	0
November	96	0	0	38.88	0
December	96	0	0	38.64	0
January 2021	96	0	0	38.78	0
February	96	0	0	42.03	0
March	96	0	0	44.77	0
April	96	0	0	46.92	0
May	96	0	0	47.26	0
June	96	0	0	47.09	0
July	96	0	0	42.68	0
August	96	0	0	40.32	0
September	96	0	0	40.09	0

Source: Kyrill Shraberman, Taub Center | Data: World Bank; Global Burden of Diseases, 2019; Our World in Data, Johns Hopkins University

Appendix Table 2. Healthcare service quality in the 25 highest-ranked countries and the 25 lowest-ranked countries

Top 25 countries		Bottom 25 countries	
Morocco	6.16	Romania	-1.41
Oman	4.53	Guyana	-1.44
Sweden	3.96	Iraq	-1.63
Iran	3.94	Lithuania	-1.71
Bangladesh	3.76	Latvia	-1.82
Belize	3.53	Bulgaria	-1.82
Sri Lanka	3.25	Saudi Arabia	-1.83
Costa Rica	2.99	Mexico	-1.90
India	2.90	Canada	-1.98
Slovenia	2.80	Hungary	-1.99
Japan	2.50	The Bahamas	-2.01
Spain	2.41	Ireland	-2.05
Malaysia	2.33	Bolivia	-2.12
Italy	2.24	Luxembourg	-2.13
United Arab Emirates	2.14	**US**	**-2.23**
Tunisia	2.00	Germany	-2.48
Singapore	1.81	Myanmar	-2.51
Chile	1.76	El Salvador	-2.76
Malta	1.74	Brunei Darussalam	-2.95
Norway	1.68	New Zealand	-2.96
ISRAEL	**1.64**	Sudan	-3.40
Antigua and Barbuda	1.61	Fiji	-3.72
Djibouti	1.56	Russian Federation	-4.44
Peru	1.54	Afghanistan	-5.06
Iceland	1.53	Niger	-6.22

Source: Kyrill Shraberman, Taub Center | Data: World Bank; Global Burden of Diseases, 2019

Appendix Table 3. First stage regressions

Variable	Life expectancy at birth (quality of healthcare system)	Number of new test weekly per 1,000 population (government effort)	Number of hospital beds per 1,000 population	Share of population age 65+
GDP per capita, 2019 ($1,000 PPP)	0.577***	0.577***	0.039***	0.106***
Current health expenditure, as a % of 2019 GDP			0.246**	1.461***
Hospital beds per 1,000 population (calculated error)	0.49**			1.847***
Prevalence of heart and vascular diseases (% in population, adjusted for age distribution)	-1.20***			
Prevalence of respiratory diseases (% in population, adjusted for age distribution)	0.03			
Prevalence of diabetes (% in population, adjusted for age distribution)	0.04			
Prevalence of digestive system diseases (% in population, adjusted for age distribution)	0.20*			
Violence (% in population, adjusted for age distribution)	0.23			
Prevalence of nervous system diseases (% in population, adjusted for age distribution)	0.14			
Prevalence of nutritional disorders (% in population, adjusted for age distribution)	-0.23***			
Prevalence of cancers (% in population, adjusted for age distribution)	3.34***			
Latitude (degrees)	-0.02			
Longitude (degrees)	0.01			
Constant	69.12***	-2.153*	0.229	-1.667*
N	96	97	96	96
R^2	0.8911	0.7022	0.3047	0.7868

Significance levels: *p < 0.10; **p < 0.05; ***p < 0.01.
Source: Kyrill Shraberman, Taub Center | Data: World Bank; Global Burden of Diseases, 2019

Executive Summary

Life Expectancy in Israel in 2021: On the Rise Again?

Alex Weinreb

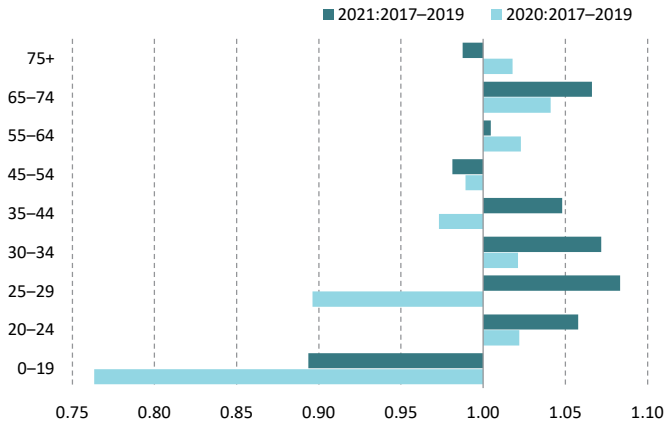
This is one of a series of studies dealing with the impact of the COVID-19 pandemic on Israel's demography. Using data from the Central Bureau of Statistics (CBS) for 2017 to 2021, we examined two main demographic indices: specific mortality rates (by age group), and life expectancy at birth. The study's main finding is that even though the COVID-19 pandemic caused a 2–3 month decrease in the life expectancy of Israelis in 2020 — in so doing interrupting the steady upward trend in life expectancy that Israel has experienced since the 1960s (about 2–3 months each year) — and even though there were more deaths from COVID-19 in 2021 than in 2020, life expectancy in 2021 did not continue to decline. On the contrary, the decline was frozen and there were even signs of a tiny increase.

Looking at trends in age-specific mortality rates (ASMR) deepens our understanding of this phenomenon. In 2021, the ASMR at ages 20–44 and 55–74 was higher than in 2017–2019. In contrast, among those aged 75 and over, the ASMR was lower than in those years. Since the annual probability of mortality increases significantly with age, the decrease in mortality rates over the age of 75 offset any increase in mortality rates among younger people.

Stopping life expectancy from continuing its decline in 2021 is a testament to the success of the public health system in Israel in coping with the pandemic among those aged 75+, if not their younger compatriots.

* Prof. Alex Weinreb, Research Director, Taub Center for Social Policy Studies in Israel. The full study was published in March 2022, the second anniversary of the COVID-19 pandemic in Israel, and can found on the Taub Center website.

Ratio of age-specific mortality rates in 2020 and 2021 to those in 2017–2019



Source: Alex Weinreb, Taub Center | Data: CBS

The Healthcare System in Israel: An Overview

Baruch Levi and Nadav Davidovitch

Introduction

The importance of the healthcare system to the resilience of Israeli society as well as its contribution to the well-being of the residents of Israel are unquestionable. Nevertheless, and despite the many complex challenges it faces, the Israeli healthcare system doesn't hold a prominent position on the country's agenda. Naturally, the healthcare system has been, and still is, at the forefront of the battle against the COVID-19 pandemic. This has brought about a certain change in the healthcare system's position. For now, the evening news broadcasts no longer open with reports on fears regarding the ability of the healthcare system to deal with the epidemic, and the current political and security situation once again is the focus of media and public attention.

COVID-19 is still with us, but it seems that the decline of the epidemic in 2022 has finally allowed the Ministry of Health and other stakeholders to turn to routine issues, issues that were on the healthcare system's agenda prior to the outbreak of the pandemic. These issues may have been pushed aside due to the state of emergency caused by the COVID-19 pandemic, but they certainly did not disappear and may have even intensified as a result. They include healthcare inequality, the shortage in medical, nursing, and other healthcare professional workforce, and the interrelationship between public and private healthcare. These and other issues will be the focus of this review.

* Dr. Baruch Levi, Guest Researcher, Taub Center for Social Policy Studies in Israel. Prof. Nadav Davidovitch, Principal Researcher and Chair, Taub Center Health Policy Program; Director, School of Public Health, Ben-Gurion University of the Negev.

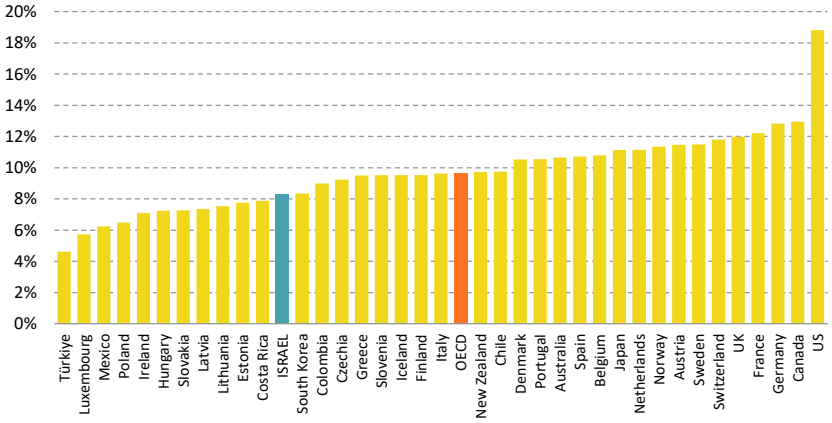
This review introduces the reader to the current data, trends, and developments in the healthcare system, overtime and as they compare to other developed countries. It is based on information available in databases, studies, reports, and policy documents of international organizations and national healthcare authorities, including the OECD, the World Health Organization (WHO), the Israeli Ministry of Health, and the Central Bureau of Statistics (CBS), as well as on reports issued by the State Comptroller and publications by stakeholders such as the Ministry of Finance, the healthcare insurance funds, the Israeli Medical Association, and other healthcare organizations involved in the formulation and regulation of healthcare policy in Israel.

It is impossible in the space alloted to cover the entire spectrum of existing data or analyze each policy step in detail. This paper will review from a bird's eye perspective some key indicators of expenditure on healthcare, infrastructure, personnel, and the health of the population, including lifestyle and risk factors such as smoking and obesity. We will also describe notable events and policy measures in the healthcare system that, if implemented, could change it in the long term. These include the reform in the work hours of medical residents, initiatives to restrain private healthcare, and more.

Healthcare expenditure

The COVID-19 pandemic has led to a sharp rise in healthcare expenditure indicators in Israel. In 2020, the year in which the COVID-19 pandemic broke out in Israel, healthcare expenditure constituted 8.3% of GDP, compared to 7.5% in 2019 — a sharp increase of about 10.6%. Nevertheless, compared to other countries, Israel remained in the bottom third of the OECD countries in this regard (Figure 1), as other countries also increased healthcare spending due to the COVID-19 pandemic. In 2020, the OECD average was 9.9%, an increase of about 10.2% relative to 8.8% in 2019, and so the gap between the average OECD country spending and Israel remained (OECD, 2022).

Figure 1. National healthcare expenditure as a percent of GDP in the OECD countries, 2020



Source: Baruch Levi and Nadav Davidovitch, Taub Center | Data: OECD

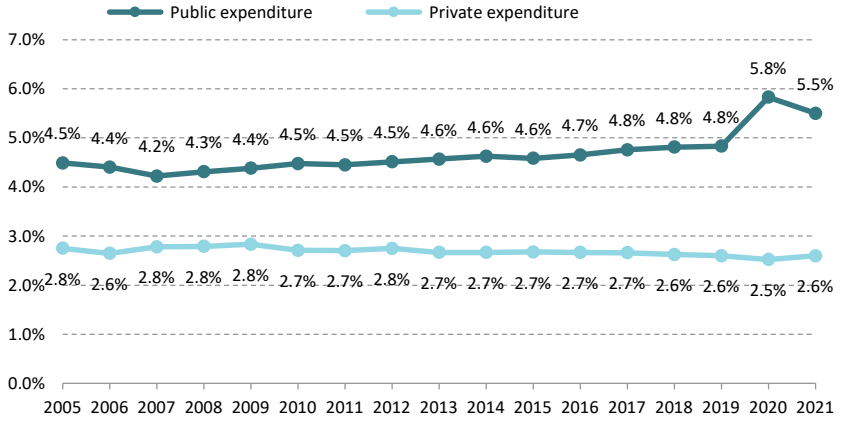
It should be noted that the increase in the rate of healthcare spending may have been due to two factors, which apparently occurred, to one degree or another, in most OECD countries during the time of the pandemic. There was an increase in the absolute spending on an array of healthcare services, from medical tests and medical equipment to the allocation of human resources, due the urgent need to deal with the pandemic. At the same time, there was restraint and even a contraction of GDP due to the considerable reduction in economic activity brought about by the pandemic due to lockdowns and restrictions imposed on economic activities in many countries, including Israel.

In 2021, the share of national expenditure on healthcare decreased compared to the previous year and stood at 8.1% of GDP. A slight decrease also occurred in the average of the OECD countries (9.7%), and the gap between OECD spending and Israeli expenditure remained.[1] In financial terms, the spending in 2021 was about NIS 126.9 billion, an increase of 8.6% in constant prices compared to 2020. Expenditure per capita, in constant prices, increased by 6.9% (CBS, 2022).

1 The comparison to 2021 should be treated with caution as only a minority of the OECD countries have published their data for this year. Therefore, most of the data in this review will refer to 2020, for which full reports were generally available from most countries.

Broken down by funding source (Figure 2), in 2021 the rate of private funding (without contributions from abroad) rose to 2.6% of GDP, compared to 2.5% in 2020. Up until 2019, the rate of public financing (the state budget and health tax), was stable and usually ranged between 4.5% and 4.8% of GDP. Following the COVID-19 pandemic outbreak, this rate rose to 5.8% in 2020. In 2021, it dropped to 5.5%. Therefore, in 2021 the share of private financing was about one-third of the national expenditure on healthcare, including contributions from abroad (1% of the spending on healthcare), compared to two-thirds public financing. For comparison, in 2020, the public healthcare spending accounted for 70% of the national expenditure. It seems that the decrease partially reflects the gradual return to normalcy following the lockdowns and the restrictions that mainly characterized 2020, and which led, among other things, to a decrease in the consumption of private healthcare services. Even though in that year there was a decrease in public medical activity, both in the community and in hospitals, at the same time resources were allocated to handle the pandemic, including additions of human resources, respiratory equipment, shielding equipment, test kits, laboratory activity, and more (CBS, 2021; 2022).

Figure 2. Public and private expenditure in Israel as a percent of GDP

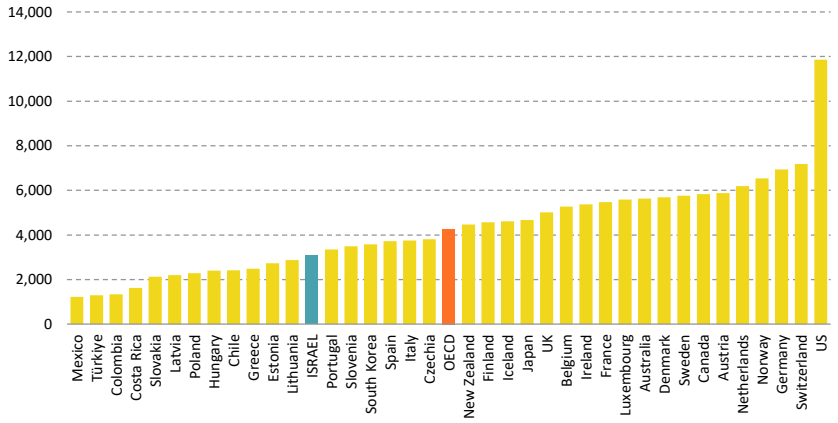


Source: Baruch Levi and Nadav Davidovitch, Taub Center | Data: CBS

In 2021, national expenditure on healthcare per capita in PPP terms (purchasing power parity) amounted to $3,441. This spending is relatively low compared to most of the OECD countries for which the data was published (Figure 3), but it should be noted that the international comparison does not take into account differences in some of factors that affect spending, such as the healthcare system structure, the employment structure, and the age distribution in the population. Adjusting for Israel's young age composition, which is required due to its young population, slightly narrows the gap between Israel and most of the OECD countries, but does not change its relative position in the lower third of the OECD countries (Achdut et al., 2016).

Figure 3. Per capita national expenditure on healthcare in the OECD countries, 2020

Dollars, in PPP terms



Source: Baruch Levi and Nadav Davidovitch, Taub Center | Data: OECD

Public expenditure per capita on healthcare in Israel is also relatively low and stands at about 65% of the OECD average ($2,166 compared to $3,346 per capita in PPP terms). This figure is a result of the relatively low share of public spending in the total national expenditure on healthcare (OECD, 2022).[2]

2 There is a disparity between the expenditure data published by the CBS and the OECD data. This is due to a difference in the healthcare spending definitions between the two agencies.

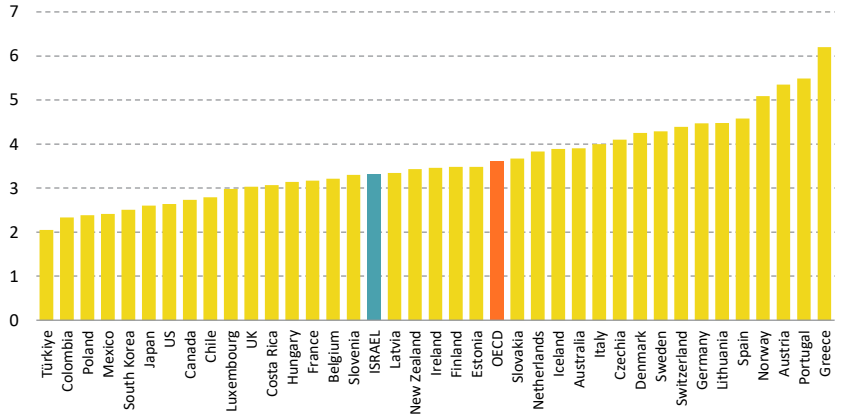
Even though public spending increased in 2020, due to the need to manage the COVID-19 pandemic, a similar increase occurred in other OECD countries, therefore Israel's relative position remained relatively low on this index as well.

Personnel and infrastructure of the healthcare system

Workforce

The share of active physicians in Israel in 2020 remained stable compared to the previous year and continued to stand at 3.3 doctors per 1,000 population, slightly lower than the OECD average of 3.6 doctors per 1,000 population (Figure 4) (OECD, 2022).

Figure 4. Number of active physicians per 1,000 population in the OECD countries, 2020

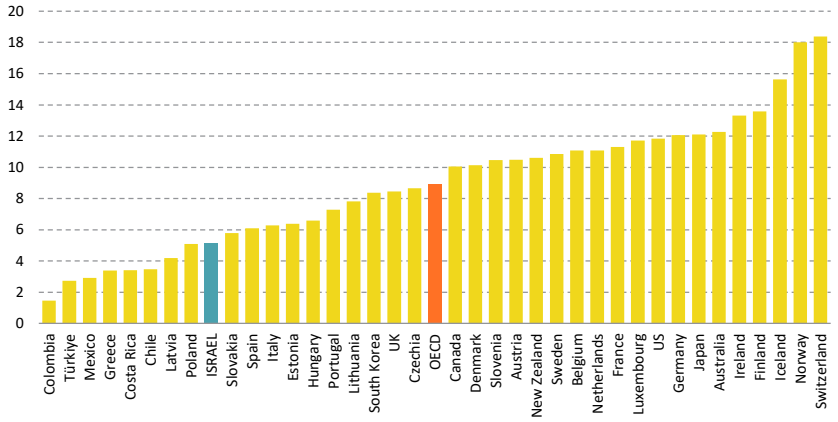


Source: Baruch Levi and Nadav Davidovitch, Taub Center | Data: OECD

The share of active nurses in Israel also remained stable, and in 2020 was 5.1 nurses per 1,000 population. This is a considerably lower than in the OECD countries, where the average is 8.9 nurses per 1,000 population (Figure 5) (OECD, 2022).

It is important to note that for both physicians and nurses, the share of older professionals in Israel is relatively high: 49% of active physicians are aged 55 or older — the second highest rate in the OECD (after Italy). The share of nurses in Israel over age 55 increased from 23% in 2000 to 39% in 2020 (Ministry of Health, 2021a; OECD, 2021). In the coming years, the healthcare system will face a challenge in finding qualified healthcare professionals. The Ministry of Health has invested a great deal in monitoring and analyzing trends as well as promoting the goal of training additional workforce, by increasing the number of medical and nursing students. And yet, most (about 60%) of the physicians applying for licenses each year took their medical training abroad. This is an improvement relative to the rate a decade ago of about 70%. This phenomenon is especially noticeable in the geographic periphery Israel. In the upcoming academic year, new job postings for medical students will open up in the North and the South as part of the Ilanot program, which aims to train physicians living in the periphery so that they will remain and practice in these areas. The program includes scholarships, a leadership program, and joint work with healthcare organizations and civil society in the periphery.

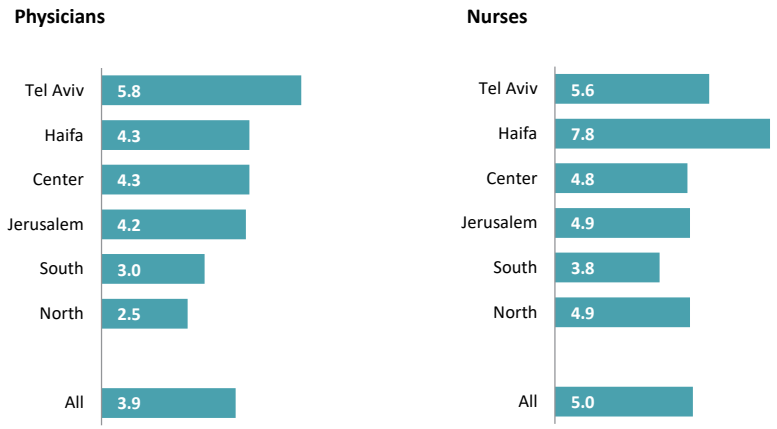
Figure 5. The number of active nurses per 1,000 population in the OECD countries, 2020



Source: Baruch Levi and Nadav Davidovitch, Taub Center | Data: OECD

Apart from the national rate of physicians and nurses, their geographical dispersal is also important, in order to address gaps in accessibility and availability of healthcare services. Figure 6 clearly shows that the share of physicians and nurses in the center of Israel and in large cities is generally higher than their rate in the geographic periphery. For example, the share of physicians in the Tel Aviv district (which is the highest rate) is 2.3 times higher than their rate in the Northern district (which is the lowest), and the share of nurses in the Haifa district (the highest) is 2.05 times higher than their rate in the Southern district (the lowest) (Ministry of Health, 2021a).

Figure 6. Share of physicians and nurses per 1,000 population, by district, average for 2018–2020



Source: Baruch Levi and Nadav Davidovitch, Taub Center | Data: Based on Ministry of Health, 2021a

It is important to note that the data on the geographic distribution of the physicians and nurses are based on findings of the CBS *Labor Force Survey* published in the Ministry of Health *Healthcare Professions Workforce* (2021a). Due to differences in definitions and methods of data collection, the number of active physicians according to the CBS (3.9 per 1,000 population) differs from the number reported to the OECD (3.3 per 1,000 population), which is based on cross-referencing data between the Israel Tax Authority and the Ministry of Health's physician license database. These differences may

sometimes be quite significant.[3] For example, based on CBS data, between 2018 and 2020, the annual average number of active physicians was 35,500. At the same time, the figure indicated on Israel's reports to the OECD was about 29,600 (1.2 times more in the CBS data). In contrast to the reporting on physicians, Israel's reports to the OECD on nurses are based on data from the CBS. Therefore, there is no contradiction between the figures of nurses in the different sources.[4]

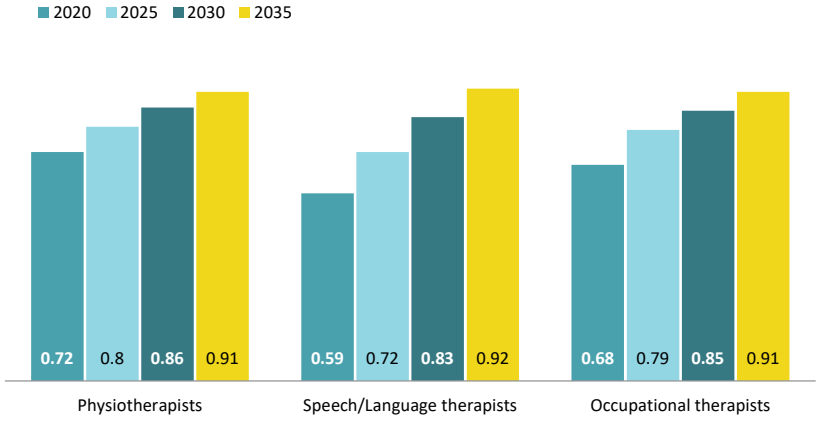
Like the geographic gap seen for physicians and nurses, there are also gaps in terms of other professional healthcare personnel, such as dentists, pharmacists, speech/language therapists, opticians, occupational therapists, and physiotherapists. For the most part, their rate in the Northern and Southern districts of Israel is the lowest relative to the other districts in Israel.

Indeed, workforce issues in Israel are not just in the medical and nursing areas. An inter-ministerial team that examined the situation of three healthcare professions — physiotherapy, speech/language therapy, and occupational therapy — found that, in the coming years, the gap between the demand for these services and the availability of trained healthcare professionals is expected to continue (Disparities in workforce in the healthcare professions, 2021). According to their findings, though, the number of professionals in relation to the population size is expected to increase (Figure 7). However, it should be taken into account that the relative share of population groups presenting the main demand for treatments by health professionals — older adults and children with disabilities — is also expected to increase. The increase in the proportion of healthcare professionals relative to the adult population (ages 65+) is expected to be rather moderate (Figure 8), and with regard to children with disabilities, this ratio is even expected to decrease (Figure 9), even though this is a population group in which the need for immediate, available care is critical in its impact on the child's continued development.

3 For more on the differences between the methods of measuring the number of physicians in Israel, see Levi and Borow, 2018.

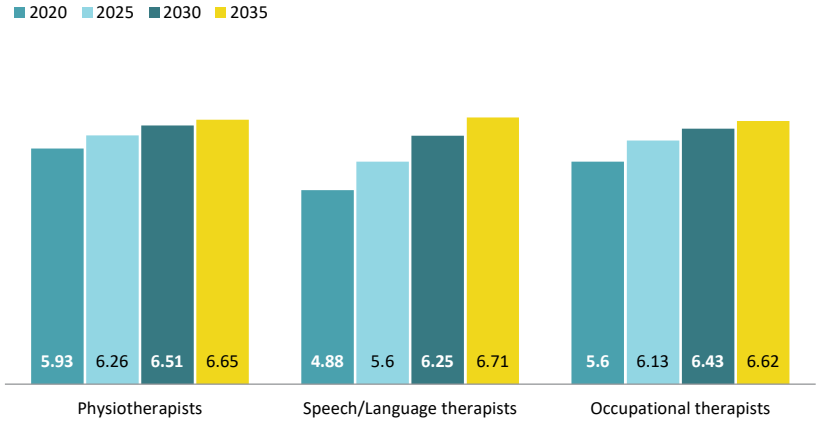
4 For further reading on definitions, sources, and methods of data collection of healthcare professionals by the OECD, see OECD Health Statistics 2022: Definitions, Sources and Methods — Healthcare Resources.

Figure 7. Number of professionals per 1,000 population: physiotherapists, speech/language therapists, and occupational therapists



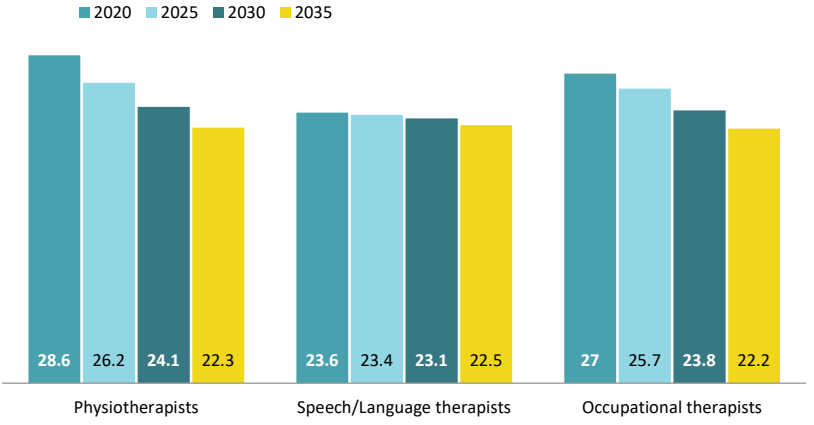
Source: Baruch Levi and Nadav Davidovitch, Taub Center | Data: Prime Minister's Office, 2022

Figure 8. Number of professionals per 1,000 population aged 65 and over: physiotherapists, speech/language therapists, and occupational therapists



Source: Baruch Levi and Nadav Davidovitch, Taub Center | Data: Prime Minister's Office, 2022

Figure 9. Number of professionals per 1,000 children under age 18 served by the child development system: physiotherapists, speech/language therapists, and occupational therapists



Source: Baruch Levi and Nadav Davidovitch, Taub Center | Data: Prime Minister's Office, 2022

According to Ministry of Health forecasts, in order to meet the clinical needs of the Israeli population, there is a need for an increase of 13%–23% every five years (2020–2035) in each of the above three professions (in terms of full-time positions). In light of these findings, the Ministry of Health has recommended government intervention to increase the healthcare labor force in these areas. Following this recommendation by the Ministry of Health, the 36th government of Israel took a series of steps, including the establishment of a special team for follow-up and implementation on the basis of the report's findings, the formulation of an incentive plan to encourage the employment of professionals in the public service, mapping of the clinical fields where healthcare professionals are currently active, and more (Prime Minister's Office, 2022).

As reported by the World Health Organization, Israel is not unique in its workforce challenges, disparities in accessibility to healthcare professionals, and the length of its waiting times for care. The report maps workforce in the healthcare systems in the European region. In view of the problems common to so many countries in this area, the World Health Organization recommended

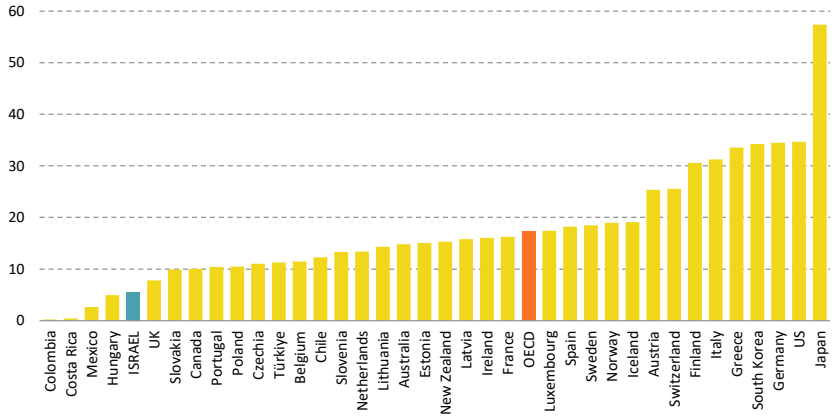
that countries take ten steps towards improving the workforce in their healthcare systems (WHO, 2022a):

1. Offer suitable workforce training appropriate to population needs and the healthcare system requirements;
2. Strengthen the continuous professional development of healthcare professionals to equip them with up-to-date knowledge and skills;
3. Expand the use of digital tools;
4. Develop strategies to attract and keep workforce in the periphery of the country;
5. Create working conditions that promote a good work-life balance;
6. Protect the health and mental well-being of healthcare system personnel;
7. Build up leadership capabilities for planning and regulation of workforce;
8. Strengthen the information systems infrastructure and improve the collection and analysis of information;
9. Increase public investment in training, development, and the protection of employees;
10. Optimize the use of resources in the healthcare system by developing innovative policy measures focusing on workforce.

Infrastructure

The number of MRI machines in Israel in 2020 was also very low relative to other countries: 5.5 machines per million population compared to 17.3 devices on average per million population in the OECD countries (Figure 10). This number is lower in only four other countries (Hungary, Mexico, Costa Rica, and Colombia). A comparable situation is observed regarding the number of CT machines. The figure in Israel is 9.9 machines per million population, whereas the average figure in the OECD countries is 27.4 machines per million population (OECD, 2022).

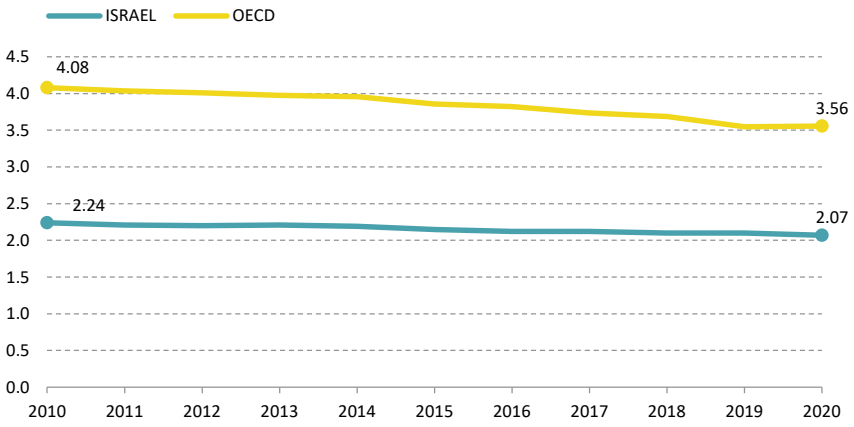
Figure 10. Number of MRI machines per million population in the OECD countries, 2020



Source: Baruch Levi and Nadav Davidovitch, Taub Center | Data: OECD

In 2021, the number of beds for acute care hospital admissions in Israel (including psychiatric beds) was 2.07 beds per 1,000 population (Figure 11). A downward trend in the number of hospital beds per population continues. Although the absolute number of beds is generally on the rise, it is not sufficient to match the rate of population growth. This trend reflects the growing tendency implemented both in Israel and globally, to transfer the key part of medical treatments from hospital inpatient care to community-based care. Between 2010 and 2020, a similar trend was seen in the OECD countries as well. Thus, the trend of reducing hospitalization in Israel is in line with international trends. Nevertheless, the share of beds for acute hospital admissions in Israel is considerably lower than the average in the OECD countries. In 2020, the average number of general acute care hospital beds in the OECD countries was 1.72 times greater than in Israel (OECD, 2022).

Figure 11. Number of acute care hospital beds per 1,000 population in the OECD countries



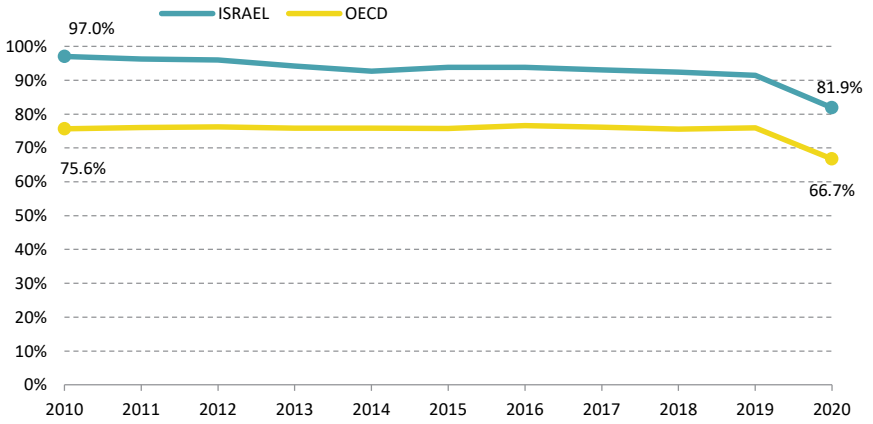
Source: Baruch Levi and Nadav Davidovitch, Taub Center | Data: OECD

Since the outbreak of the COVID-19 pandemic, dedicated wards have been added to manage the disease, and the number of hospital beds has been changing in response to needs and morbidity rates. These beds were not added onto the hospital's license, though, and their number is not reflected in official reports of the health authorities (Ministry of Health, 2022a).

Throughout the last decade, there has also been a decrease in the rate of long-term hospitalization beds in Israel: 2.9 beds per 1,000 population aged 65 and over in 2021, compared to 3.97 beds in 2010. The number of hospital beds for rehabilitation remained stable: in 2021, the number was 0.1 beds per 1,000 population (previous rates were 0.09 in 1995 and 0.1 in 2011) (Ministry of Health, 2022a).

In 2020, the occupancy rate in general hospital beds in Israel dropped to approximately 82%, compared to more than 90% throughout the previous decade (Figure 12). It seems that this could be attributed to the reduction in the hospital's activity during the pandemic, especially during its first months. A sharp decrease was also recorded in most OECD countries, and thus Israel remained at the top of the OECD ranking of occupancy rates second only to Canada (OECD, 2022).

Figure 12. Occupancy rates for general hospital admissions, Israel and the OECD average



Source: Baruch Levi and Nadav Davidovitch, Taub Center | Data: OECD

In 2020, the average length of stay of general hospitalization patients in Israel was 4.6 days, as it was in the previous year. There has been a moderate and gradual decrease in this figure throughout the last decade (4.8 days in 2010). Only in Türkiye is the length of stay in general hospital admissions lower than in Israel (4.5 days on average), whereas the average length in the OECD countries is about 6.6 days (OECD, 2022).

Waiting times for consultations and treatment in the community and in hospitals

The Ministry of Health publishes waiting times for medical consultations in the community in selected specialties. The latest publication refers to the fourth quarter of 2021 and is comparable to data from 2019–2020 (Figure 13).[5]

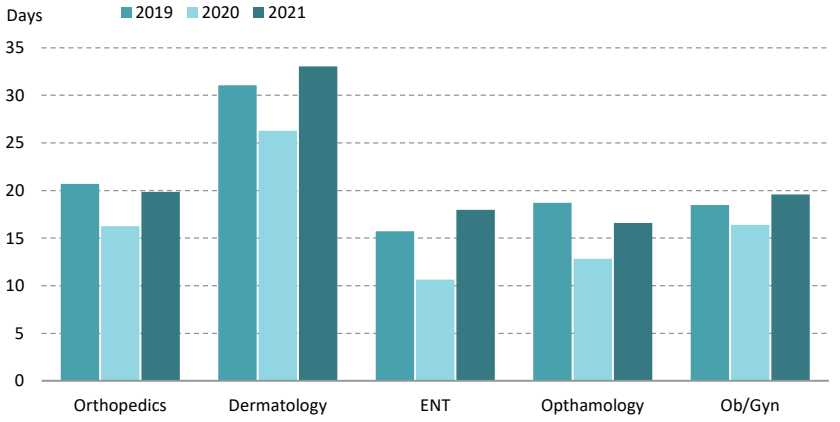
The data show that there are significant differences in waiting times for appointments depending on the medical specialty. The waiting times for dermatology consults are extremely high (over 30 days). The waiting times for other medical professionals range from 15 to 20 days on average.

5 See the Ministry of Health website, Waiting times for consulting medicine in the community.

Comparing 2021 and 2019, there has been a slight increase in waiting times for some specialties, while a decrease has been observed for others (to avoid any seasonal effect, the comparison refers to the fourth quarter of each year). In 2020, there was a decrease in waiting times for all specialties. This may be related to the decrease in demand for non-urgent healthcare services during the COVID-19 pandemic.

Figure 13. Average waiting times for medical consultations

Fourth quarter of every year



Source: Baruch Levi and Nadav Davidovitch, Taub Center | Data: Ministry of Health

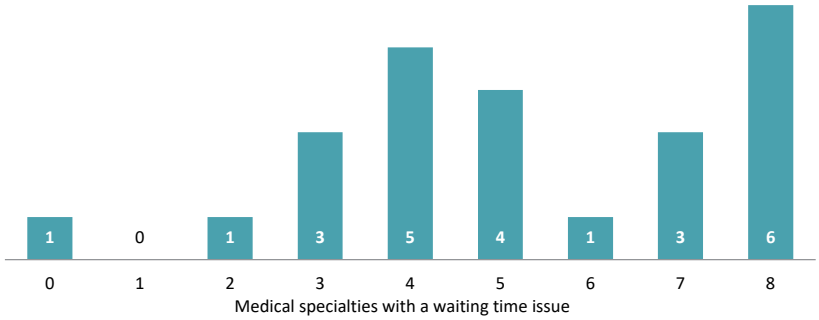
It should be noted that gaps can also be observed on a geographic basis. For example, in the fourth quarter of 2021, the waiting time for an orthopedic consultation in the community in the city of Be'er Sheva reached 55 days, compared to 15.9 days in Tel Aviv. It is interesting that sometimes the waiting times in the periphery are shorter than those in the center of Israel. For example, in the fourth quarter of 2021, the average waiting time for a dermatology appointment in Holon was 55.2 days, compared to 28.8 days in Akko. However, in general, it seems that the issue of long waiting times is evident mainly in the Negev region, and in some cases waiting times in the Southern Negev and the Jordan Rift Valley are not published at all due to the small number of physicians.[6]

6 See the Ministry of Health website, Waiting times for consulting medicine in the community.

The issue of waiting times for medical consultations was part of a survey conducted on the subject (Laron et al., 2022): one in three (32%) of those who visit a specialist through their health fund reported that they waited over a month for an appointment. Particularly high waits for specialist appointments were noted in gastroenterology (51%), surgery (43%), and dermatology and venerology (42%). According to the survey, long waiting times for medical treatment are the main reason people forgo treatment: 35% of the survey respondents went without medical treatment due to the waiting times — an increase of 6 percentage points compared to the previous survey conducted in 2018 (29%).

With regard to waiting times in hospitals, although the OECD collects and publishes member country data on waiting times annually, the Ministry of Health in Israel does not publish these data on a regular basis. A research report published by the OECD (2020) relies mainly on a survey and the subjective assessment of senior officials in the healthcare system regarding the situation in their corresponding countries. In this survey, the executives were asked whether they consider the waiting times in the following eight different healthcare areas to be an issue that requires attention: elective surgeries, appointments for specialists, appointments for diagnosis, emergency rooms, primary medicine, cancer treatments, mental health, and cardiology treatments. In Israel, seven out of these eight areas (with the exception of cancer treatments) were considered to be in need of attention, i.e., there are waiting times issues in these areas. Only in six of the twenty-four comparison countries were all eight of the survey areas reported as having an issue with waiting times (Figure 14). Thus, according to the subjective assessment of senior officials in the Ministry of Health, in the absence of quantifiable data, waiting times for healthcare services in Israel are among the worst in the participating countries.

Figure 14. Distribution of countries by the number of medical specialties with a waiting time issue, 2020



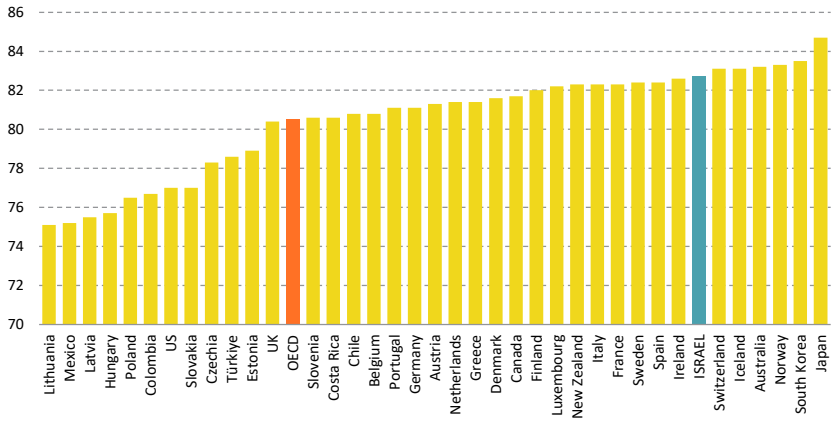
Source: Baruch Levi and Nadav Davidovitch, Taub Center | Data: OECD, 2020

The government's plan to shorten waiting times in the public health system was meant to improve the situation with the help of a budget of about NIS 900 million. However, in the absence of consistent and transparent measurement, it is difficult to know if the plan achieved its goal. Steps that may shorten the waiting times for elective surgeries include not only the addition of resources, but also setting targets for maximum waiting times and ensuring them, expanding the hospital choice available to patients, encouraging competition between hospitals, and changing to an activity-based payment method so that hospitals are paid per surgery rather than per hospitalization days and in this way incentivizing increased outputs (Bowers & Chernichovsky, 2016).

Health status

The population of Israel is characterized by high life expectancy. As shown in Figure 15, in 2021, life expectancy at birth was 82.6 years (seventh place in the OECD ranking). As in all developed countries, women's life expectancy is higher than that of men (84.8 years compared to 80.6 years). Compared to members of the same gender in other countries, both Israeli women and men are at the top of the OECD's life expectancy ranking (OECD, 2022).

Figure 15. Life expectancy in the OECD countries, 2020



Source: Baruch Levi and Nadav Davidovitch, Taub Center | Data: OECD

As in many countries, life expectancy in Israel also declined in the course of the COVID-19 pandemic, although to a relatively moderate extent. Compared to 2019, in 2020, life expectancy in Israel decreased by 0.2 years (82.7 years in 2020 compared to 82.9 in 2019). At the same time, there was a decrease of 0.5 years on average in the OECD countries (80.5 years in 2020 compared to 81 years in 2019). The decline in life expectancy in Israel was almost halted in 2021 (82.6 years) compared to the year before it, despite a 73% increase in deaths from COVID-19. A possible explanation is that the increase in mortality from COVID-19 offset the continued decrease in mortality from other major causes of death (such as cancer and heart disease) that accompanied improvements in public healthcare and medical services over the last thirty years (Weinreb, 2022).

Mortality rates among population groups in Israel are not equal. A breakdown by sector and gender reveals that the life expectancy of Arab men in 2019 was the lowest (78.1 years) and the life expectancy of Jewish women was the highest (85.1 years). In between those two groups are Jewish men and Arab women, both having the same life expectancy (81.9 years). Compared to 2018, in 2019, the life expectancy of Arab men increased slightly while that of Arab women decreased. There was no change in the life expectancy of the Jewish population during this time period (Ministry of Health, 2021b).

Differences in life expectancy are also seen on the basis of place of residence. In the larger cities in Israel (with over 100,000 inhabitants), the highest life expectancy in 2017–2019 was found in Kfar Saba (84.8 years), and the lowest was in Be'er Sheva and Bat Yam (81.2 years in both). These data show that the term *periphery* not only is a reference to the geographic periphery but also to the social periphery, that is, the socioeconomic gaps that exist within areas. A comparison between the average life expectancy in 2017–2019 to the average in 2010–2012 shows that there has been an increase in life expectancy in all the localities surveyed, although at varying rates. The highest increase (1.6 years) was in Rehovot and Rishon LeZion, while in Be'er Sheva, which is characterized by the lowest life expectancy among the large cities, the lowest increase was recorded (0.5 years) (Ministry of Health, 2021b).

Mortality rates also reflect socioeconomic gaps between localities. Localities with high mortality rates are usually ones of a lower socioeconomic status, and primarily Arab. Localities with a moderate to high socioeconomic level enjoy lower mortality rates. These include some Arab localities, mainly those with a large Christian population. The mortality rates in the city of Modi'in Illit are unusual: they are relatively low despite the low socioeconomic status of its residents (Ministry of Health, 2021b). This supports the finding that health is not only affected by economic aspects, such as income and expenditure levels, but also by social aspects, such as belonging to a community as well as social and family safety nets, which characterize the Haredi (ultra-Orthodox Jewish) and religious sector.

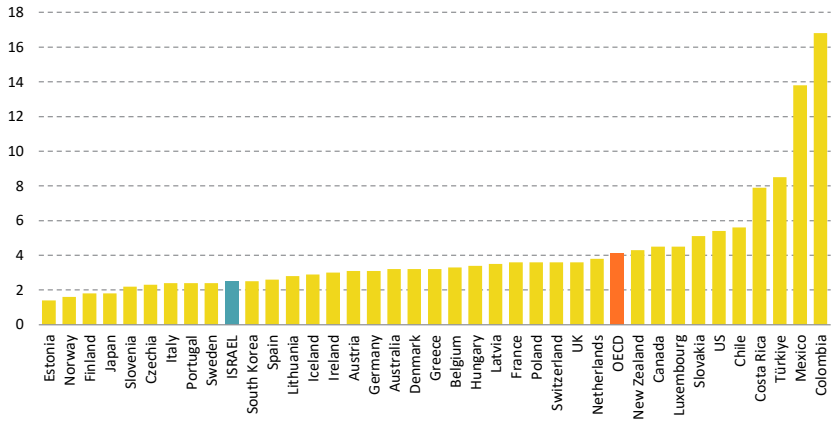
Another index in which Israel excels is *Healthy Life Expectancy* (HALE), in which Israel ranks sixth in the world. In 2019 (the most recent year for which data were published), the healthy life expectancy in Israel reached 72.4 years, an increase of about 4.6% from 2000 (69.2 years).[7] This is a smaller increase than the increase in life expectancy in Israel (5.2%) over the same period. This means that the share of the healthy life expectancy out of the general life expectancy decreased by about half a percent between 2000 and 2019, from 87.8% to 87.3%.

Israel is also characterized by low rates of infant mortality, which have been steadily declining over the years (the infant mortality rate is lower in only nine of the other OECD countries) (Figure 16). In 2020, infant mortality in Israel stood at 2.5 deaths per 1,000 live births, compared to an average of 4.1 in the

7 See WHO, The Global Health Observatory.

other OECD countries (OECD, 2022). These data are particularly impressive considering the high fertility rates in Israel, the low rates of prenatal testing among Haredi women, and the high rates of consanguineal marriages in Arab society in Israel.

Figure 16. Infant mortality per 1,000 live births in the OECD countries, 2020



Source: Baruch Levi and Nadav Davidovitch, Taub Center | Data: OECD

Here, too, there are considerable gaps among population groups. Among Jews and others, infant mortality rates are 2.3 deaths per 1,000 live births, while the rate is 5.4 deaths per 1,000 live births in the Arab population. Disparities were also found on the basis of geographic districts. These are particularly notable when comparing Tel Aviv and other Central districts (1.9 and 2 deaths per 1,000 live births, respectively) and the Southern district (5 deaths per 1,000 live births including the South's Bedouin population, where the figure reaches about 9 deaths per 1,000 live births). In all districts, the general trend over the last decade is a decrease in infant mortality, although fluctuations (both increases and decreases) in infant mortality have been observed in some of the years in certain districts (Ministry of Health, 2021b).

In a breakdown by sector within districts, the differences between Jews and others and Arabs are also clear. For example, although the infant mortality rate among Jews in the Southern district (3 deaths per 1,000 live births) is 1.8 times higher than the death rate among Jews in the Central district

(1.7 deaths per 1,000 live births), the death rate among Arabs in the Southern district (9.2 deaths per 1,000 live births) is 3.1 greater than the corresponding rate among Jews in the same district. A similar picture is obtained in the other districts (Ministry of Health, 2021b).

Lifestyle and risk behavior

As of 2020, the smoking rate in the adult population (ages 21 and over) in Israel is 20.1%. The share of male smokers is higher than the share of women smokers (25.6% versus 14.8%). Smoking is more prevalent among Arabs than among Jews (24.4% compared to 19.1%, respectively). The smoking rate in Israel, among both men and women, is slightly higher than the OECD average, although international comparisons of smoking habits should be treated with caution due to methodological differences among countries in definitions and data collection. Comparing data collected in Israel over the years is not a simple task due to changes in research methods over the years. In any case, according to Ministry of Health data, in the last five years the smoking rate among adults in Israel has remained constant at around 20%–21%, following a decline in smoking rates beginning in the early 1970s and a moderation in the rate since 2010. A survey conducted by the Ministry of Health shows that the COVID-19 pandemic has had a negative effect on the smoking habits of Israelis: 26.8% of the interviewees in the survey who were smokers reported that since the beginning of the pandemic they smoke even more and they reported an average increase of thirteen cigarettes per day.[8]

Between 1998 and 2019 there is a noticeable downward trend in the share of teenagers reporting that they have tried smoking cigarettes or hookah. According to a Ministry of Health report on smoking in Israel in 2020, 15% of teenagers reported that they had tried smoking cigarettes, and 25% reported that they had tried smoking a hookah. However, an international study on risk-taking behavior among teenagers (WHO-HBSC) ranks Israel sixth highest with regards to the rate of cigarette smoking among students, with 6% of students reporting smoking cigarettes at least once a week. What is more, including electronic cigarettes increases the smoking rate among teenagers. About a quarter of teenagers reported using electronic cigarettes, which they regarded as less harmful than *regular* cigarettes. According to these data,

8 See the Ministry of Health website, *The Report of the Minister of Health on Smoking in Israel* for the years 2018, 2019, and 2020 (in Hebrew).

it seems that there has been a change in the mix of smoking products, and electronic cigarettes and pre-packed tobacco cigarettes (*rolled* cigarettes) form a prominent part in the teenage experience of smoking.

In 2018, the smoking rate among Israeli army recruits was 28% for men and 18% for women. Like the 2017 data, the average smoker smoked ten cigarettes per day for men and nine cigarettes per day for women.

Unlike cigarette consumption, alcohol consumption in Israel is one of the lowest in the OECD countries (it is only lower in Türkiye). In 2019, the average alcohol consumption among those aged fifteen and over was 3.1 liters per capita per year compared to 8.4 liters on average in the OECD countries (2.7 times higher). However, it should be noted that in recent decades alcohol consumption in Israel is on a gradual upward trend (an increase of approximately 72% in per capita consumption since 1990) (OECD, 2022).

The rate of overweight adults in the population in Israel is just under 65%, a figure that ranks Israel third in Europe. More men are overweight than women. Israel also stands out for the share of people who are considered obese, which is about 25% of the adult population (sixth place in Europe).[9] Unfortunately, the situation among children and teenagers is not much better. For these age groups as well, Israel is found at the top of the list of countries whose residents suffer from overweight and obesity: about 40% and about 15% respectively among 5–9-year-olds; about 30% and about 10% respectively among 10–19-year-olds (WHO, 2022b).

A report published by the World Health Organization states that overweight and obesity are among the main causes of chronic illness and disability. Overweight and obesity were also found to be associated with excess morbidity and mortality from COVID-19. The World Health Organization also emphasizes that these have increased to epidemic proportions around the world due to unhealthy diets and a lack of sufficient physical activity. The result is also an increase in healthcare expenses. In view of these findings, the organization recommends taking a series of steps to change food consumption habits such as labeling products, emphasizing their nutritional values and influencing their prices (for example, discounting healthy foods and making unhealthy foods more expensive).

9 These rates have been calculated following standardization by age, which takes into account the different age structure of the population in each country.

The World Health Organization further recommends increasing public awareness of the importance of a healthy diet and promoting urban planning that encourages physical activity (WHO, 2022b).

Overweight and obesity are also associated with the prevalence of diabetes. According to the World Health Organization, as of 2019, the prevalence of diabetes in Israel is approximately 6.2%, compared to 5.5% on average in the European Union countries. Since the year 2000, the prevalence of diabetes in Israel has increased by about 94% (at that time the rate of diabetes patients was 3.2% of the population). The prevalence of diabetes among adults in the age range of 20–79 reaches about 8.5%. It should be taken into account that these data are not standardized by age. That is, even though the population of Israel is younger, the prevalence of diabetes (type 2) in Israel which increases with age is higher than in European countries. According to data from the World Health Organization, which standardizes death rates from diabetes per 100,000 population, the death rate from diabetes in Israel in 2018 was 4.3 deaths per 100,000, compared to 2.5 on average in the European Union (1.7 times higher). Although the prevalence of diabetes in the population is on the rise, the rate of mortality from diabetes since the late 1990s has been trending downward, both in Israel and in the EU countries.[10]

Another risk to public health which does not receive proper attention is the increased exposure to air pollution. The population of Israel is exposed both to high concentrations of nitrogen oxides, originating from vehicle emissions, industry, and electricity production, and to respirable particles, found at levels of up to 94% above the target value set by the World Health Organization.[11] The majority of exposure to pollution is in densely populated urban areas (Levy et al., 2019). Air pollution can cause a host of diseases, such as lung and heart diseases and cancer. According to the data by the Ministry of Environmental Protection, in recent years there has been some decline in the concentration of respirable particles in most regions in Israel (and even more so in 2020, probably due to the decrease in economic activity during the COVID-19 lockdown periods). Nevertheless, abnormal concentrations were still recorded in various locations, particularly in the Tel Aviv-Yafo area. High concentrations of respirable dust particles were measured in the Sharon region, Gush Dan,

10 See the World Health Organization website, European Region, European Health for All database.

11 Tiny particles that are carried in the air, some of which are of natural origin (such as desert dust) and some are man-made (pollution from transportation, industry, etc.).

and the coastal plain to its east, in Haifa, and in the northern valleys. In these areas there is a relatively high density of emissions from vehicles and from industry and power plants (Ministry of Environmental Protection, 2022).

Another indicator in which Israel does not stand out favorably is *self-assessment of health*. According to OECD data, only 74% of Israelis report good or particularly good health. Israel ranks fifteenth among OECD countries. In addition, in only nine countries did respondents report poor health at higher rates than in Israel (11% of respondents), even though Israel's population is younger relative to the OECD countries (data were not standardized by age) (OECD, 2021). It can be claimed that this statistic serves as a *warning sign* for Israel, as health measurement mostly focuses on mortality and survival indicators, in which Israel excels. However, health is a complex concept with many layers which are difficult to quantify. Various aspects of health relate to quality of life and to personal and social well-being, and subjective feelings may indicate an illness that is not being properly treated or a general feeling of dissatisfaction with a physical or mental state of health.

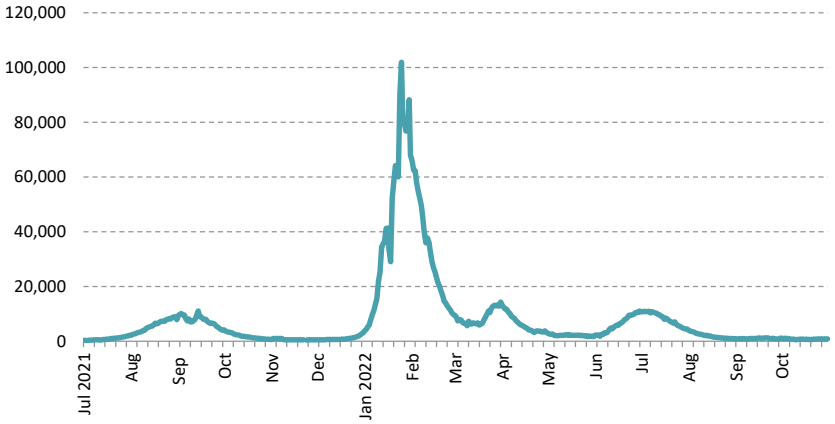
COVID-19 pandemic

The winter of 2021–2022 brought about the greatest morbidity wave that Israel has known since the outbreak of the pandemic. In January 2022, this wave reached a peak of approximately 100,000 new confirmed cases per day, which is higher than any other time period (Figure 17).[12] In January, the number of daily deaths from COVID-19 also reached a peak of more than 70 deaths per day, which was more than double the daily mortality peak, recorded in January 2021 (see Figure 18). In February 2022, the morbidity wave began to fade, but the smaller waves of pandemic re-emerged throughout 2022 signaling that the pandemic has not completely disappeared from our world, and that the danger of a renewed outbreak still exists.[13]

12 Additionally, on January 5, 2022, the Ministry of Health began acknowledging individuals who have been tested and found positive for COVID-19 using a supervised (institutional) antigen test as *confirmed*, without the need for a PCR test. This has contributed to the increase in the number of confirmed cases. See the Ministry of Health website, Coronavirus in Israel — General Snapshot.

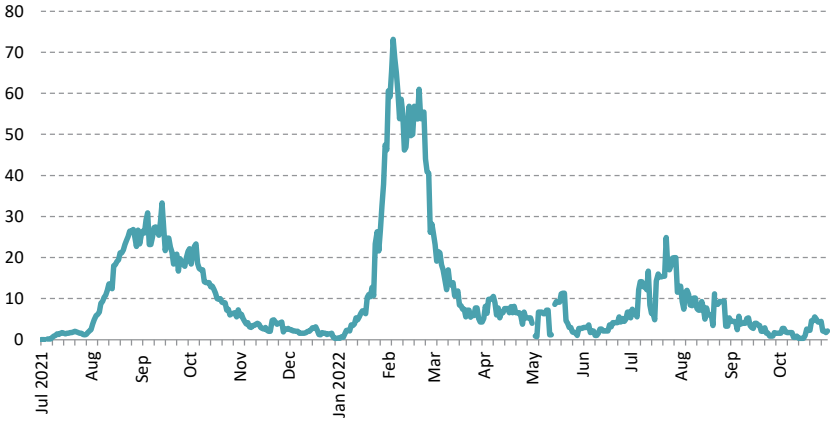
13 See Our World in Data – COVID-19.

Figure 17. COVID-19 morbidity incidence in Israel: daily number of new confirmed cases, 7-day moving average, July 2021 to October 2022



Note: Due to the limited number of tests that can be performed in the population, the number of confirmed cases is lower than the actual number.
Source: Baruch Levi and Nadav Davidovitch, Taub Center | Data: Our World in Data — COVID-19

Figure 18. COVID-19 related mortality in Israel: daily number of deaths, 7-day moving average, July 2021 to October 2022



Note: Due to the challenges surrounding cause of death, it is possible that the number of deaths does not properly reflect the number of COVID-19-related deaths.
Source: Baruch Levi and Nadav Davidovitch, Taub Center | Data: Our World in Data — COVID-19

The decline of the pandemic also marks a trend change in COVID-19 vaccination rates. Within a period of one year, from the beginning of the vaccination campaign in December 2020 until January 2022, approximately 72% of Israel's population was vaccinated. Since then, vaccinations in the population have stopped almost completely, and between February and September 2022, only about 0.3% of the Israeli population was vaccinated.[14] Among children, vaccination rates are particularly low, both in absolute terms and relative to other countries. As the winter approaches (2022–2023), vaccinations for the Omicron variant will also be available to the public (a bivalent vaccine which also includes the original virus).

In September 2022, army exercises were held under the leadership of Alon Headquarters of the Home Front Command in cooperation with the Ministry of Health with invitations to all the government ministries and other organizations involved in emergency services with the aim of discussing possible scenarios for the upcoming winter. The solution offered by the *health in every policy* approach, which also deals with social, economic, and other perspectives, has put infrastructure in place to deal with an event in which a new and more virulent strain of the coronavirus erupts, combined with the winter influenza morbidity, as well as other respiratory diseases and places a substantial and heavy burden on the healthcare system and other systems such as schools and work places.

With the decline of the pandemic, most of the restrictions imposed to prevent infection have been lifted throughout the year, such as the requirement from students to present a test with a negative COVID-19 test result upon entering educational institutions, the ban on social gatherings, and the masking requirement both outdoors and in closed spaces. Restrictions imposed on entering Israel were eased as well. In May 2022, the requirement to self isolate, which was one of the most prominent symbols of the COVID-19 era, was eliminated for those who were in close contact with a person confirmed for the virus, for those living with a confirmed person in the same household, and for those who accompany a person in isolation. Currently, the requirement to self-isolate applies only to those who have been confirmed for COVID-19 or who have received individual instructions by the health system to enter isolation (for example, individuals who work in an institution where there is a high-risk population who have been in close contact with a person

14 This refers to those who have been vaccinated with at least one dose of the vaccine.

confirmed with COVID-19).[15] In fact, the *normalization* of the coronavirus and transition to a *new normal* era means that we have many tools at our disposal to deal with the virus, but they must be used wisely and above all in a way that will strengthen the healthcare system in a sustainable way and provide a broad response not only to the coronavirus. On the other hand, the effects of the COVID-19 pandemic — lockdowns, school closures, long-term side effects (*long COVID*) and more — require a holistic solution and it may take many more years to recover from these effects.

Initiatives to plan medical workforce in the public healthcare system and to restrain private healthcare

Planning of medical workforce is by nature a subject that occupies many healthcare systems, around the world and in Israel. Its enormous importance to the functioning of healthcare systems keeps this subject at the top of the agenda, especially in the face of demographic pressures, economic hardships, and organizational and professional challenges. Therefore, policy makers are forced to find creative and innovative solutions to ongoing problems such as a lack of caregivers and the unequal geographic distribution of the workforce. When planning workforce, the interaction between the public healthcare system and the private healthcare system must also be taken into account. When attempting to direct personnel to the public system, the mutual effects of these systems must be considered, especially in view of the dominance of the private healthcare market in Israel. In recent years, workforce planning initiatives have also included initiatives to restrain private medicine.

The waning of the COVID-19 pandemic in 2022 has allowed the healthcare system to once again take up the tasks of policy planning and reorganization. Indeed, the year 2022 especially stands out for the burst of policy initiatives in the area of healthcare services. The most notable move is the attempt to

15 See the Ministry of Health website, Corona Information Center.

implement a plan for shortening continuous working hours in hospitals.[16] It is joined by other measures which have received less media attention which if implemented, have the potential to make real changes in the healthcare system in Israel, especially with regard to the work of doctors in the private sector. The main points of these initiatives are in the following discussion.

Shortening the hours of continuous work for medical residents in hospitals

Shortening the hours of continuous work for medical residents is an issue that has long been on the public agenda. Along with a desire to improve their quality of life, those in favor of shortening the rotation shifts express concerns about the issues that surround long work hours: quality of care and patient safety due to errors in judgment and a decrease in the ability to deliver high-quality care due to fatigue and poor concentration following long hours of work without proper rest. Opponents of shortening the length of shifts emphasize the fear that the quality of care and the patient safety might be harmed by the lack of continuity of care in *handoffs* (shift changes) between care providers. Added to this concern is that physicians will be less well trained with a reduction in hours spent in the hospital (Linder, 2020; Recommendations of the High Committee, 2021).

In 2011, as the collective agreement for physicians was about to be signed, a protest by medical residents ignited where they demanded a shortening of their rotation shifts. This demand was not met, and despite continual discussions within the healthcare system, no agreement was reached. The demand to shorten the number of continuous working hours resumed in full force with the outbreak of the COVID-19 pandemic. During the first wave of the epidemic in March 2020, hospitals moved to 12-hour shifts followed by

16 *Shortening the length of shifts for medical residents* is an inaccurate term that has taken root in the public and media discourse for a move designed to shorten the number of continuous working hours in hospitals and not the actual length of shifts. It should be noted that the length of weekday shift defined in the collective agreements between doctors and employers is 16 working hours from 16:00 until 08:00 the next day. In the proposed outline, the shift itself will not be shortened, but a doctor will not perform the usual eight-hour morning shift before or after the shift, and thus the duration of continuous working hours will be shortened from 24 (and another two hours of shift transfer, i.e., *overlap* to 16 hours. It is also worth mentioning that some of the shifts are performed by specialists and not only medical residents, therefore it is a shortening of the continuous working hours in hospitals in general and not only those of medical residents.

24 hours off. The purpose was to reduce staff exposure to COVID-19 patients in the wards (DoctorsOnly, 2020). The decision initially raised concerns about reduced wages with shorter shifts and fewer overtime hours, but soon this concern was replaced by a call to adopt the new work-format and end the long shifts which were customary prior to the COVID-19 period (the number of continuous working hours of a medical resident is currently 26 hours, consisting of 8 hours of *regular* work in the morning and afternoon plus an additional 16-hour shift, until 8 am the following morning, plus an additional two hours or so for changing shifts). In the protests held by the medical residents, they called for shorter shifts and regarded the move imposed on the healthcare system due to the pandemic, as a successful *natural experiment*, illustrating that the time for a change in their work schedules has come (Linder, 2020).

Following the COVID-19 pandemic and against the background of these protests, the debate on the issue was rekindled, and it prompted the Israeli Medical Association (IMA) to establish a special committee, designed to examine changes in the work patterns of physicians in hospitals (Recommendations of the High Committee, 2021). In June 2021, the committee recommended a fundamental and far-reaching change and stated that the traditional approach of a uniform shift length for all specialties is not the best solution, since each specialty has unique characteristics that may dictate different work styles. In light of the position of the unions, which were aided by surveys among medical residents, the committee recommended determining the work schedule in each specialty according to its needs, and proposed models that differed on elements such as hours of continuous work, hours of rest, number of shifts, and so on. The committee also recommended additional allocations for administrative staff and physician assistants to improve the working conditions of physicians in the hospitals and in the community.

In October 2021, the Minister of Economy Orna Barbivai published an amendment to the General Labor Directive outlining permissible weekly work hours, overtime, and rest in medical establishments and institutions for the care of the elderly and children. The permit, which was drawn up in coordination with Minister of Health Nitzan Horowitz, established for the first time that the working day of physicians will be limited to 16 hours, and if needed, it can be extended to 18 hours. It was also determined that the directive will be implemented gradually. The first phase of its implementation was planned to begin on March 31, 2022, in ten hospitals in the periphery, for medical specialties other than surgery or intensive care. It was also determined

that the working hours for intensive care and anesthesia will be shortened no later than March 31, 2023. Finally, the directive states that a five-year plan will be drawn up to gradually shorten the working hours of physicians in hospitals around the country, and that the number of monthly shifts per physician will not exceed six (Ministry of Health, 2022b).

Following the amendment to the General Directive, the Minister of Health appointed a professional team to plan and implement the move to shorten the rotation shifts of physicians. The team, led by the Deputy Director General of the Ministry of Health, Dr. Sefi Mendelovich, included representatives of the Ministries of Health, Economy and Industry, and Finance, representatives of the IMA and of the hospitals, as well as experts and specialists in various medical professions. The team was assigned the task of planning an outline for the implementation of the shortening of rotation shifts, as required by the amendment to the General Directive, while weighing all the relevant aspects, including the quality of treatment and safety, the training quality of medical residents, the well-being of the doctors, and their working conditions. The team was also tasked with examining additional solutions that would lighten the workload during the shifts, including through the support of physician assistants and administrative support teams (Ministry of Health, 2022b).

While preparing the interim recommendations for the implementation of the first phase, deep differences of opinion emerged among the team members regarding the feasibility of shortening shifts to 16 hours, and in particular, meeting the deadline set for the start of implementation. Some of the committee members believed that, in light of the expected additions to the labor force in the coming years as the result of steps taken to increase the number of medical students in Israel, it was possible to implement the reform. Those who opposed the reforms, particularly representatives of the Ministry of Finance and the IMA, claim that the implementation of this program is not currently feasible given the expected shortage of medical workforce. Their claim of a shortage is based on two main reasons: we are currently seeing the final decline in the positive effect of immigrant physicians from the former Soviet Union as these physicians reach retirement age; and the implementation of the reform by Prof. Yatziv, which disqualifies potential physicians who have studied at various schools in Eastern Europe due to their lower standards of training, which accounts for about one-quarter of returning physicians (Israeli Medical Association, undated; Ministry of Finance, undated).

To reinforce their claim, they stated that the share of medical school graduates from those Eastern European schools which will no longer be accepted is particularly large in the periphery, where the reform is expected to begin.

Another controversy that casts doubt on the implementation of the outline is the issue of wages: the Ministry of Finance Commissioner for Wages argued that the wages of medical residents who work according to the new outline should be reduced in relation to the reduction in their work hours (Ministry of Finance, 2022a). The organization Mirsham, which is at the front of the fight to shorten the working hours for residents, strongly opposes this move (DoctorsOnly, 2022).

Additional concerns that have arisen around the question of implementing the new outline reflect a number of concerns: that there will be a deterioration in residents' well-being following the increase in weekend shifts that will be required; that training quality will be impacted due to fewer morning shifts according to the outline; and a fear of the widening of the gap in the share of physicians choosing to train in the center and the periphery, as residents will be drawn to the large and powerful medical institutions in the country's center at the expense of those in the periphery as the new format is rolled out.[17]

Eventually, in March 2022, the team's interim report was published with the signatures of only ten out of the twenty-five team members — all of whom were representatives of the Ministries of Health and Economy and Industry and of various medical institutions. None of the Ministry of Finance and the IMA representatives were among the signatories (Ministry of Health, 2022b). The latter two submitted their reservations to the report, in which they noted the expected shortage of medical personnel, the dispute over wages, and the fears of lowering the quality of training. Nevertheless, both the Ministry of Finance and the IMA emphasized that, in principle, they support shortening the number of continuous work hours (Israeli Medical Association, undated; Ministry of Finance, undated).

The main recommendations of the interim report are as follows. (1) Shortening rotation shifts in ten hospitals in the periphery as of March 31, 2022, as required by the amendment of the General Directive. For each specialty, the shift will be shortened gradually, in accordance with the medical institution capacity and the training needs in the internal medicine wards, the emergency medicine wards, geriatrics, neurology, imaging, psychiatry,

17 In this context, see the statements by the Israeli Medical Association Chair, Prof. Zion Hagay, on the Israeli Medical Association website.

oncology, rehabilitation, nephrology, hematology, and pediatrics; (2) Gradually changing the work method in emergency medicine wards throughout the country, transitioning to working in shifts (for example, two 12-hour shifts or three 8-hour shifts per day); and (3) Enhanced promotion and assimilation of the role of the physician assistant, including the completion of the legislation required to establish this role and the opening of an academic course for a master's degree in this profession (Ministry of Health, 2022b).

Following the publication of these recommendations, Clalit Health Services petitioned the Supreme Court against the implementation of the outline, on the grounds that its implementation would harm the healthcare system. The Supreme Court rejected the petition, but following it, the implementation date was postponed by a month to allow the parties to reach agreements regarding the desired outline. However, an agreement was not reached. Against the background of the dissolution of the government in Israel and the dispersal of the Knesset, and under the guidance of the Attorney General of Israel, the implementation of the clause for shortening medical residents' rotation shifts has been postponed until September 2023 (Zvi, 2022). Following this postponement, Mirsham members took drastic protest steps, including the submission of letters of resignation in hospitals across the country and starting a hunger strike (Gaz, 2022). At the same time, the parties continued trying to reach an understanding regarding the drafting of the amendment to the General Directive, such as permitting doctors who wish to work on long shifts during weekends to do so and limiting the number of monthly shifts worked by residents.

Recently, there was another twist in the plot. Prime Minister Yair Lapid ordered immediate preparations to shorten the work hours of residents in the country's periphery, and even ordered the Ministry of Finance to transfer NIS 66 million to hospitals in these areas for the purpose of implementing the outline, with the aim of completing the process by September 2023. Following this, Mirsham announced the withdrawal of the two hundred resignation letters submitted by medical residents and they returned to work (Efrati, 2022). Nevertheless, it seems that the prevailing dispute between those in the healthcare system on the very feasibility of implementing the plan remains the same, especially with regard to the medical workforce and the issue of wages. Therefore, for now, it is not clear how things will develop, especially against the background of the prevailing political uncertainty in Israel.

The Gamzu Committee

The Committee for Long-Term Planning of the Physician Workforce in Israel (Gamzu Committee, 2022) published its recommendations in January 2022. The committee dealt with the challenges in the field of medical and nursing workforce in light of the expected increase in demand for healthcare services. Four main issues were covered: long-term planning for the training of physicians, geographic dispersal of physicians, planning and distribution of physicians among medical specialties, and long-term planning of the nursing system. The committee recommendations are detailed here.

In the field of planning physician training, the committee recommended, among other things, increasing the number of licenses granted to 2,000 licenses per year by 2035 (compared to 1,721 in 2020). At the same time, they recommended increasing the share of Israeli medical school graduates out of the total number of licenses to 60%, by expanding the training of medical students in Israel. It was also recommended to promote measures to encourage students currently studying abroad to return to Israel, as well as to encourage and subsidize the immigration of young specialists to Israel.

With regard to geographic dispersion, the committee emphasized the importance of reducing the existing gaps in the number of hospital beds and physicians between the center and the periphery, and in particular, the Negev and the Galilee districts. They recommended launching the Ministry of Health's Ilanot program, which aims to widen and strengthen the medical workforce in those two areas. The committee also recommended giving incentives to outstanding physicians, including medical residents, with the aim of attracting them to the Negev and the Galilee (*The Stars Model*).

On the subject of planning and distribution of physicians among medical specialties, the committee recommended a series of regulatory measures aimed at strengthening the Ministry of Health's ability to plan the distribution of medical specialists between the various medical disciplines, in accordance with predicted needs. Among other things, this would be achieved through several actions: establishing a Ministry of Health database, which is to include data on medical residents at any given time; forecasting the needs of the healthcare system for the coming years; setting annual national goals for the number of new residents in each specialty by the Minister of Health; and, later on, setting regional indicators up to the hospital level.

In the field of long-term planning of the nursing system, the committee recommended, among other things, an increase in the number of nurses in Israel to 7 nurses per 1,000 population by 2027, compared to about 5 today; to gradually increase the number of nursing students in Israel while expanding the current study courses; and to set a target of 60% for nurses with a degree above the basic qualification level by 2027.

The committee did not specify the *price tag* for these recommendations, but it is clear that the proposed increase in workforce, the expansion of the study courses, the funding of the incentives, and the regulatory intervention measures will require a significant budgetary increase, which depends to a large extent on the approval of the Ministry of Finance. Beyond that, such extensive changes in medical training will require the agreement and cooperation of the universities and other agencies involved in physician training. Additionally, there will no doubt be objections by the IMA to some of these recommendations, especially those regarding regulation of the medical workforce through central planning of resident quotas for the various medical specialties, as well as the recommendation to increase the involvement of the Ministry of Health in the planning of medical residencies which are currently legally managed by the IMA's Scientific Council.

The Ilanot program

In October 2022, the Ministry of Health, in collaboration with the Faculty of Health Sciences at Ben-Gurion University in the Negev and the Azrieli Faculty of Medicine of Bar-Ilan University in Safed, opened the first-year cohort of the Ilanot program of medical cadets in the Negev and the Galilee. This program joins the network of programs for leadership in public service in Israel — *Cadets for Israel* — with the aim of building a future generation of medical leadership in Israel.

The goal of the Ilanot program is to quantitatively increase the medical workforce in the Negev and the Galilee, and to strengthen it qualitatively through the creation of outstanding medical leadership. The program includes full funding of tuition fees, a subsistence stipend, external academic support including training in medical management, personal and professional support by seniors in the healthcare system, and close support during the internship period. The first cohort of graduates will include up to thirty cadets in the Negev and up to thirty cadets in the Galilee, all selected after a strict selection process. Participation in the program is conditional on a commitment to work

as a physician in the Negev or the Galilee for seven years after completing studies and to live in the Negev or the North (including the Galilee) throughout the study period.[18]

Integration of immigrant physicians

The inter-ministerial committee for regulating the employment of immigrants, encouraging immigration, and removing barriers to the immigration of medical teams is currently considering this problem. This committee was established by Government Resolution 499 of October 2021 to encourage the immigration and remove barriers to the employment of immigrants in the medical professions, in view of the growing need for physicians and healthcare professionals in the healthcare system (Prime Minister's Office, 2021).

The purpose of this committee is to formulate a placement program for immigrants in the medical and nursing professions, while working in cooperation with the various healthcare agencies, and to promote effective employment solutions in the medical and nursing professions. Among the measures discussed by the committee: easing the bureaucratic processes for licensing prior to immigration; streamlining the recognition procedures for medical specialties; examining the ease of submitting documents of medical training abroad, including establishing a platform for submitting application documents for licensing in Israel in different languages (Hilaie, 2021).

The restraint of private healthcare: Arrangements Law 2023

The Ministry of Finance draft economic plan for 2023 (the Arrangements Law) included extensive reference to the healthcare system, and in particular to the private healthcare system (Ministry of Finance, 2022b). The dissolution of the government and the Knesset in June 2022 stopped the progress of a draft economic plan which was to be brought before the Knesset for a vote. It is likely that the bureaucratic and parliamentary processes related to this will be renewed with the election of the new Knesset and the formation of a new government.

It appears from the draft plan that the Ministry of Finance intends to continue with the policy line it implemented over the past decade of emphasizing the restraint of private healthcare, while trying to incentivize physicians to practice in the public sector. By employing certain controls set in legislation and regulation, the Ministry of Finance seeks to regulate the medical workforce

18 See the Ministry of Health website, Ilanot — Medical Cadets.

and reduce the share of private healthcare in the system. These are detailed in the draft economic plan, and the following are the main points:

- Reducing insurance duplication between supplementary healthcare insurances through the health funds (*shaban*) and commercial health insurances; establishing regulations regarding reimbursement of insurance holders of both supplementary and commercial insurance plans.
- Expansion of the arrangement-reimbursement reform. In the Arrangements Law 2015–2016, it was established that a financial refund will no longer be given to patients for surgeries performed through supplemental or commercial insurance. The health funds and insurance companies will pay directly for the surgery, according to the arrangement with the physician or the medical institution (meaning the cancellation of the reimbursement route). It is now proposed to expand the settlement mechanism of the supplementary and commercial insurance plans to include consultations, where payments are still made through the reimbursement route.
- A levy on income from supplementary and commercial insurances. It is proposed to impose a levy of 35% on the activities of commercial insurance companies and 15% on those of the supplementary healthcare services of the health funds. Additionally, the insurance companies and the health funds will be required to report the price paid to surgical teams and the medical facility for private surgeries. This report will be obligatory also for health institutions that perform private surgeries that are not funded by supplementary healthcare insurances of the health funds or commercial insurance of private insurance companies.
- Preventing the increase of premiums in the supplementary healthcare insurance resulting from the imposition of the levies. In addition, it is proposed to exclude non-medical services from the supplementary healthcare insurance plans, thus protecting the current premium rates.
- Shortening waiting times for procedures and appointments in the public healthcare system. It is proposed to allocate a total of NIS 250 million for a comprehensive program designed to shorten waiting times for surgeries and consultations.

The purpose of these measures is to reduce the national expenditure on health by restraining private healthcare, which currently forms a significant part of it. Furthermore, according to the Ministry of Finance, restraining private healthcare will reduce the negative effects it has on public healthcare, including: the drain of workforce into private healthcare due to higher wages; the skimming of the *cream* from public to private healthcare, that is, the transfer of profitable medical activity to private medicine while leaving more complex and less profitable cases in public medicine; and referring patients from the public system to the private system.

Once discussions of the economic plan are resumed, strong opposition to these clauses should be expected from the stakeholders, especially the commercial insurance companies and the IMA. The Ministry of Finance regards the restraint of private healthcare as a way of strengthening the public healthcare system by reducing the negative effects. However, the opponents claim that the private market is the *pressure valve* that prevents the collapse of the public healthcare system and that it offers a response to the rising demand for healthcare services, outside of the public healthcare system, which suffers from a lack of resources and infrastructure. They also claim that a reduction in private healthcare services with no significant, simultaneous expansion of the public system will, first and foremost, harm patients. The economic and organizational debates regarding the nature of the healthcare system are often accompanied by a value debate regarding the individual's right to freedom of choice and the state's commitment to equality as well as differences of opinion regarding the freedom of physicians and occupational choice. For many years, disputes between the parties regarding the state's efforts to restrain private healthcare have been ongoing, and it is not expected that they will be resolved in the foreseeable future either.

The Ash Committee

In March 2022, the Minister of Health appointed the Independent Committee to Strengthen Healthcare Services in Israel and Regulate the Private Healthcare System, headed by the Director General of the Ministry of Health Prof. Nachman Ash. The committee was established to examine the key issues and the challenges faced by the healthcare system in Israel, with an emphasis on the bilateral effects between the private and public healthcare systems, as well as to recommend policy measures to improve the efficiency and quality of the healthcare system (Ministry of Health, 2021c). The committee members

are representatives of the Ministries of Health, Economy and Industry, and the Ministry of Finance, representatives of the Israeli Medical Association, academics, and public figures. In view of the current political instability, it is difficult to assess if and when the committee will publish its conclusions and what their impact will be.

Supervision of fees of privately financed surgeries

In July 2022, the Prices Committee, functioning as part of the Law for Price-Controlled Consumer Products (1996), recommended to the Minister of Health and the Minister of Finance that privately financed surgeries will be subjected to the highest level of supervision, that is, one that prohibits price changes without a permit. This will increase the level of supervision on private surgeries, which were previously under an obligation only to report prices and profitability (Ministry of Health, 2022d).

The committee believes that in light of the current financial data and the highly centralized nature of the private surgery market by the service providers, there is justification for raising the supervisory level. The committee further believes that there are failures in the healthcare market that make it difficult to reach a competitive equilibrium without regulatory intervention. These arise from patient risk-aversion, asymmetry in information, and a rigid demand for surgeries. Patients' willingness to pay for surgery when they are in physical and mental distress does not necessarily reflect the optimal and fair price of the surgery were it to be determined in a calm and stress-free negotiation.

Furthermore, the failures of the private healthcare market have a negative effect on the public healthcare system. They create wage gaps that cannot be bridged between physicians in private practice and those employed in the public system. These disparities cause wage pressures in the public system, while at the same time the private institutions benefit from treating profitable patients at the expense of the public system.

The committee proposes that price determination be done by one of the following methods:

- Pricing from below: collecting data from those in the field, about the costs involved in privately financed surgeries, and weighing them in order to determine an average price, similar to what is done today for publicly financed surgeries.

- Pricing based on the public price list: in accordance with the findings, a mechanism will be established to allow the conversion prices listed in the Ministry of Health's tariff for publicly funded surgeries to the price of privately financed surgeries.

It can be assumed that this plan will arouse strong opposition from stakeholders, primarily private health institutions and surgeons working in the private healthcare market. The Israeli Independent Doctors' Organization (Artzi) has already called for the reform to be halted and alleged a hijacking by the Ministry of Finance, taking advantage of the absence of a sitting Knesset (Filut, 2022).

Summary

As a result of the COVID-19 pandemic, there has been a sharp increase in the measures of healthcare spending in Israel, as in most developed countries. As a result, expenditure on healthcare in Israel remains low compared to international figures. Israel's infrastructure and human resources in relation to its population is also relatively small. Nevertheless, Israel has achieved impressive achievements in the areas of mortality prevention and life expectancy, including a healthy life expectancy. This phenomenon is sometimes referred to as Israel's *health paradox*. It seems that this phenomenon was preserved throughout the COVID-19 period as well.

Nevertheless, one must be careful not to rely excessively on these data, for several reasons. First, it is difficult to learn about the functioning of the healthcare system by looking at mortality and life expectancy data, since these are affected by a variety of variables, among them socioeconomic, environmental, and personal risk factors. Second, achievements such as high life expectancy are not indicative of the current state of the healthcare system but rather an expression of past investments (Chernichovsky, 2018). It is difficult to determine whether by having relatively low healthcare expenditure, the system will be able to continue its good performance long term, compared to other parts of the world. On the one hand, efficiency components of the healthcare system should not be ignored, since, to a certain extent, they allow it to restrain the spending on healthcare (Chernichovsky, 2018). On the other hand, the increase in chronic morbidity and the aging of the population must be considered, partly due to the increase in life expectancy. Thus, today's

healthcare system may be a victim of its own past success (Chernichovsky, 2019). The increase in life expectancy emphasizes the importance of the quality of life and not just its length. This increase forces the healthcare system, like other social systems, to also take into account needs related to physical and mental well-being and physical functioning. In this context, it should be noted that Israel also excels in healthy life expectancy. However, as the life expectancy increases it is higher than the rate of healthy life expectancy, which may have consequences both on the health needs of the population, especially in the elderly, and on expenditure, infrastructure, and workforce.

Finally, mortality and life expectancy indicators are not the all-important elements in health measurement. A series of health indicators should serve as a warning sign for policy makers. For example, the moderation in the decrease in the smoking rate, and the further increase in smoking due to the COVID-19 pandemic, and the rapidly increasing rate of adults and children suffering from overweight and obesity are issues that are alarming. Added to this is the growing danger to public health from exposure to air pollution. The prevalence of diabetes in Israel is on the rise and is high compared to other developed countries. At the same time, the Israelis' subjective health self-assessment is relatively low. In addition, there are wide-ranging and persistent disparities in health indicators and in accessibility to healthcare services, both between the center and the periphery and between population groups, as well as lengthy waiting times for consultations and procedures.

It must be remembered that apart from expenditure indicators, the functioning of the system depends to a great extent on its organizational methods. At this point, developments occurred in 2022 that should not be taken lightly including a stream of initiatives led by the Ministry of Health aimed at solving various problems related to medical workforce, such as the long rotation shifts of medical residents, and restraining private spending on healthcare, which contributes to inflation in medical prices. These initiatives have mostly been blocked or slowed down due to the current political crisis but will most likely be renewed with the establishment of the new government and will lead to serious struggles between the various players in the healthcare system over their nature and implementation.

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Executive Summary

School Health Services in Israel: Between Privatization and Nationalization

Baruch Levi, Rami Adut, and Nadav Davidovitch

School health services are a long-standing and central component of the public health service in Israel, although over the past thirty years it has withstood many upheavals. Today, after years of endless changes with service in some locations nationalized (that is, in some districts the service is operated directly by the government), and in other locations, privatized, the service is unstable and its future is as unclear as ever.

The current lack of clarity calls for professional and public discussion regarding the optimal framework for operating the school health service. This study and the paper that ensued examine how the relevant stakeholders in the field view the current status of school health services from the perspective of manpower, the role of the school nurse, as well as methods to measure effectiveness, and to clarify which models of service they see as optimal going forward.

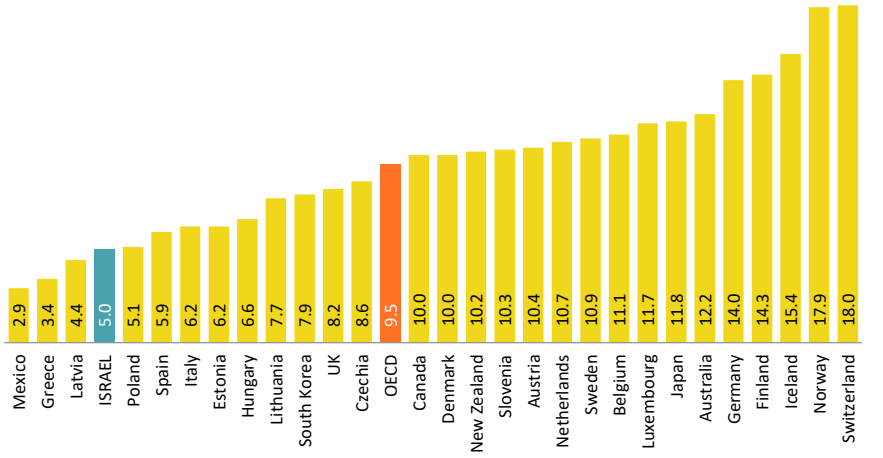
* Dr. Baruch Levi, Guest Researcher, Taub Center for Social Policy Research in Israel; postdoctoral student, Department for Healthcare Policy and Management, Ben-Gurion University of the Negev. Dr. Rami Adut, School for Behavioral Sciences, Netanya Academic College; Ben-Gurion University of the Negev. Prof. Nadav Davidovitch, Principal Researcher and Chair, Taub Center Health Policy Program; Director, School of Public Health, Ben-Gurion University of the Negev.

This project began at the initiative of the Yaakov Hazan Center for Social Justice and Democracy at the Van Leer Institute in Jerusalem, which was closed during the course of the research. The authors wish to thank the Taub Center for helping to complete the research and publish its findings. The full study was published in March 2022 and can be found on the Taub Center website.

This study is based on written sources and a series of in-depth, partially structured interviews conducted with thirteen decision makers and service providers in the field. Among them were central decision makers from relevant government ministries and professionals from a variety of fields: nurses, past and present inspectors, and doctors. The interviews focused, among other things, on the following questions: What is the opinion of the interviewee regarding the privatization of the school health services and what should be the future of the service? Should the school health services be nationalized and operated directly by the Ministry of Health or privatized and operated by a contractor? Is the decentralized model a good one, as in the current situation in which some of the districts are nationalized and others privatized?

Three factors stand out as central for the discussion of school health services in general and for the role of the school nurse in particular: manpower challenges in school health services, the integration of the school health service within the overall public health service, and the methods for measuring the effectiveness of the service. The findings are worrisome regarding the current situation of the school health service in Israel as well as for its future. It is portrayed as characterized by a chronic shortage of manpower, difficulties in filling positions in the school service, and neglect of the *soft* aspects of the service which are not easily quantified and measured, such as health education. All of these are tightly connected to the severing of professional ties between school nurses and the Tipat Halav public health service in the majority of health districts and the loss of status and attractiveness that the profession of school nurse has experienced. These factors produce a vicious cycle: the lack of professional attractiveness is a central reason for difficulties in filling positions as well as a result of the severing of professional ties and loss of status of the role. All of these are connected to basic underlying problems in the national health system, which throws a dark shadow over the school health service as well — the chronic and severe shortage of nurses. The number of nurses in Israel relative to the size of the population is among the lowest in the developed countries. According to OECD data, in 2020, Israel had 45,400 active nurses, that is, about 5 nurses for every 1,000 population, versus an OECD average of 9.5 (OECD, 2021).

Number of active nurses per 1,000 population in OECD countries, 2019 (or the closest year for which there are data)



Source: Baruch Levi, Rami Adut, and Nadav Davidovitch, Taub Center | Data: OECD, 2021

According to those interviewed, five possible models are presented for operating the service: a model that rests on outsourcing the entire service; a decentralized model (outsourcing or government operation); *Schools Promoting Health*; a nationalized and uniform service; school health services run by the local authority. Each model has its own service provision method and definition of the role of the school nurse as well as integration within the Tipat Halav service. There is no reason not to discuss interim possibilities as well that might combine components from several models.

The multiplicity of opinions regarding the most desirable model for school health services is one of the most outstanding findings of this research. The lack of agreement mainly reflects how each stakeholder sees the desirable framework for service operation — beginning with outsourcing, through a decentralized service and the handing over of responsibilities to the local authorities, or the complete nationalization of the service and its operation by the government. Discussion of the school health services gained particular importance during COVID-19 as the importance of the integration of public health services into the education system became clear in dealing with the epidemic — beginning with vaccinations through to promoting health. Nonetheless, the basic problems of the school health services in Israel are tied to a great extent to structural issues in the public health service, including

the serious shortage of nurses. Improving school health services, whether privatized or nationalized, is largely dependent on finding solutions to these problems.

Finally, the school health service can serve as a test case of the larger question — the future of the welfare state and the rise of market ideology. Against the ideology that promotes market values stands the concept of the continuing operation by the government of long-standing social services such as school health services and public health services as an expression of the social nature of the State. As in other policy areas, it seems that the struggle taking place in Israel between these two world views is far from over.

The school health services — potential models (based on the interviews)

Model	Method	Service delivery	The nurse's place in the service	Integration with the public health services (Tipat Halav)
1	Outsourcing the entire service	Delivery by means of a contractor that is an outside company	The nurse is part of the staff in a specific school but is not present on a full-time basis	No connection between the school health services and the public health service (Tipat Halav)
2	Decentralized service: outsourcing or government operation	Delivery model is determined in each district separately, according to the situation in the district and the decision of the district physician	The nurse is part of the staff in a specific school but is not present on a full-time basis	In privatized districts, the nurse works alone, without any connection to the Tipat Halav services
3	Schools Promoting Health	The method of service delivery has not yet been decided	The nurse is responsible only for health education and prevention, alongside the educational staff, and has the ultimate authority in these matters in the school. Vaccinations and examinations are conducted in the community and not in the school	The issue of integration in this model has not yet been decided
4	Nationalized and uniform service	State-operated model. Nurses return to working as government employees	There is no consensus as to the full-time presence of the nurses in the school	The nurses are an integral part of the Tipat Halav clinic, as was the case in the past
5	School health services in the local authorities	They are the nurses' employers and the Ministry of Health provides professional guidance	The nurse coordinates the local and school programs	The nurse is not part of the Tipat Halav staff, but receives support and guidance from the district health bureau

Source: Baruch Levi, Rami Adut, and Nadav Davidovitch, Taub Center

Executive Summary

An Examination of the Cost Update Mechanism for the Healthcare Services Basket Between 1995 and 2020

Baruch Levi, Gabi Bin Nun, and Nadav Davidovitch

This research examines the history of the updating mechanism for the Healthcare Services Basket from 1995 — the year in which the National Health Insurance Law went into effect — until 2000. It is this law which provides universal insurance coverage by means of the health funds. The study surveys the updating coefficients of the basket and the changes made to them over this period.

The National Health Insurance Law is intended to guarantee equal rights and to support values of solidarity and mutual responsibility. This approach is reflected in the establishment of an egalitarian basket of healthcare services, in the allocation of the basket's financing burden, and in the oversight over the health funds. The erosion of the basket's budget and the lack of an updating mechanism that is set in law has, over the years, encouraged the growth of a private healthcare market at the expense of the public healthcare system and has led to the undermining of public confidence in the system and even to an expansion of health inequality.

* Dr. Baruch Levi, Guest Researcher, Taub Center for Social Policy Studies in Israel. Prof. Gabi Bin Nun, Professor Emeritus, Department for Healthcare Policy and Management, Ben-Gurion University of the Negev. Prof. Nadav Davidovitch, Principal Researcher and Chair, Taub Center Health Policy Program; Director, School of Public Health, Ben-Gurion University of the Negev.
The full study was published in October 2022 and can be found on the Taub Center website.

Since the law went into effect, there have been a number of professional committees appointed to examine the updating mechanism for the cost of the basket. Although updates have been made in the prices of healthcare services, the growth and aging of the population and progress in medical science and technology and in medical instrumentation require further updating of the basket in order to meet the developing needs of the population. The authors looked at these three areas, including a survey of their characteristics and their development over the years.

The calculation of the *healthcare price index*, which reflects changes in the prices of healthcare services, weights its various components, such as wage costs, the CPI, and the construction inputs index. However, it does not take into account the price of hospitalization services, which is a major component in the cost of the basket of services for which the health funds are responsible. In contrast, the healthcare inputs index, an alternative index developed by the Ministry of Health, includes the price of a day of hospitalization with a weight of 40% of the index. The research presents the disparity been the cost of the basket according to the healthcare price index, which is used in practice to update the cost of the basket, and its cost if the updating had been carried out according to the healthcare inputs index.

The *demographic index* is intended for the updating of the cost of the basket according to the country's demographic changes. Although in recent years the demographic update of the basket has reflected the annual increase in the population to a large extent, the authors emphasize that, in the context of healthcare, it is not only population growth that must be taken into account, but also the aging of the population, since the expenditure on healthcare services is higher for the elderly.

The *technology index* is intended to reflect scientific progress in the development of pharmaceuticals and medical technologies. According to the authors, in most developed countries the annual rate of increase in healthcare expenditure per capita to cover technological progress is about 2% or more, while in Israel it is only on average about 1%.

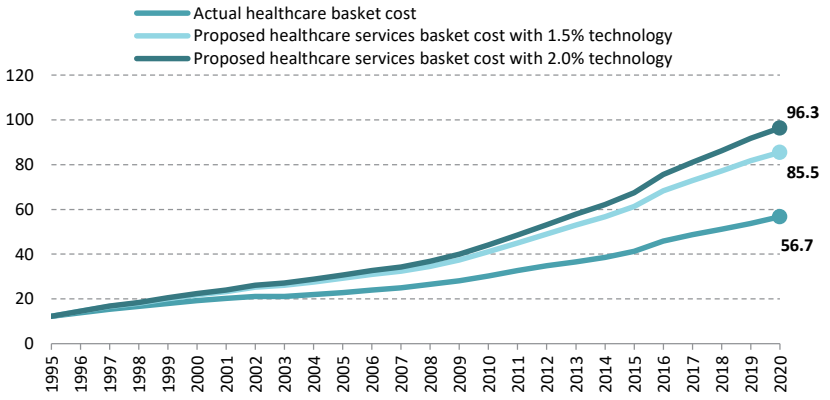
The research points to a disparity of 50%–70% between the cost of the basket in practice and the estimated cost if it had been updated according to the alternative indices proposed by the various committees. Taking into account only the changes in healthcare prices and demographic changes (while ignoring technology progress), the cumulative erosion amounts to about 26%, which is equivalent to about a NIS 20 billion shortfall in the current budget of

the health funds. This deficit has inevitably led to a decline in the quality of the Healthcare Services Basket and in its accessibility.

Israel's situation is rather dismal also relative to other countries. Thus, in 2019, healthcare expenditure per capita in Israel was about 60% of that in the OECD countries, which puts Israel in 26th place among the 38 member countries.

The cumulative gap between the actual and alternative cost of the basket

NIS billion



Source: Baruch Levi, Gabi Bin Nun, and Nadav Davidovitch, Taub Center | Data: Ministry of Health, 2022

In conclusion, the research shows that if the basket had been updated annually since 1995 according to the recommendations of healthcare experts and the public committees that examined the issue, its cost would be NIS 85–95 billion. In actuality, its cost in 2020 was NIS 56.7 billion, a disparity that has created a flourishing private healthcare market and a deepening of health inequality. In order to halt the erosion, the public healthcare system needs to be strengthened and this calls for, first and foremost, a fundamental change in the updating mechanism of the Healthcare Services Basket, in a manner that is acceptable to all of the agents in the healthcare system.

EDUCATION

2

Achievements in Israel's Education System: An Overview

Nachum Blass

> It's also true that some story lines, and the facts that fit them, become so commonplace that they are hard to dislodge by counter facts. Whenever I write a public essay claiming that our schools are not in a state of historic decline, fact-checkers call to ask for citations. They do not ask the same of those who claim the opposite. This is the way of all media... (Meier, 2009)

Introduction

In an article written more than a decade ago (Blass, 2011), the question was asked whether there is any truth to the claim that the education system in Israel is rapidly deteriorating. Based on the data, we showed that there is no decline taking place, and we suggested looking at the situation from a slightly different perspective. While it can certainly be said that the education system does not meet expectations, in light of the economic, social, and political situation, the very fact that its achievements are not on a downward trend is reason enough for praise.

More than a decade has passed since then and it would appear that there is nothing new under the sun. Most of the public in Israel tends to have a negative opinion of the education system and they express long-term dissatisfaction with its achievements and functioning. The main reasons for this are as follows:

* Nachum Blass, Principal Researcher and Chair, Education Policy Program, Taub Center for Social Policy Studies in Israel. The author wishes to thank Laura Schreiber for her assistance in preparing the graphs and the readers of the early drafts for their helpful comments.

1. The achievements of Israeli students on international tests continue to be lower than in countries to which Israel compares itself. Considering that more than 20% of the children in any cohort are not tested (most of the students in Haredi (ultra-Orthodox) schools, students attending schools in East Jerusalem, and students in special education), and some of these students are academically weak, the natural conclusion is that academic achievement is even lower than it appears to be.
2. The disparities in academic achievement between students according to socioeconomic status are among the largest in the Western world. The achievements of students from weak socioeconomic backgrounds are very low, and those of students from strong socioeconomic backgrounds are low relative to their counterparts in other countries.
3. The exam scores among those studying to become teachers are low relative to other professions that require an academic education, and, what is more, low salaries of teachers make the profession unattractive.
4. Many students and teachers encounter a reality of violence in the schools.

The list goes on and there is no doubt that the heads of the education system should be investing efforts in solving these problems. However, is it correct to say that the education system has been on a downward trend during the past decade? Or in other words, is the situation of the education system worse than it was a decade ago? Are these widely held opinions justified? In what follows, we will see that just as the assessment that the system was on a downward trend between 2000 and 2010 was unjustified (Blass, 2011), so, too, is the current assessment that it has continued on its downward trend.

It is human nature to believe that the past was somehow better than the present, but memory tends to be selective and is often misleading. There are those who feel that an apocalyptic description of the system is necessary in order to shake up the public and to achieve willingness on the part of the government to allocate the necessary resources to improve the system. However, it may be that the reality is just the opposite and that such an error serves those who believe that any additional investment in the education system is a waste of resources.

The following chapter surveys some widely used indices to determine whether the situation of the education system has worsened or improved. First is a discussion of the budget and then the academic achievements of

Israel's students. Following that is an examination of several aspects of the system's manpower and then a look at school environment. The final section is devoted to a summary and conclusions. The discussion will relate to both the student population as a whole and the Jewish and Arab sectors separately, and in some cases it will differentiate between schools according to the School Nurture Index.[1]

The discussion is based on data from the Central Bureau of Statistics (CBS), the Ministry of Education, and the National Authority for Measurement and Evaluation (RAMA), unless a different source is noted. We have full faith in the objectivity, level of professionalism, and quality of work of these agencies. Their data is gathered on an ongoing basis to meet the administrative needs of students and teachers or it is taken from large national surveys which are carried out by the top professionals in education and statistics in Israel. We are emphasizing the sources of our data because a discussion of the *deterioration of the education system* is to a large extent based on subjective data cited by parents, teachers, and principals, and on their personal impressions. While this form of data are important and may contribute to new and innovative perspectives, their value and credibility are far less than that of the data on which this chapter is based. It is, of course, possible to interpret the data in different ways and to emphasize different aspects of it; however, in any discussion there is a need to agree that the chosen dataset is the most objective and precise that is available.[2]

Most of the discussion will focus on the period between 2010 and 2019, the decade prior to the COVID-19 pandemic. The reason for this choice is that the period of the pandemic was an outlier and the extent of its effects and its ongoing and more long-term effects are not yet known.

1 The School Nurture Index is a socioeconomic index of the school population. In this chapter, differences based on gender differences or among the different supervisory authorities will not be discussed.

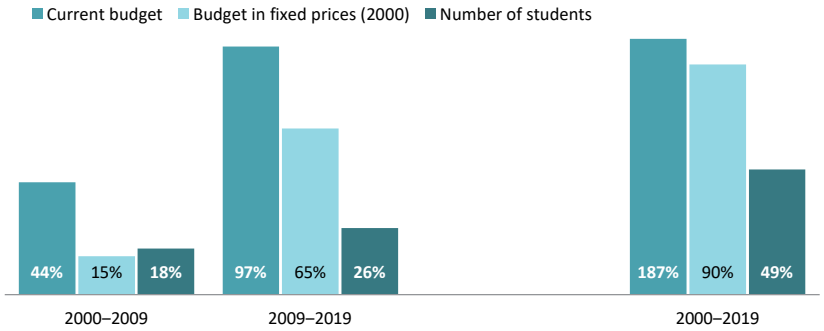
2 Even if we accept that the Ministry of Education, and sometimes also RAMA, may have an agenda with respect to how the data are presented, the scope of the data, and which data to present, we still have no doubt as to the reliability of the published data and its reliability.

The budget

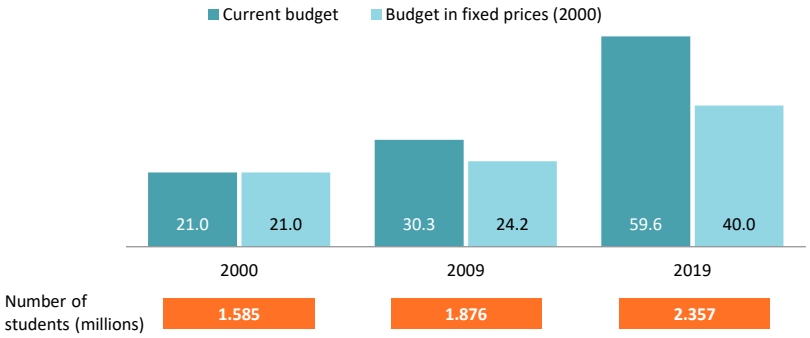
Many educators tend to underplay the importance of the budget available to the education system and argue that is it is not the size of the budget that is important, but rather if it is used efficiently and effectively. Furthermore, it has been said that even if the claim is true — "without sustenance there is no Torah" — without an appropriate budget framework there is no possibility of maintaining a properly functioning education system. Therefore, it is important to determine whether the budget per student — as opposed to the total budget — has increased in real terms in recent years and how it has been distributed among the various parts of the system.

Figure 1. The rate of growth in the Ministry of Education budget and the number of students in preschool and school (Grades 1–12), 2000, 2010, and 2019

a. Percent



b. NIS billion



Source: Nachum Blass, Taub Center | Data: Ministry of Education, Economics and Budgeting Administration website, *Transparency in Education*

An examination of the Ministry of Education budget as it relates to the increase in the number of students (Figure 1a) shows that, between 2010 and 2019, the number of students in preschools and schools grew by 26%. During that same period the Ministry of Education budget (not including the development budget) grew by 97% in current terms and in real terms (2000 prices) by 65% (Figure 1a and b). During the previous decade (2000 to 2009), the number of students grew by 18% while the budget grew by only 15% in real terms from 2000 to 2010. During the entire period, the budget grew by 90% in fixed prices while the number of students grew by 49%; in contrast, during the first decade the rate of growth in the budget did not keep up with the increase in the number of students.[3]

The share of the national budget, not including interest payments, allocated to education was 18.7% in 2000, 20.4% in 2010, and 21% in 2019.[4] In other words, the share of the Ministry of Education budget over the entire period (2000–2019) grew significantly, although the rate of increase was higher during the first decade. Another way of looking at this is to examine the share of total expenditure on education at current prices within the GDP: the share in 2010 was 7.4% while in 2020 it reached 8.6% (CBS, 2021; Table 4.1). Another indicator is the number of weekly work hours budgeted by the Ministry of Education, which also grew much faster than the number of students during this period. Thus, between 2000 and 2010 it grew by 28% while between 2000 and 2019 it grew by 115% (CBS, 2022). In short, all of these statistics show that the resources available to the Ministry of Education — even after taking into account the growth in the number of students — exceeded the resources available in 2010.[5]

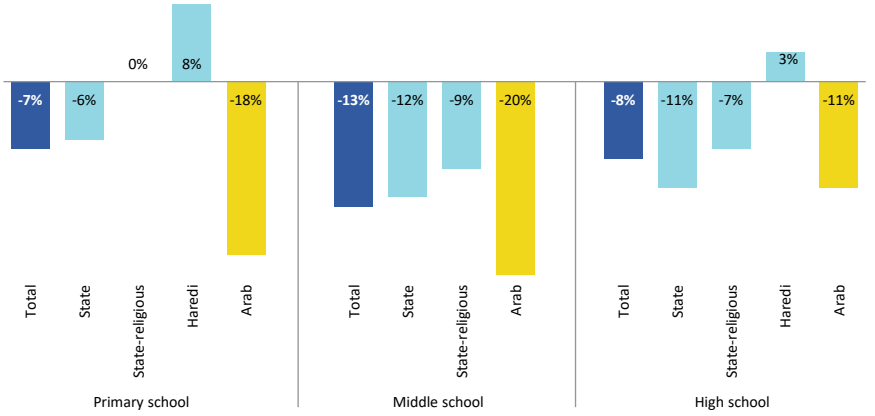
The growth in the Ministry of Education budget was also visible in class size and in students per full-time teacher, as shown in Figure 2. The point that is worth emphasizing is that apart from Haredi education (primarily due to the high rate of increase in the number of students which can be seen in the increase in class size), the population that benefited much more than others from the addition to the budget was the Arab sector, which until recently lagged far behind the Hebrew education sector.

3 Ministry of Education site, Economic and Budget Authority, *Facts and Figures*.

4 Ibid.

5 Note that the increase in budget was not uniform throughout all parts of the education system and there were parts in which the budget grew at a faster rate. Prominent among them is special education and preschool education. According to the preliminary data available, the situation did not change in 2020.

Figure 2. Rate of change in the number of students per class, 2019/2020 vs 1999/2000

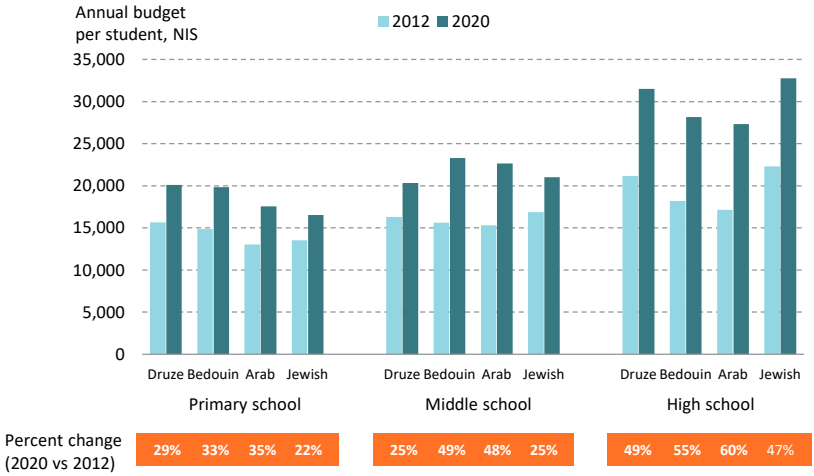


Source: Nachum Blass, Taub Center | Data: CBS

Figure 3 presents the increase in budget per student in the official primary education system, in the middle schools, and in the high schools, according to sector for 2012–2020. The graph clearly shows the rapid improvement in the budgets in Arab and Bedouin education, while the improvement in the Hebrew and Druze education sectors was much slower. The fact that in general the budget per student in both primary education and high school education is larger in the Arab and Druze sectors reflects the much larger share of students in those population groups from weaker socioeconomic backgrounds. This is not particularly noticeable in high school education because in this stage the budget per student is much less affected by socioeconomic background (in the high school system, there is no Nurture Basket nor differential budgeting according to socioeconomic background).

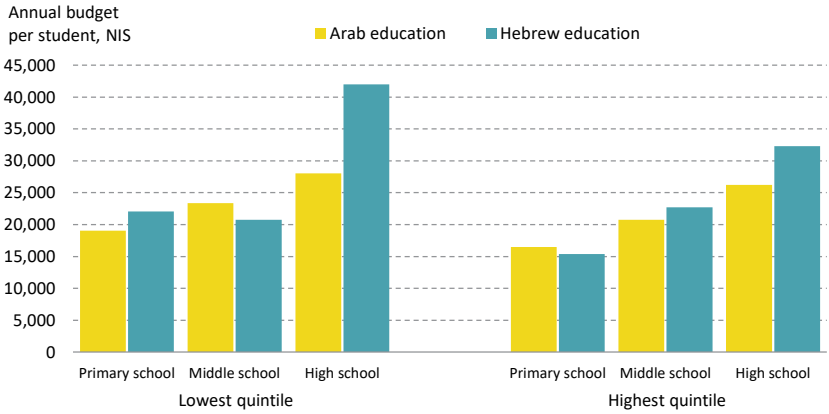
The current, largely positive picture does not properly reflect the worrying reality and persistent inequality between schools serving different population groups of similar socioeconomic status. This is seen in all education levels and is particularly noticeable in high school where the budget per Arab student is 67% of the budget per student in the Hebrew education system.

Figure 3. Annual budget per student in current prices in official primary education, middle school, and high school by education sector, 2020 vs 2012



Source: Nachum Blass, Taub Center | Data: Ministry of Education, Economics and Budgeting Administration website, *Transparency in Education*

Figure 4. Annual budget per student in the Hebrew and Arab education systems in the lowest and highest socioeconomic quintiles



Note: In the Arab sector, the comparison is between the lowest quintile and the fourth quintile because there are no students from the highest socioeconomic quintile.
Source: Nachum Blass, Taub Center | Data: Ministry of Education, Economics and Budgeting Administration website, *Transparency in Education*

Overall, there has been some improvement both in the level of expenditure per student and the narrowing of gaps between student in the Hebrew and Arab education systems; however, it cannot yet be said that the gaps have been eliminated. In fact, there is a long way to go.

Academic achievements

This section will examine the academic achievements of students in Israel in a number of subjects, and will provide a basis for comparisons over time. Achievements of primary school students are evaluated based on the results of the Meitzav exams which are administered in Grade 5 and the PIRLS exams which are given in Grade 4. The achievements of students in middle school are evaluated according to the results on the Meitzav exam administered in Grade 8 and on the TIMSS exam which is also given in Grade 8. The achievements of high school students are evaluated on the basis of the PISA exam, which tests the achievements of 15-year-olds (most of whom are in Grade 10). The tests in primary school and in middle school are calibrated to enable a comparison of scores.[6] Achievements on the Bagrut (matriculation) exams can be compared only over time with respect to the share of students taking the exams; the share of students who pass all the Bagrut requirements (which enables them to apply for entrance to institutions of higher education); and the share who obtain a Bagrut with honors. Since the exams are not calibrated, there is currently no way to say whether they are easier or more difficult than in the past.

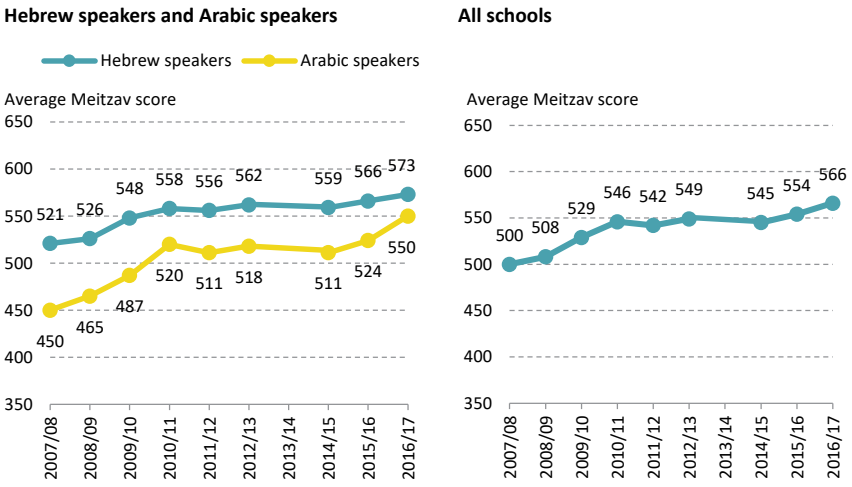
6 Until 2008, there were no achievement tests that were comparable over time. The survey exams, which were conducted in the 1950s and 1960s, the national feedback exams, which were conducted in the 1980s and 1990s, and the Meitzav exams, which were conducted in the early 2000s, were not calibrated in a way that enabled a comparison over time. It is, therefore, impossible to discuss in a valid and scientific manner whether there was an increase or a decrease in academic achievements on the basis of these exams. This situation changed in 2008 when the Meitzav exams became calibrated.

Primary education

The Meitzav exams, Grade 5

The data for the Meitzav exams presented below relate to the 2007/2008 to 2016/2017 school years.[7] In order to be able to compare the exam scores of students in the various sectors, discussion will focus on the exams in mathematics and English (as a second language). Figure 5 presents the scores in mathematics for Grade 5 which clearly show a consistent improvement over time and a narrowing of the gap between Jewish and Arab students.

Figure 5. Average scores on the Meitzav mathematics exams in Grade 5

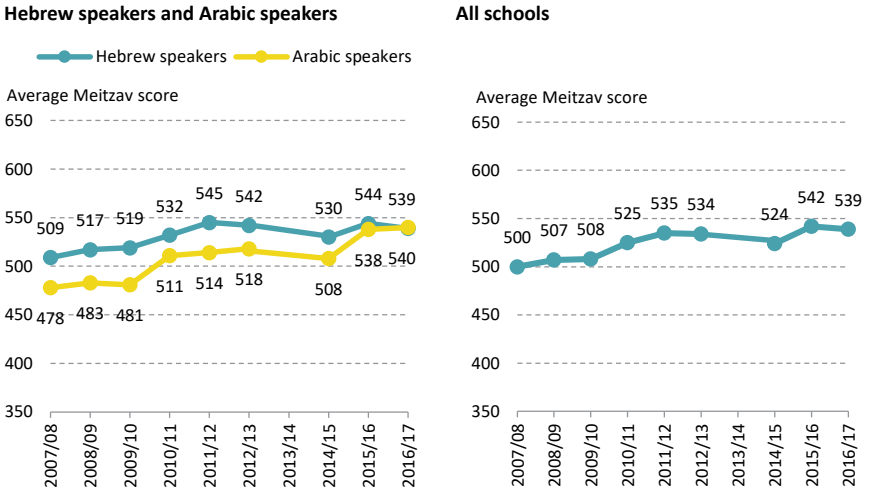


Note: In the 2013/2014 school year, no Meitzav exams were administered.
Source: Nachum Blass, Taub Center | Data: RAMA, 2017a

The situation in English in those years is similar: there is a continuous improvement for the population as a whole, with a major improvement among Arabic speakers and a closing of the gap and a narrowing of disparities related to socioeconomic status over the years (RAMA, 2017a, p. 42).

7 RAMA did not publish the results of the mathematics and English exams for Grade 5 in 2017/2018 for various methodological reasons, and since a comparison of reading literacy between Jews and Arabs has no meaning, we decided to make the comparison to the 2016/2017 school year despite it being several years ago.

Figure 6. Average scores on the Meitzav English (as a second language) exams in Grade 5



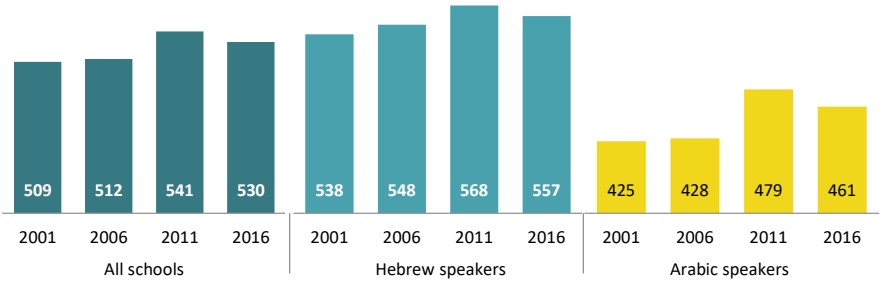
Note: In the 2013/2014 school year, no Meitzav exams were administered.
Source: Nachum Blass, Taub Center | Data: RAMA, 2017a

The PIRLS exam

The PIRLS exam evaluates reading literacy among Grade 4 students. The data in this paper are from 2016,[8] and could certainly have been left out of any discussion of developments in the last decade, but for consistency reasons we decided to present them here. The achievements of students in Israel on these exams have also been on an upward trend since 2001, although a slight downward trend can be seen between the exams in 2011 and 2016 (RAMA, 2016).

8 The last PIRLS exam in Israel took place in 2022 and the results are expected in 2023.

Figure 7. Average scores in reading literacy on the PIRLS exams



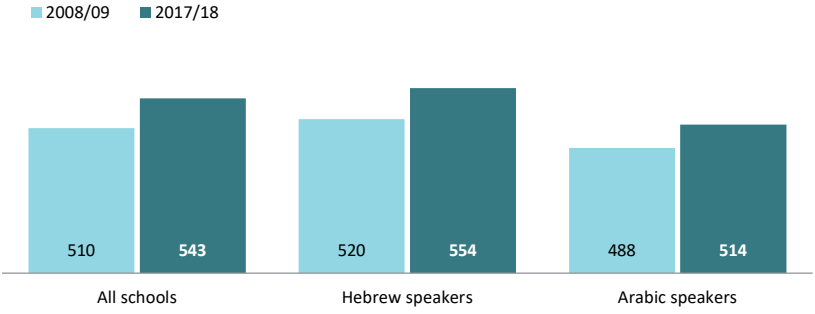
Source: Nachum Blass, Taub Center | Data: RAMA, 2017b

Middle school

Meitzav Grade 8[9]

In addition to language arts in Hebrew (or Arabic in the case of Arabic speakers), English (as a second language), and mathematics, students in Grade 8 were also examined in science. In mathematics (Figure 8), there was an improvement in the scores of the overall population, although it was largest among Hebrew speakers, and the gap widened somewhat. In English, the overall score rose while the main improvement was among Arabic speakers. In science, the improvement is more visible and the overall score among Arabic speakers rose by more than a standard deviation (RAMA, 2018).

Figure 8. Average scores on the Meitzav mathematics exams in Grade 8

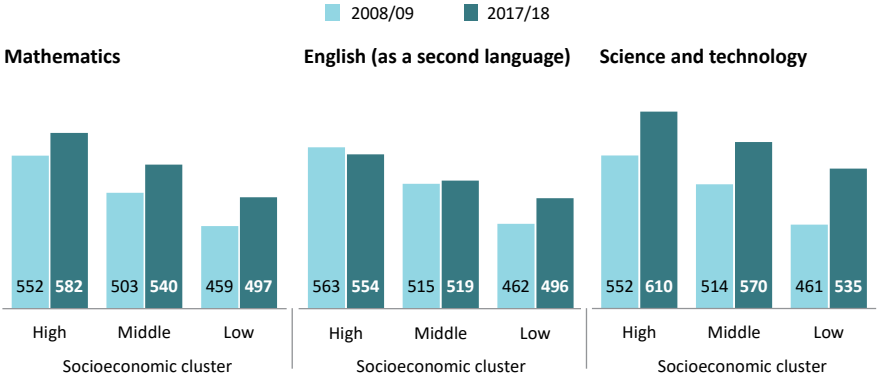


Source: Nachum Blass, Taub Center | Data: RAMA, 2018

9 Although some of the Grade 8 students attend primary schools, their curriculum corresponds to that of students in middle schools.

A look at the Meitzav data, where trends can be seen by socioeconomic level (Figure 9), shows a significant narrowing of the gaps. Thus, the gaps between the various socioeconomic groups in all of the subjects were larger in 2008/2009 than in 2017/2018. The narrowing of the gap between the strongest group and the weakest is particularly notable in English.

Figure 9. Student scores on the Meitzav mathematics, English (as a second language), and science exams in Grade 8, by socioeconomic cluster

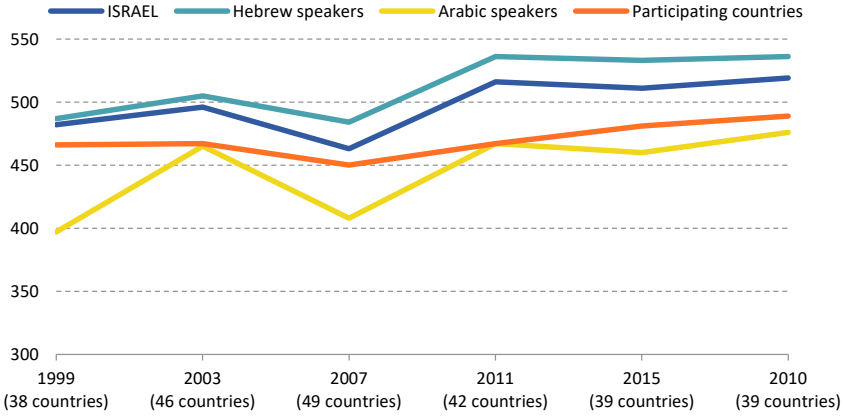


Source: Nachum Blass, Taub Center | Data: RAMA, 2018

The TIMSS exam

Between 1999 and 2019, there was a significant improvement in Israel's scores, with the scores in mathematics and science rising by about 50 points (about one standard deviation; RAMA, 2020b). Since 1999, only 16 countries have participated in all of the TIMSS exams (see Appendix Table 2). In 1999, Israel was in 13th place among 16 in the two subjects, but in 2019 it rose to 9th place in science and 7th place in mathematics. In other words, in comparison to the countries participating in all of the exams, Israel's students improved both their absolute scores and their relative ranking. Nonetheless, it is worth noting that in recent years there has been a slowdown in the rate of improvement.

Figure 10. Mathematics scores on the TIMSS exams



Source: Nachum Blass, Taub Center | Data: RAMA, 2020b

The situation in science is similar to that in mathematics. Here again, between 2011 and 2019 there was only a slight improvement in Israeli student achievements, except for a small one in the Arab sector.

The gaps between the strongest and weakest students show that while the situation in the participating countries did not change between 1999 and 2019, in Israel the situation improved relative to 1999, and only slightly 2015. It is worth noting that in Israel the share of high-achieving students (among Hebrew speakers) rose while the share of low-achieving students (among Arabic speakers) fell.

Table 1. Average scores and the share of students who scored excellent and those who did poorly on the TIMSS exams in the participating countries and Israel

		1999	2015	2019
ISRAEL (overall)	Average score	466	511	519
	Excellent score	4%	13%	15%
	Poor score	24%	16%	13%
	Spread of scores	314	332	322
Hebrew speakers	Average score	482	533	536
	Excellent score	4%	16%	19%
	Poor score	19%	9%	9%
	Spread of scores	—	302	313
Arabic speakers	Average score	397	460	476
	Excellent score	0%	6%	6%
	Poor score	51%	31%	22%
	Spread of scores	—	337	306
Participating countries	Average score	487	481	489
	Excellent score	6%	5%	5%
	Poor score	12%	16%	13%
	Spread of scores	—	282	284

Note: Excellent score: students who scored *excellent* on the exams; poor score: students who scored *below minimum*.
Source: Nachum Blass, Taub Center | Data: RAMA, 2020b

High schools

As noted previously, the achievements in high school are also measured by results on the Bagrut exams and the PISA exam, which assesses the achievements of Israeli students at age 16 (most of whom are in Grade 10 with some in Grade 9 or Grade 11).

The Bagrut exams

A Bagrut exam in Israel is virtually a necessary precondition for entering higher education and for social mobility. Therefore, a Bagrut certificate — particularly one which includes 5 units of mathematics and 5 units of English — is one of the most widely accepted measures of success for the education system in one of its main tasks, namely to increase opportunities of students to enter

higher education and to succeed in the job market. An increase in the share of students who graduate with a Bagrut certificate is perceived to be highly important, both for society and for the individual, and the publishing of the Bagrut results and the relative achievements of the students from various populations sectors receives wide public attention.

One of the problems in identifying an improvement or a deterioration in the achievements of Israel's students on the Bagrut exams is the lack of score calibration, which prevents making reliable statements about their level of difficulty, and, by extension, drawing conclusions regarding the level of students' knowledge. There are those who claim that improvements in the Bagrut rates are the result of lower exam standards, and they also claim that the education system is deteriorating. Another claim is that within some groups in the population success on the Bagrut exams is achieved by an increase in the level of cheating.[10]

There are also those who believe that the large increase in the share of students taking and passing the Bagrut exams is sufficient to indicate a lowering of the exams' standards. According to them, major improvements in the intellectual abilities of students cannot occur in such a short period (20 years, as we will see below). Therefore, only the lowering of standards can explain the increase in scores. Those who support this claim also believe that even if it is possible that the social benefit from increasing the level of eligibility exceeds the damage from lowering standards, this does not contradict the claim that the exam standards have been lowered.

Those who deny this claim feel that less stringent conditions for qualifying to take the exams and perhaps even a reduction in the material covered by the exams does not automatically lead to a less difficult exam. Thus, as long as the exams are not meant to test the students' abilities to work under time pressure or to memorize large quantities of material, the easing of the exams' conditions (such as spreading the exams over several years and reducing the amount of learned material) will not necessarily harm the ability to evaluate a student's achievements. If the exams reveal the students' ability to deal with difficult questions, to understand complicated material, and to deal with a subject on a high level of sophistication, as well as good levels of self-expression, then there is nothing intrinsically wrong with easing exam conditions.

10 The data available for this study show that even if cheating is more common among certain groups, its scope (only a few percent of all examinees) cannot explain the large increase in Bagrut eligibility rates.

Some educators believe that a reduction in the amount of learned material covered by the exams, accompanied by higher-quality teaching and a guarantee that every student reaches a minimum level of comprehension skills and an ability to apply learned material, then not only will the level of learning not be compromised, but the educational process is likely to improve.[11] In the opinion of these researchers, an excessive burden on the student leads to superficial and rote learning rather than a real understanding of the material. The question is not whether students should learn less material and whether the conditions of the exams are less stringent than in the past, but rather whether students today are required to reach a higher or lower level of understanding and analytical ability than in past years.

A well-grounded response requires comprehensive research to compare the level of difficulty of Bagrut exam questions in the past and the present, something which to the best of our knowledge has not yet been done. The only research that indirectly dealt with this issue — and whose relevance is limited in view of the year in which it was carried out — is that of Prof. Baruch Nevo and his colleagues on the second sitting of the Bagrut exams. Their research did not find any decline in the level of the exam for the second sitting nor in the criteria for marking the exams (Nevo et al., 2005). It is difficult to understand why these issues have not been examined more thoroughly in Israel, whether by RAMA or some other research body.[12] The questions of whether there is a need for Bagrut exams at all and, if there is, whether their level of difficulty should be calibrated are important in their own right and require a public and professional discussion before a decision is made.

Notwithstanding what has been said so far, there are several findings that are relevant to the question of whether the Bagrut exams achieve the goals set by the education system. They will be discussed based on data from the Ministry of Education website (Economic and Budget Authority — *Facts and Figures* and *Transparency in Education*) and the *Statistical Abstract of Israel No. 72* (CBS, 2021).

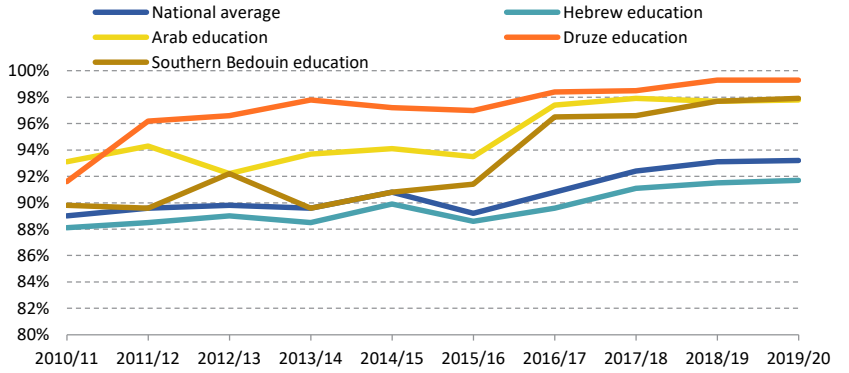
11 The late Prof. Chaim Adler, winner of the Israel Prize for Education, for example.

12 The Chief Scientist's Office in the Ministry of Education brought a group together which discussed the issue and concluded that there are major methodological difficulties in comparing the level of difficulty between exams. In the end, it was decided not to carry out a comprehensive study of the issue (information provided by Dr. Nora Cohen, the administrator of the Chief Scientist's Office at that time).

Students in Grade 12 as a share of the age cohort — Unfortunately, the Ministry of Education has stopped publishing this statistic. It is an important piece of data because it shows the extent to which youth in Israel — including Haredim and Arabs in East Jerusalem — continue attending an educational framework and in particular frameworks that lead to the Bagrut exams.[13] Removing East Jerusalem and Haredi students (because they choose not to take the Bagrut exams for ideological reasons) from the denominator (i.e,. from the total 17-year-old cohort) yields a higher rate of eligibility to take the exams.

The share of Grade 12 students taking the Bagrut exams — The share of Grade 12 students taking the Bagrut exams has increased during the past decade from 89% in 2010 to 93.1% in 2019 (Figure 11).[14] There are disparities, though, among population sectors. Particularly notable is the Druze sector which improved from 91.6% to 99.3%, and the Bedouin sector which improved from 89.8% to 97.7%.[15]

Figure 11. Share of students taking the Bagrut exams out of all students in Grade 12



Source: Nachum Blass, Taub Center | Data: Ministry of Education, Economics and Budgeting Administration website, *Transparency in Education*

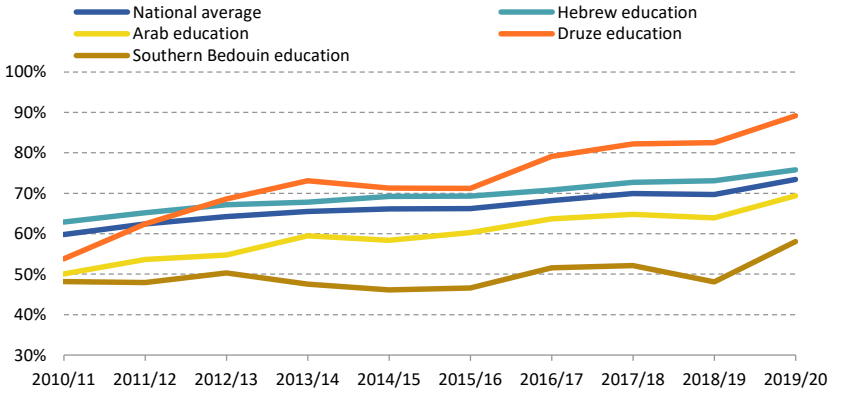
13 Despite the aforementioned, because there are students from various age cohorts studying in Grade 12 and the vast majority of the relevant age group attends some kind of educational framework, it may be that this statistic is less important than it might at first appear to be.

14 We are not taking into account the data for the 2020 Bagrut exams, which in our estimation are of less importance due to the exemptions provided during the COVID-19 pandemic.

15 These figures are somewhat lower than those according to the CBS data (2021, Table 4.19), according to which the share of Grade 12 students taking the Bagrut exams in 2019 was 86.4%. However, the reason for this disparity is apparently the different definitions used as the basis of the calculation. Nonetheless, the differences do not explain the large increase in the share of students taking the Bagrut exams.

The rate of qualifying for a Bagrut certificate among Grade 12 students — According to Ministry of Education data, the share of those qualifying for a Bagrut certificate from among those who took the exams rose from 59.8% in 2010 to 69.7% in 2019 (Figure 12). Here again the Druze sector stands out with an increase in rate from 53.8% to 82.5%, as well as the Arab sector which increased from 50.1% to 69.4% (or 65.8% according to the CBS). Any student who fails to qualify on the Bagrut exams for a Bagrut certificate can study and take the exams in an external setting, and of the students who completed their studies in 2012, 15% of the ineligible ones (3,905 students from among 26,038) later completed the exams and qualified for a Bagrut certificate.

Figure 12. Share of those qualifying for a Bagrut certificate out of all students in Grade 12



Source: Nachum Blass, Taub Center | Data: Ministry of Education, Economics and Budgeting Administration website, *Transparency in Education*

The share of those qualifying for a Bagrut certificate who meet university entrance requirements out of all those qualify for a Bagrut certificate — There has been a significant improvement also in this case. Between 2000 and 2015, this rate increased from 41.4% to 50.9% and in 2019 it reached 56.2% (CBS, 2021; Table 4.19). In 2009, it was only 45.6% (CBS, 2011, Table 8.23). In 2009, the rate in the Druze education system was 41.5% and among the Arabs it was 31.6%. In contrast, by 2019, it was 48.4% in the Arab education system.

The share of those qualifying for a Bagrut certificate with honors among all Grade 12 students — According to data on the Ministry of Education site *Transparency in Education*, the share of students who qualify for a Bagrut certificate with honors increased from 6.5% in 2014 to 8.8% in 2019 (we will not be discussing the 2020 data). The actual improvement may in fact be smaller due to the change in the definition of a Bagrut certificate with honors; nonetheless, the improvement was still significant.[16]

The share of Bagrut certificates with 5 units of mathematics and 5 units of English — The Ministry of Education has set a goal of increasing the share of students studying high-level mathematics and English. And indeed, the share of Bagrut certificates with 5 units of English increased from 30.7% in 2014 to 39.1% in 2019. In mathematics, the share rose from 9.5% to 15.5%.

At the end of the day, it can be said that the education system has made impressive achievements in many aspects of eligibility for a Bagrut certificate. It is reasonable to assume that within the cohort of students who completed high school in the 2018/2019 school year, close to 75% will qualify for a Bagrut certificate after they complete the exams in subjects which they previously failed or which they did not take, and at least 60% will qualify for a certificate that meets university entrance requirements.

The PISA exam

The achievements of Israel's students on the PISA exam show a slight downward trend or stability on the last three tests (since 2012) in contrast to the results of the TIMSS and PIRLS exams. Nonetheless, the results of the PISA exam in 2018 were better than those in 2009 and 2000. This can be seen in RAMA's abstract for the 2018 PISA report:

> From 2006 until 2012, there was an increase in achievement in reading literacy and mathematics. In science, there was no major change relative

16 Until the 2015/2016 school year (inclusive), a Bagrut certificate with honors was defined in one of two ways: (a) a certificate of 30 units, of which 5 are in English and at least 4 are in mathematics and the weighted average [of all the scores on the certificate] is at least 90; or (b) a Bagrut certificate of at least 25 units, of which 5 are in English and 5 are in mathematics and the weighted average [of all the scores] is at least 95. Beginning in the 2018/2019 school year, a Bagrut certificate with honors was defined as follows: a Bagrut certificate with 5 units of English and at least 4 units of mathematics with an average score of at least 90 and honors in a personal development and social involvement program.

to 2006. The changes in Israel's achievements from 2006 to 2018 are as follows: there was a large increase of 31 points in reading literacy (from 439 to 470); in mathematics, there was a moderate increase of 21 points (from 442 to 463); in science there was a not significant increase of 8 points (from 454 to 462). Among Hebrew speakers, the increases are comparable to those for all students in Israel while among Arabic speakers there was no clear trend. Relative to 2015, there were no significant differences in any of the three subjects (RAMA, 2019).

In comparing results for Israeli students to the OECD student average, it appears that the gap in reading literacy narrowed from 53 points in favor of the OECD students to only 10 points between 2006 and 2012. Meanwhile, the gap increased to 17 points between 2012 and 2018. The gap in mathematics was 54, 28, and 26 points respectively while in science it was 46, 31, and 27 points respectively (see RAMA, 2019, p. 10). Essentially, the picture according to PISA is one of significant improvement from 2000 to 2012, stability with somewhat of an increase up to 2015, and a slight decrease in 2018.[17]

In an examination of the gaps between Hebrew speakers and Arabic speakers, the data shows that since 2006 there has been an improvement in the share of honor students among Hebrew speakers alongside a drop in the rate of poorly performing students. The rate of honor students in the three subjects together (reading literacy, mathematics, and science) increased by 2% while the share of poorly performing students in the three subjects combined fell by 9%. In contrast, the share of honor students among Arabic speakers was negligible in all the subjects and across all of the tests over time, and in most cases there was an increase in the share of poorly performing students. In addition, the share of poorly performing students in all three subjects together rose, such that the gap widened (RAMA, 2019).

17 See Appendix Table 1. With respect to the 2018 exam, the data (as they appear in the official PISA report in the section on the attitude of the examinees toward the exam) present an interesting but worrying picture. Students in Israel (and in particular students at low levels of achievement, most of whom are apparently Arabs) demonstrated a low level of interest and a lack of desire to invest effort in order to succeed on the exam. The phenomenon was particularly acute in 2018. We do not have any explanation for this, although it may explain the surprising drop in the achievements of Arab students (see Weinreb & Blass, forthcoming).

Comparison of achievements on the Meitzav exam and the international tests: Final comments

While the Meitzav and Bagrut data for Israel show a clear upward trend between 2000 and 2019, the data on the international tests is more complicated and they should be looked at within a broader context of Israel's economic and background characteristics. Some of the studies by Israeli researchers have shown that, in general, Israel's ranking on international tests is in line with its economic level, its annual budget per student, and its demographic structure (Blass, 2016; Cahan et al., 2017; Feniger & Shavit, 2011; Yogev et al., 2009). Moreover, the PISA 2018 report presents two graphs which show that the achievements of students in Israel are higher than expected relative to its GDP per capita and more or less in line with what would be expected according to budget per student (OECD, 2019, pp. 65–66).

Teaching manpower

The discussion of the development of the education system in Israel cannot be separated from the public debate over the shortage of teachers that accompanied the start of the 2022/2023 school year. First, it is worth mentioning that this discussion seems to be an annual event. For example, in February 2011 an expert in the teaching of mathematics sent a letter to the Minister of Education in which she warned that mathematics education in Israel is liable to pay a heavy price due to the severe shortage in mathematics and physics teachers. "We are past the 11th hour," she wrote (Valmer, 2011). In August 2016, a worrying article was published on the teacher crisis. It mentioned steps that had been adopted out of desperation, such as the hiring of students without training to fill teaching positions and the teaching of English by geography teachers (Trabelsi Hadad, 2016). A further article dated May 2019 quoted the State Comptroller who surveyed the shortage in high-quality teachers: "Many students are taught by teachers who did not specialize in the subject they are teaching" (Dvir, 2019). And finally, in July 2022, Dalit Stauber, the Director General of the Ministry of Education, described the severe shortage in manpower and called on the government to accelerate the signing of wage agreements with the teachers (Somfalvi, 2022).

We could have brought dozens, if not hundreds, of other quotes from past years and from other contexts but these are sufficient to illustrate that the discussion of the *teacher shortage* and the *severe manpower crisis in teaching* has been with us for many years. The persistence of the discussion does not imply that there is no crisis — it may be that the crisis persists and that the discussion occurs in parallel. Therefore, the rest of our discussion will be devoted to claims that there is indeed a crisis.

It appears that despite the popularity of claims regarding the teacher shortage, the data indicate that the number of teachers has grown much faster than the number of students and class size. Thus, even if there is a basis for the claims of a teacher shortage, that current shortage is less than it was in the past.

With regard to the quality of teachers, there is a consensus among researchers that there are no tools to objectively and reliably address this question. This is because defining the outputs of education is also dependent on one's value-based attitudes and beliefs. Another reason is the lack of reliable tools for measuring output, even when the tools are agreed upon. Essentially, it is for these reasons — and for reasons of administrative efficiency — that policy makers, educators, and researchers use a few accepted indicators of teacher quality, including seniority, academic education and cognitive skills (according to achievements on the Bagrut and psychometric exams), even though many believe that there is little connection between these parameters and the quality of a teacher.[18] We first examine the claim of a teacher shortage and then the data on teacher quality as measured by the various indices.

The teacher shortage

According to CBS data, the number of teachers in the system grew by 2.7% in the 2020/2021 school year relative to 2019/2020, and, during the past decade (2010/2011 to 2021/2022) the change in the number of teachers has risen on average 3.2% annually (Table 2; CBS, 2022). Not only has there been overall growth, but it was across all parts of the system, apart from primary education and the Arab sector. Not only has the number of teachers grown relative to the number of students, the average number of instruction hours has also risen during the past decade at a faster rate than the number of students.

18 For a more detailed discussion, see Blass (2011).

Table 2. Number of teachers in the 2020/2021 and 2021/2022 school years and the rate of change over the last decade and the last year

Sector, supervisory authority, education level	2020/2021	2021/2022	Average annual change, 2010/2011 to 2021/2022 (percent)	Average annual change, 2020/2021 to 2021/2022 (percent)
Total	193,100	198,270	3.2	2.7
Hebrew education	149,026	154,038	3.4	3.4
Preschool	16,611	17,841	5.0	7.4
Primary school	71,755	73,337	3.1	2.2
Middle school	31,231	32,276	2.9	3.3
High school	45,227	46,289	2.7	2.3
State education	90,033	91,730	3.1	1.9
State-religious	34.799	35.725	3.2	2.7
Haredi	24,194	26,583	4.5	9.9
Arab education	44,074	44,232	2.8	0.4
Preschool	3,171	3,310	2.7	4.4
Primary school	22,388	21,855	1.5	-2.4
Middle school	8,611	8,815	2.7	2.4
High school	11,578	11,783	4.8	1.8

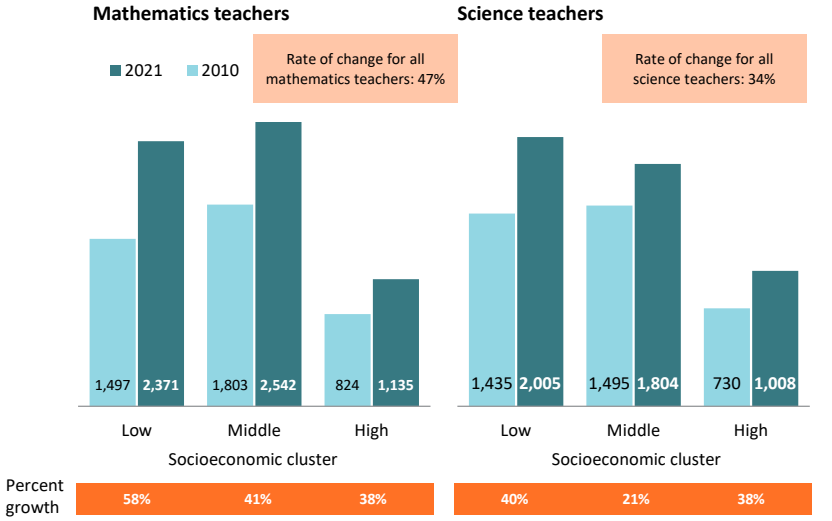
Source: Nachum Blass, Taub Center | Data: CBS

Given that the rate of increase in the number of teachers was greater than the increase in the number of students in all of the years up to 2018/2019, the data imply that, at least until then, the average number of students per full-time teacher and the average class size fell significantly. Both of these phenomena are evidence that recent years have in fact not been characterized by a growing overall shortage in teachers across all levels of education, sectors, and supervisory authorities. If the feeling of a shortage indeed exists, then it must be the result of a limited and temporary shortage in specific locations.

The claim of a teacher shortage and in particular a shortage of high school teachers, can be examined closer and from additional perspectives by looking at the situation of high school science teachers. Data available are for high school teachers in mathematics, physics, biology, chemistry, and computer science. Figure 13 clearly shows that the total number of mathematics teachers grew by 47% between 2010 and 2021 while in the sciences it grew by 34%, which is far greater than the increase (of only about 20%) in the number

of students in high schools that prepare for the Bagrut exams (which are the relevant schools for these subjects) during the same period. Moreover, the increase in the number of teachers was much faster in schools with a lower socioeconomic ranking than in those with a higher socioeconomic ranking.

Figure 13. The number of mathematics and science teachers

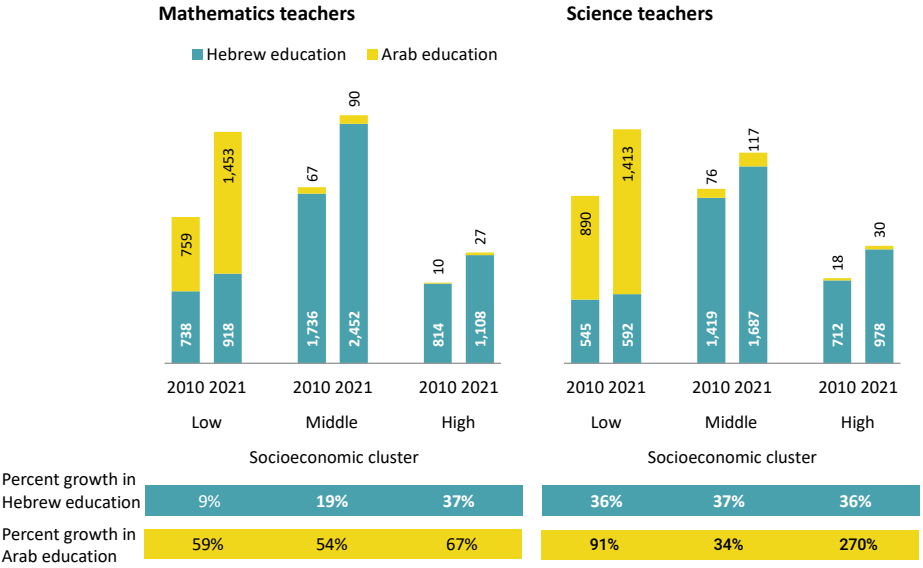


Note: A breakdown by subject (physics, biology, chemistry, and computer science) could have been shown, but since the trends are similar it was decided, for the sake of brevity, to consolidate the data for these subjects.
Source: Nachum Blass, Taub Center | Data: CBS

During the relevant years, i.e., 2010 to 2021, the number of high school students in the Hebrew education system grew by 14% while the number of Arab high school students grew by 37%. Figure 14 shows that in Hebrew education the number of mathematics teachers grew by 37% during this period while the number of mathematics teachers in Arab education grew by 91%. In all of the other subjects, the figures are 25% and 56%, respectively.

In view of these data, the claim that there is a shortage of high school teachers in the sciences and that the existing ones are abandoning the profession appears to be baseless.

Figure 14. The number of mathematics and science teachers, by socioeconomic cluster and education system



Source: Nachum Blass, Taub Center | Data: CBS

There are those who cast doubt on the CBS data, as reflected in claims made at the Mandel Institute conference held on July 24, 2022.[19] However, as long as there is no clear cut and solid evidence that data from the CBS *Statistical Abstracts* are inaccurate, then we will continue to use their data. Furthermore, the CBS is not a stakeholder and their publications are based on data gathered for administrative purposes by the Ministry of Education.

19 For example, a Ministry of Education official stated that: "The solutions currently proposed are on the level of aspirins and band aids. An overall strategic perspective is needed. This is a national issue that needs to be solved on the national level." A well-known school principal stated that "the flight from the system is leading to a reduction in standards and compromises on quality. Whole subjects are on the verge of extinction. Large groups do not have opportunities available to them and in that sense the system has failed to narrow the gaps. This is a violation of the covenant between the state and its citizens." Finally, a famous member of academia and an expert on the subject defined the situation in the closing remarks of the conference: "This is our Yom Kippur. An eye-opening and painful day; but we do not have the right to despair." The quotes are based on what I heard at the conference itself and on the summary of the conference.

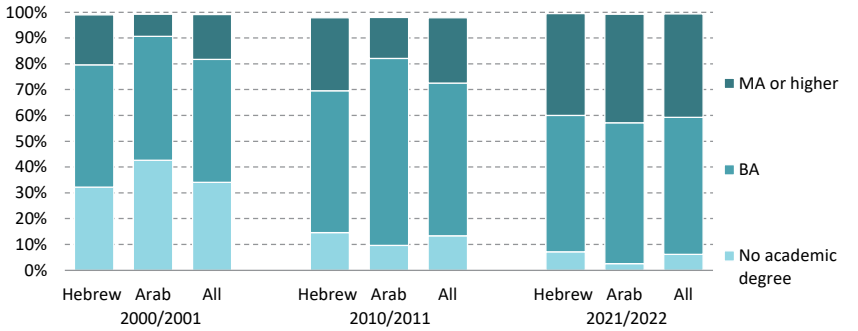
Teacher quality

There are currently no reliable and agreed-upon indicators to rank teacher quality and so we will rely on the conventional parameters to measure it, i.e., teacher level of academic education and the match between their training and the subject they are teaching.

The level of academic education of teachers

Figure 15 shows that the share of degree holders among teachers has risen consistently over time. Most teachers today have at least a bachelor's degree. Of note is the closing of gaps in teachers' education between the Hebrew and Arab sectors. In 2022, the share of teachers with a bachelor's degree in the Arab sector was even somewhat higher than in the Hebrew sector: 54.% vs 52.8% while the share of teachers with a master's degree or higher was 42% in the Hebrew education sector and 39.4% in the Arab sector. Of course, the question then arises as to whether a teacher with a master's degree is better than one with a bachelor's degree or even one without an academic degree. The question is particularly relevant in the context of the education level. According to the literature, the evidence is ambiguous particularly in the case of the value of a master's degree.[20]

Figure 15. Teaching manpower, by sector and education level



Note: The categories do not add up to 100% in the CBS publication.
Source: Nachum Blass, Taub Center | Data: CBS, 2022

20 There are those who believe that this raises the costs of the education system since a teacher with a master's degree receives a higher salary without necessarily improving their performance (Blass, 2008).

There are those who believe that the institution where a teacher studied for their degree is an indicator of the quality of their training. Thus, a teacher who studied at a university has an advantage over a teacher who studied at a college or a teachers' college. However, there is no data to confirm this assertion. According to a recently published article, the share of teachers who studied at a university and who joined the education system in 2017 was lower than the number who joined the education system in 2008 (CBS, 2019). This is generally true also with respect to differences in achievement on the Bagrut exams or the psychometric exam when comparing teachers who joined the education system in 2011 to those who joined in 2019.

The Hebrew sector — In the case of teachers teaching language arts, scores on the Bagrut exams were lower among those who joined the education system in 2019 (between 2 and 5 points) and their scores were similar on the psychometric exam, depending on the level of education they were teaching in (the gap was larger in primary schools and smaller in high schools). Among mathematics teachers, the gap in scores on the Bagrut exam in mathematics was between 1 and 5 points, although there was almost no difference in quantitative thinking on the psychometric exam. Here again, the gap was dependent on the level of education. Among English teachers, the scores on the Bagrut exam in English showed an upward trend (of about 5 points), as did the scores in English on the psychometric exam (between 4 and 10 points), depending on the level of education.

The Arab sector — The Bagrut scores of language arts teachers in the Arab sector were, in general, similar or better than of their peers in the Hebrew sector. In the case of mathematics, the percentage of those who took the Bagrut exam in 5-units of mathematics was generally higher in the Arab sector than in the Hebrew sector, while in the case of English it was lower in the Arab sector; in both sectors there was an upward trend. In contrast to the Bagrut exams, the achievements on the psychometric exam of new teachers in the Arab sector were consistently lower than those of their counterparts in the Hebrew education sector.[21]

In sum, although there has been a major improvement in the level of training among new teachers and in the average level of education of all teachers relative to the past, there are also signs that in recent years the level of new

21 The most recent data available are taken from a publication of the CBS (2019).

teachers has not been improving and has even declined somewhat. The question is then whether an increase in level of education compensates for a decline in teachers' background data, which is reflected in their achievements on the Bagrut exams and on the psychometric exam.

The match between teacher training and the subject they teach

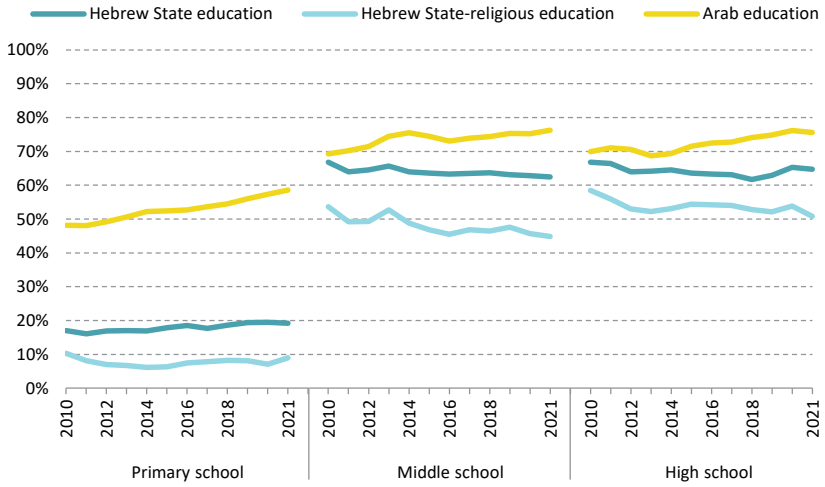
In order to assess the match between a teacher's training and the subject they teach, three perspectives (at least) need to be considered. The first is the situation at a specific point in time; the second is the situation over time; and the third is a comparison to other countries.

The following discussion will focus on only the first two perspectives. Figure 16 describes the situation in the teaching of Hebrew (language arts); Figure 17 describes the situation in mathematics; and Figure 18 describes the situation for English teachers (English as a second language).[22] Figure 16 shows that in primary education only about 20% of teachers in the Hebrew State education system (and about 10% in the State-religious education system) who teach Hebrew have training that matches the subject they are teaching. This situation has remained unchanged over the past decade. The reason may be that school principals feel that Hebrew as one's mother tongue is sufficient training to teach language arts, in addition to teaching skills. In the Arab sector, where the teachers' mother tongue is Arabic, separate training in teaching Hebrew is almost always a necessary requirement and, therefore, the share of teachers who are trained in teaching Hebrew language arts reaches 60%.

In middle schools and high schools, the match between teachers' training and the subject they teach is better than in the primary schools, and in the State system it is better than in the State-religious system, although a clear decline is seen. This could possibly be attributed to the steep decline in the number of students studying liberal arts or the social sciences and to the lower priority given to these subjects relative to mathematics and English by the education system. Here, too, the situation in the Arab sector is better than in the Hebrew education sector.

22 It is worth mentioning that the match between a teacher's training and the subject they teach is almost always measured by the teacher's type of professional training. Nonetheless, studies have not found a correlation between a teacher's degree and their students' academic achievements. In our context, it is perhaps worthwhile mentioning that the match to a teacher's subject is highest in Arab education and lowest in Hebrew State-religious education, although the academic achievements of students in these sectors are not necessarily correlated with the quality of the match.

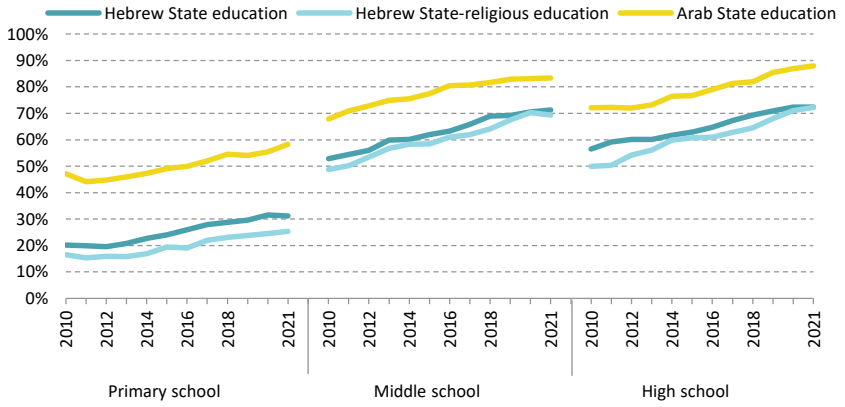
Figure 16. Share of language arts (Hebrew) teachers with appropriate training



Source: Nachum Blass, Taub Center | Data: CBS, 2022

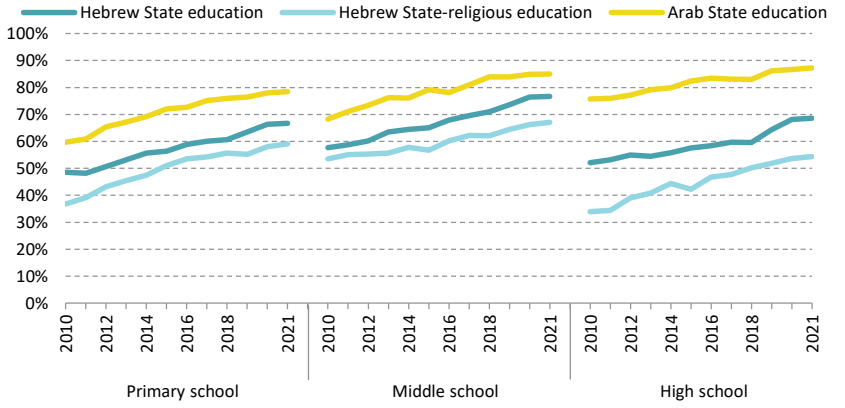
With respect to the match in mathematics and English, in 2021 there were still many teachers whose training did not satisfy the requirements of the Ministry of Education. Nonetheless, the data indicate that the current situation is better than in the past — at all levels of education and in all of the population sectors. Here again, the Arab sector seems to be in a better situation, which can perhaps be explained by the fact that many of the Arab teachers are young and have just completed their training in teachers' colleges. This means there is a surplus of teachers enabling a better match between young teachers and their training. In the end, although there is criticism that there are too many teachers teaching subjects they aren't trained in, there has been a significant improvement in this situation in recent years.

Figure 17. Share of mathematics teachers with appropriate training



Source: Nachum Blass, Taub Center | Data: CBS, 2022

Figure 18. Share of English (as a second language) teachers with appropriate training



Source: Nachum Blass, Taub Center | Data: CBS, 2022

Teachers' wages

The issue of teachers' wages has recently been the focus of public discourse.[23] Below we will examine the development of teachers' wages over the past decade, both from an absolute perspective and also relative to other professions in Israel, as well as relative to other countries.

The most recent CBS press release devotes significant attention to this subject (CBS, 2022). It states that, between 2000 and 2020, the average monthly wage rose by 90.1% while the hourly wage rose by 43% (Figure 19). During those two decades, the CPI rose by 34% and during the last decade it rose by 8.5%. In this context, it is worthwhile considering a few additional points:

1. The wages of women teachers improved more than those of men teachers, particularly in hourly terms.
2. The wages of teachers with high seniority improved more than those of new teachers.
3. The wages of teachers without an academic degree improved more than those of teachers with one (which is apparently the result of the improvement among Haredi teachers, most of whom are eligible for a salary according to a degree that is *equivalent* to an academic degree).
4. There was greater improvement in the wages of teachers in locations with a low socioeconomic ranking, apparently due to the large number of Arab or Haredi teachers. The significant improvement in wages in the Arab sector can be partially explained by an increase in seniority and in education, which has been more rapid that in the Hebrew education sector.
5. The hourly wages of preschool teachers improved the most during the past decade and particularly during the past two decades.
6. The rate of increase in the monthly wages of middle school teachers was the highest, but the increase in their hourly wages was the lowest. This is explained by the new wage agreements, according to which middle school teachers who work about 40 weekly hours are defined as full-time as compared to only 24 weekly hours in previous wage agreements.

23 A few months before the time of writing, a new wage agreement was signed with the Teachers' Union. At this stage, we still do not know how it will affect the education system and therefore it is not discussed here.

Figure 19. Rate of change in salaries of teaching manpower, by selected characteristics

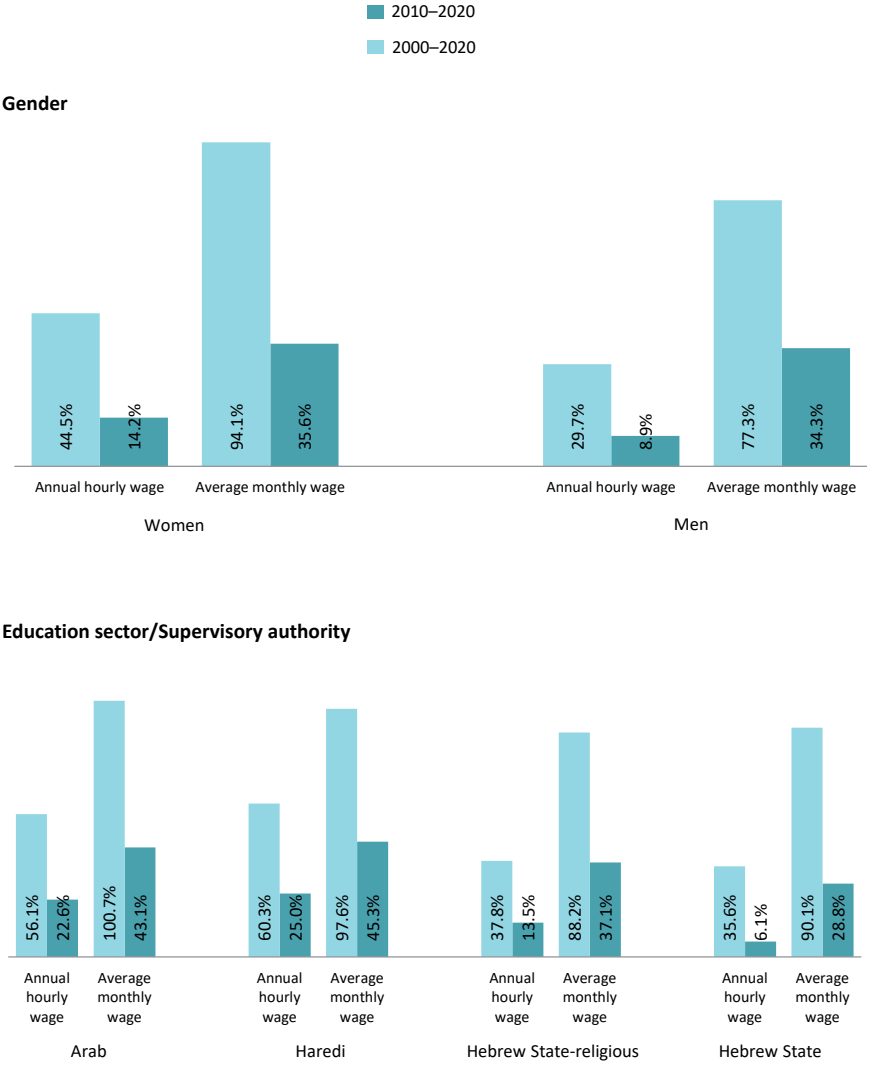
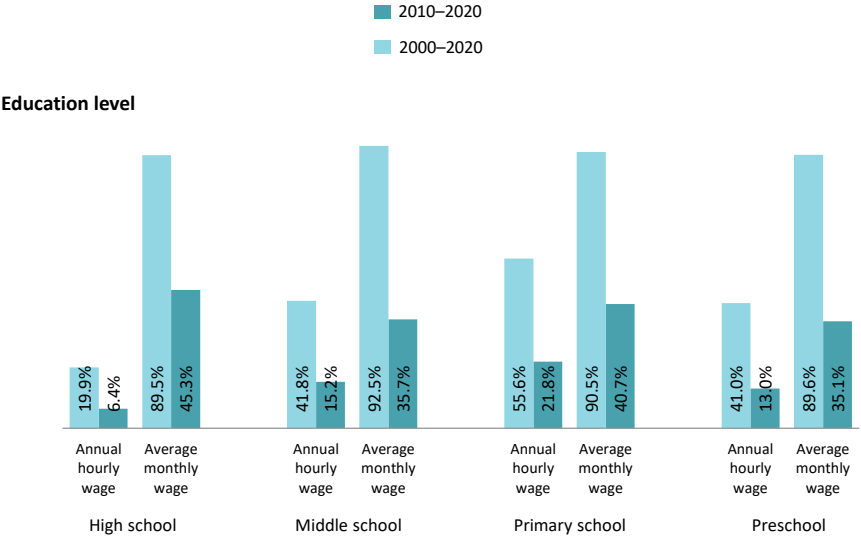


Figure 19 (continued). Rate of change in salaries of teaching manpower, by selected characteristics



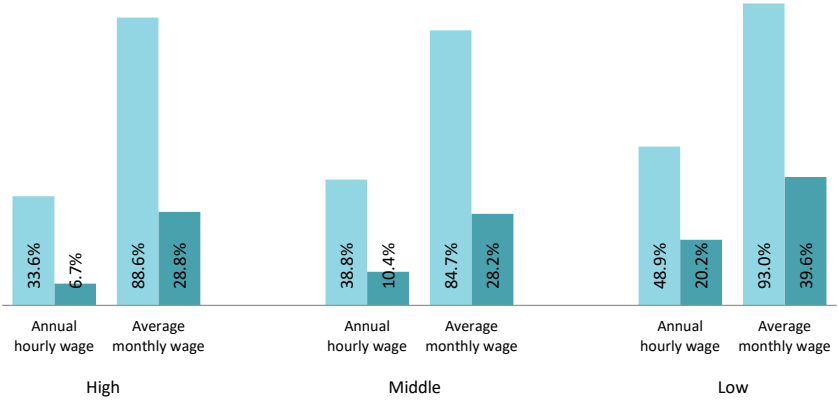
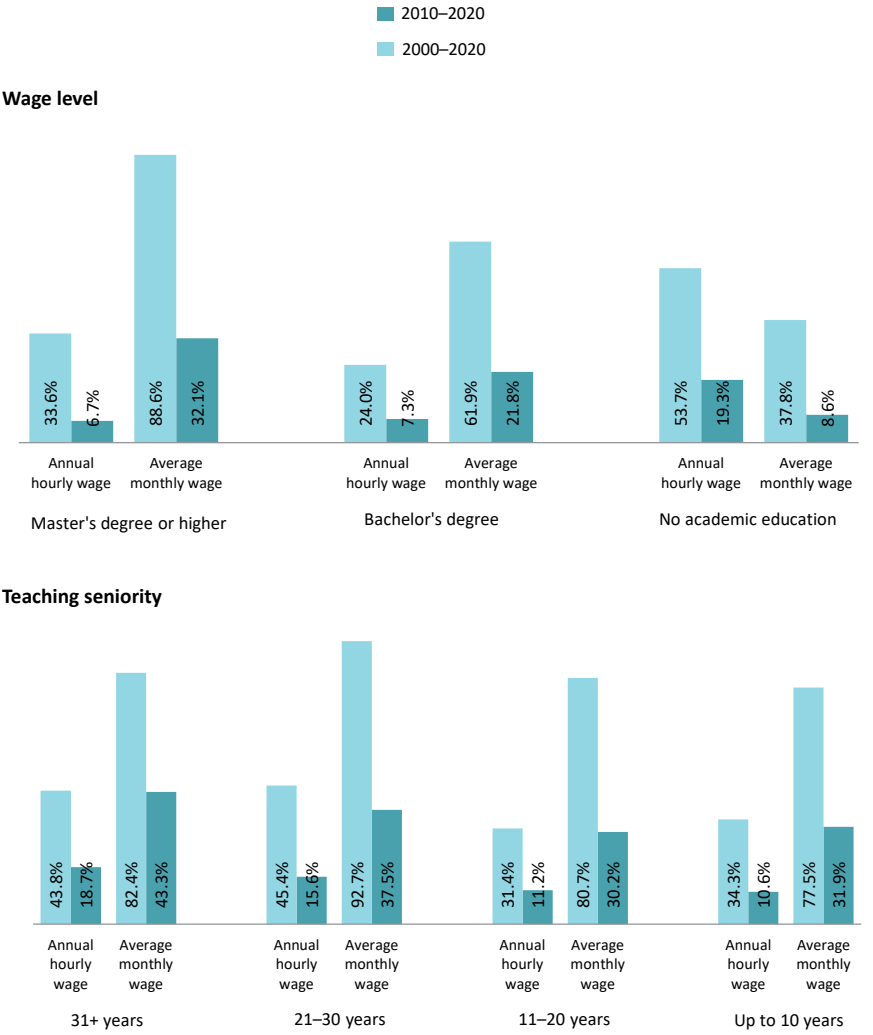


Figure 19 (continued). Rate of change in salaries of teaching manpower, by selected characteristics



Source: Nachum Blass, Taub Center | Data: CBS, 2022, Table 9

School environment

School environment is an important issue which has not received the attention it deserves. The relevant data is gathered by RAMA using questionnaires answered by students and teachers in primary schools, middle schools, and high schools in both the Hebrew and Arab education sectors. The results are shared on the website *The Educational Picture*. Some of the subjects related to educational atmosphere have been surveyed since 2009/2010 while others were introduced later on. The following is a discussion of the data gathered from 2009/2010 onwards.[24]

Figure 20 presents the change in students' responses to questions asked in 2009/2010 and in 2019/2020. The graph indicates the following:

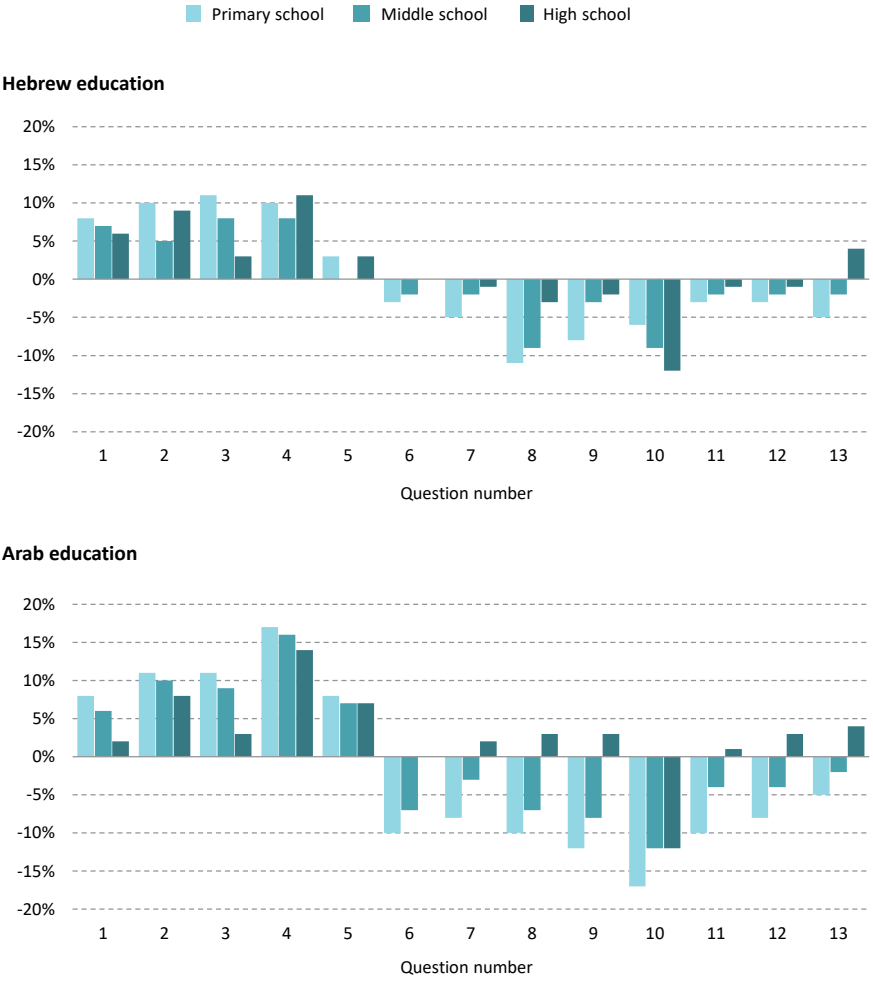
1. The vast majority of student responses indicated an improvement, with just a few — all of them from students in middle school — indicating no change.
2. The improvement in primary schools was usually larger than that in middle schools, and the improvement in middle schools was in turn larger than that in high schools.
3. In primary and middle schools, the improvement in the Arab sector was greater than in the Hebrew sector. In high schools, there were aspects of school environment in which the improvement was greater in the Arab sector and others in which it was greater in the Hebrew sector.
4. It is important to note that students complain about teachers being violent toward them verbally and even physically. Although the situation improved in primary schools and in middle schools, it worsened in high schools. Clearly, such a situation cannot be tolerated.

24 For further details, see the Ministry of Education website, *The Educational Picture*, and the 2009/2010 Meitzav Report (RAMA, 2020a).

Students answered the following questions regarding school environment (Figure 20):

1. A generally positive feeling toward the school;
2. Close and empathic relationships between teachers and students;
3. Positive relationships between students and their classmates;
4. Proper behavior of students in class;
5. Respect and encouragement to learn provided by the teachers;
6. The lack of a feeling of security among the students;
7. Involvement in violent incidents;
8. A student cursed me with the intent of insulting me;
9. A student made fun of me because of my skin color, ethnic origin, or religion;
10. Students break or destroy school property;
11. Students stole something from my personal belongings;
12. A teacher made fun of me, insulted me, or humiliated me verbally in the school;
13. A teacher grabbed me, pushed me, or intentionally hit me.

Figure 20. Changes in students' responses to the school environment questionnaire between the 2009/2010 and 2019/2020 school years, by education level and school sector



Source: Nachum Blass, Taub Center | Data: RAMA

Conclusion

In any discussion of an improvement or deterioration in the education system, it is important to remember that it is not a separate entity from other systems in Israeli society. It is part of Israeli society in all of its aspects and components; it has an impact on society and is impacted by society; it is the reason for certain phenomena and it is the outcome of others. It is important to determine, as much as possible whether it is deteriorating, stagnant, or improving.

Decisions relating to the quality of the education system must be based on a comprehensive and broad perspective that considers all of its functions and the potential effect it has on social processes. When this is done, it appears that the situation of the education system in Israel is not as bad as some think, and attempts to ignore its achievements and place blame on its workers, who are investing the best of their abilities in its success, is somewhat misguided.

This approach is mistaken first and foremost because the facts reflect otherwise. The current state of the education system is no worse or no better than in the past according to most of the parameters that were examined. Those parameters are the main ones that appear in the literature on assessing education systems. The rates of attendance in all stages of the education system have risen; the share of high school graduates and the share of them that graduate with a Bagrut certificate have also risen; the number of students per teacher and average class size have declined. Teachers today are more educated than in the past; the match between a teacher's training and the subject they teach has improved, as has the school environment, according to this survey. These processes have been accompanied by a narrowing of gaps between the Hebrew and the Arab education system and between schools of different socioeconomic levels on most of the variables considered above.

The view of the education system as being in decline and in an existential crisis is not only inaccurate but also dangerous because it may lead to feelings of despair and the hopeless conclusion that no matter what is done and no matter how much is invested, the results are dismal and investment is wasted.

In order to meet the oft-heard criticism of the education system, it is worth mentioning some additional achievements that have not been directly attributed to the education system but perhaps should be. For example, Israel's high tech industry, which employs a great number of young workers who have only just completed their education, is an achievement to be proud of. The brain drain from Israel — although it is a warning light for higher education in Israel — would not have occurred unless the owners of those *brains* had not

received their training in Israel's education system. (The problem could perhaps have been prevented to a large extent if graduates of higher education had more jobs available to them in institutions of higher education.) In addition, three of Israel's universities are almost consistently ranked among the top 100 worldwide and the rest are usually among the top 300. The education system in Israel has attained this level of achievement despite an ongoing security situation and far-reaching demographic changes, which have increased the share of weaker socioeconomic groups within the population.

It is worthwhile recognizing and praising the achievements of the system while being aware of its faults, which are substantial. It is important to increase efforts to improve academic achievement in all subjects. Every effort should be made to narrow academic and social gaps within the system, to halt the decline in the value of education and learning for its own sake; and to end the lack of respect for educational workers and especially teachers. It would also be worthwhile to mend the ever-widening gaps between the various parts of the system, to stop the decline in the study of liberal arts and the social sciences, and to rectify the lack of attention given to the sciences, mathematics, and English in the Haredi sector.

In recent years, we have been witness to growing polarization in discourse and sometimes even in behavior regarding relations between Jews and Arabs. Attempts to organize encounters between Arab and Jewish youth are few in number and not always successful in achieving their desired outcomes. Even discussions of relations between Mizrahim and Ashkenazim, secular and religious sometimes diverge from the discourse that is expected in an educational institution. Teachers are often fearful of expressing positions that are in line with the goals of education as set down in the Law of State Education and in the Declaration of Independence, and there is the blatant intervention of parents in what is happening in the schools. Finally, changes in government policy following the most recent elections, like freezing efforts to teach core subjects in Haredi education and encouraging activities of private educational institutions especially in the Haredi sector, place difficult challenges before the public education system.

We must demand from the education system leaders and from all those who are stakeholders, including teachers, principals, students, parents, and researchers, that they make improvements and increase efficiency, so that we will be able within the shortest time possible to achieve even better outcomes in academic achievement, in the narrowing of educational and social gaps, and in the learning and educational atmosphere in the schools.

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Appendix

Appendix Table 1. PISA exam scores: An international comparison

Reading literacy (Hebrew)

	2000	2009	2018	Difference 2018 to 2000	Difference 2018 to 2009
South Korea	525	539	514	-11	-25
Canada	534	524	520	-14	-4
New Zealand	529	521	506	-23	-15
Belgium	507	506	493	-14	-13
Switzerland	494	501	484	-10	-17
US	504	500	505	1	5
Sweden	516	497	506	-10	9
Germany	484	497	498	14	1
Ireland	527	496	518	-9	22
France	505	496	493	-12	-3
Denmark	497	495	501	4	6
Portugal	470	489	492	22	3
Latvia	458	784	479	21	-5
ISRAEL	452	474	470	18	-4
Russian Federation	462	467	479	17	12
Chile	410	449	452	42	3
Mexico	422	425	420	-2	-5
Indonesia	371	402	371	0	-31
ISRAEL'S rank	15	14	15	0	1

Appendix Table 1 (continued). PISA exam scores: An international comparison

Mathematics

	2000	2009	2018	Difference 2018 to 2000	Difference 2018 to 2009
South Korea	547	546	526	-21	-20
Switzerland	529	534	515	-14	-19
Canada	533	527	512	-21	-15
Denmark	514	503	509	-5	6
Belgium	520	515	508	-12	-7
Sweden	510	494	502	-8	8
Germany	490	513	500	10	-13
Ireland	503	487	500	-3	13
Latvia	463	482	496	33	14
France	517	497	495	-22	-2
New Zealand	537	519	494	-43	-25
Portugal	454	487	492	38	5
Russian Federation	478	469	488	10	19
US	493	487	478	-15	-9
ISRAEL	433	447	463	30	16
Chile	384	421	417	33	-4
Mexico	387	419	409	22	-10
Indonesia	367	371	379	12	8
ISRAEL'S rank	15	15	15	0	0

Appendix Table 1 (continued). PISA exam scores: An international comparison

Science

	2000	2009	2018	Difference 2018 to 2000	Difference 2018 to 2009
South Korea	552	538	519	-33	-19
Canada	529	529	518	-11	-11
New Zealand	528	532	508	-20	-24
Germany	487	520	503	16	-17
US	499	502	502	3	0
Belgium	496	507	499	3	-8
Sweden	512	495	499	-13	4
Ireland	513	508	496	-17	-12
Switzerland	496	517	495	-1	-22
Denmark	481	499	493	12	-6
France	500	498	493	-7	-5
Portugal	459	493	492	33	-1
Latvia	460	494	487	27	-7
Russian Federation	460	473	478	18	5
ISRAEL	434	455	462	28	7
Chile	415	447	444	29	-3
Mexico	422	416	419	-3	3
Indonesia	393	383	396	3	13
ISRAEL'S rank	15	15	15	0	0

Note: The comparison is between the scores of Israeli students and those of students from the participating countries in each exam.
Source: Nachum Blass, Taub Center | Data: RAMA, international studies

Appendix Table 2. TIMSS exam scores: An international comparison

Mathematics

	1999	2011	2019	Difference 2010 to 1999	Difference 2019 to 2011
Australia	525	505	517	-8	12
Hong Kong	582	586	578	-4	-8
Hungary	532	808	517	-15	12
Iran	422	415	446	24	31
ISRAEL	466	477	519	53	42
Italy	479	485	497	18	12
Japan	579	578	594	15	16
Jordan	428	406	420	-8	14
South Korea	587	613	607	20	-6
Lithuania	482	502	520	38	18
Malaysia	519	440	461	-58	21
Morocco	337	371	388	51	17
Romania	472	458	479	7	21
Russian Federation	526	539	543	17	4
Singapore	604	611	616	12	5
Slovenia	530	510	511	-19	1
ISRAEL'S rank	13	11	7	-6	-4

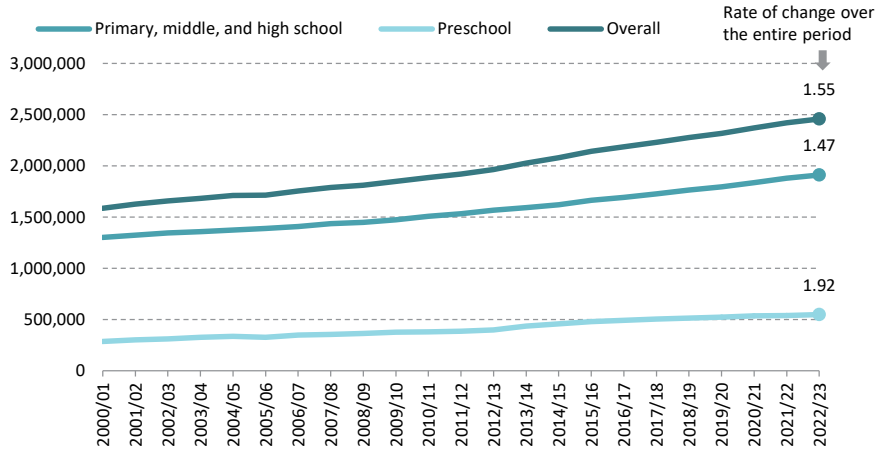
Appendix Table 2 (continued). TIMSS exam scores: An international comparison

Science

	1999	2011	2019	Difference 2010 to 1999	Difference 2019 to 2011
Australia	540	519	528	-12	9
Hong Kong	530	535	504	-26	-31
Hungary	552	539	530	-22	-9
Iran	448	474	449	1	-25
ISRAEL	468	503	513	45	10
Italy	493	494	500	7	6
Japan	550	566	570	20	4
Jordan	450	449	452	2	3
South Korea	549	560	561	12	1
Lithuania	488	514	534	46	20
Malaysia	492	426	460	-32	34
Morocco	323	376	3984	71	18
Romania	472	465	470	-2	5
Russian Federation	529	542	543	14	1
Singapore	568	590	608	10	18
Slovenia	533	517	543	10	26
ISRAEL'S rank	13	10	9	-4	-1

Note: The comparison is between the scores of Israeli students and those of students from the participating countries in each exam.
Source: Nachum Blass, Taub Center | Data: RAMA, international studies

Appendix Figure 1. The number of students in the Israeli education system



Source: Nachum Blass, Taub Center | Data: Ministry of Education

Executive Summary

Special Education Budgeting in Israel: From the Dorner Committee Recommendations to Implementation of Amendment 11 to the Special Education Law

Nachum Blass

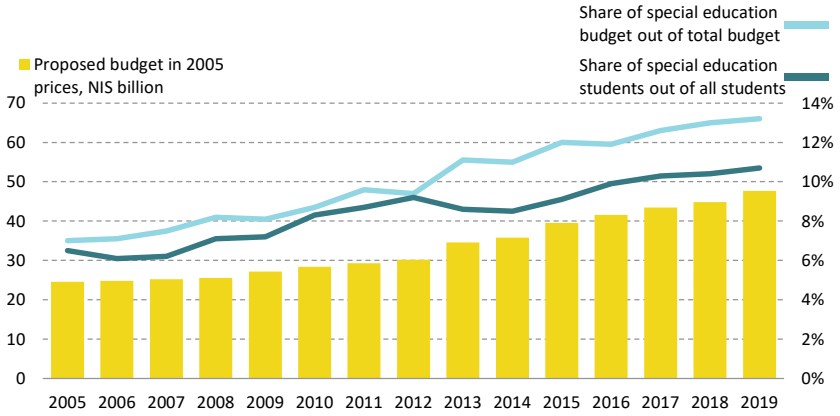
Of all the main items in the Ministry of Education's budget, the special education budget is the one that has grown at the fastest rate in recent years. This research discusses the development of special education budgets and the division of the budget between the various special education frameworks (special education schools, special education classes in regular schools, and students with special needs integrated into regular classes). It also describes the factors affecting the size of the budget for special education and suggests ways to improve the budgeting methods.

Between 2005 and 2019, there was a significant increase in the education budget in general and more specifically in the special education budget. During this period, while the real budget of the Ministry of Education as a whole increased by 94%, the special education budget grew by 267%. The share of the special education budget in the total education budget climbed during these years from 7% to 13%, and the share of students with special needs increased from 6.5% to 11% of all students in the system.

* Nachum Blass, Principal Researcher and Chair, Education Policy Program, Taub Center for Social Policy Studies in Israel. The full study was published in April 2022 and can found on the Taub Center website.

This means that the budget per student in special education grew at a faster rate than the entire special education budget, let alone the education budget in general. Currently, the budget per student in special education is determined mainly on the basis of the type of disability and level of functioning, but it is also strongly influenced by the framework in which the student studies. As a result, children with the same limitations or disability may not receive the same assistance because they are studying in different frameworks.

Special education students and Ministry of Education budgets



Source: Nachum Blass, Taub Center | Data: Ministry of Education Budget; Accountant General reports; *Mabat Rahav* (A Wide Perspective) website

The increase in the special education budget is due to three factors, the main factor being the sharp increase in recent years in the number of students defined as *special needs*. Between 2005 and 2019, the number of students with special needs increased by 122%, compared to an increase of only 29% in the number of students in regular education. Another factor is the distribution of special education students among the various educational frameworks.

Students who study in separate settings generally receive a larger budget compared to special education students who attend special classes in regular schools or those who are integrated (mainstreamed) into regular classes. As a result, in 2019, students enrolled in separate settings received about 60% of the budget, even though their share of all special education students is about 40%.

The rest of the students, those integrated into regular settings, had to manage with 40% of the budget. Another factor that may explain the increase in the budget for special education is the difference in the growth rate of students with disabilities such as autism that require relatively large budgets, compared to the share of students with, for instance, learning disabilities, whose cost of treatment is much lower.

When referring to special education budgeting two important milestones must be mentioned. The first is the establishment of the Dorner Committee to examine special education in Israel in 2009. Its main recommendations were to allow parents freedom of choice regarding the educational setting in which their children will study; to link the budget allocated to the students with the their level of functioning and disability (physical, mental, or intellectual); and to work to sever the connection between the budget allocated to the students and the educational setting to which they are directed.

The second landmark is Amendment No. 11 to the Special Education Law, which was approved in 2018 and is intended to promote the implementation of the Dorner Committee's recommendations. The main goal of the Amendment to the Special Education Law is to bring about the integration of the majority of special education students at high and medium-high functioning levels into regular settings, and to designate the separate settings for students with low levels of functioning. In practice, the Amendment allows the Ministry of Education to transfer students from separate frameworks for integration into regular schools without granting them the same budget as students with disabilities and similar levels of functioning who attend separate settings.

Looking to the future, if the Amendment to the Special Education Law does achieve its goal and students at the higher levels of functioning are referred to integrated frameworks in regular schools, this could lead to considerable budget savings for several reasons: *reducing teaching costs* — reducing the number of students in separate settings will require fewer high-pay personnel; *reducing transportation costs* for students with special needs to separate settings, which are usually located far from the student's place of residence; and *reducing construction costs* due to the lessening in demand for special education classrooms, the cost of which is about 26% more expensive than the cost of building regular classrooms.

Executive Summary

The Continuing Struggle for Equality in the Funding of Special Education: A Historical Overview

Nachum Blass

The paper presents a historical overview of the budgeting of special education in Israel. The review shows that, contrary to the recommendations of various committees on the subject, the budget for students with special needs who study in a separate special education framework continues to be larger than that allocated to a student with the same disability and with the same functional ability who learns in an integrated classroom in regular education. The following are some milestones in the history of special education budgeting in Israel:

- 1950 — A dedicated Special Education Department in the Ministry of Education and the first frameworks for students with special needs were established.
- 1988 — The Special Education Law, 5748-1988 was enacted. This law is the first law that explicitly deals with students with special needs. The law stipulates four main changes to the situation that existed before it was enacted: the rights of students were expanded — from educational services to ancillary support services; the range of those eligible was increased to ages 3–21; the importance of integrating students with special needs into regular educational settings was emphasized; and the participation of parents in making decisions regarding their children was expanded.

* Nachum Blass, Principal Researcher and Chair, Education Policy Program, Taub Center for Social Policy Studies in Israel. The full study was published in April 2022 and can be found on the Taub Center website.

- 1994 — A master plan for the implementation of the Special Education Law was formulated, which determined, among other things, that students with special needs should be, as much as possible, mainstreamed into regular educational frameworks, and that general educational institutions that integrate these students should be incentivized. However, in the absence of the necessary budgetary support, the recommendations of the plan were not implemented.
- 2000 — The Margalit Committee submitted a report that examined the implementation of the Special Education Law. In addition to other items, the committee found gaps in budgetary investment among special education students due to of the fact that the budgeting method used was from the 1990s, when students were budgeted according to the setting in which they studied and not according to their abilities. This was declared to be unacceptable.
- 2000–2005 — A number of petitions dealing with the issue of special education budgeting were submitted to the High Court of Justice, such as the Yated Supreme Court petition (2000) and the Marziano case (2003). The Knesset and the government also tried to modify Amendment No. 7 to the Special Education Law (2002), and formulated a number of proposals on the issue within the framework of the Dovrat Committee (2005), but this did not significantly change the current situation.
- 2007 — The Dorner Committee was appointed to examine the special education system in Israel. In 2009, the Committee published a comprehensive report with three main recommendations: allow parents of children with special needs to choose the educational institutional settings in which their children will study; create a link between the size of the budget allocated to students with special needs and their level of academic functioning in addition to their disability (physical, mental, or intellectual); sever the link between budget size and the educational setting to which the student with special needs is referred, and act according to the principle of *the budget follows the child*.
- 2009 — The Amichai Committee was appointed to monitor the implementation of the Dorner Committee's recommendations. The Committee estimated, among other things, the cost of implementing the recommendations and proposed a framework for their implementation. In early 2010, the Ministry of Education adopted the Committee's

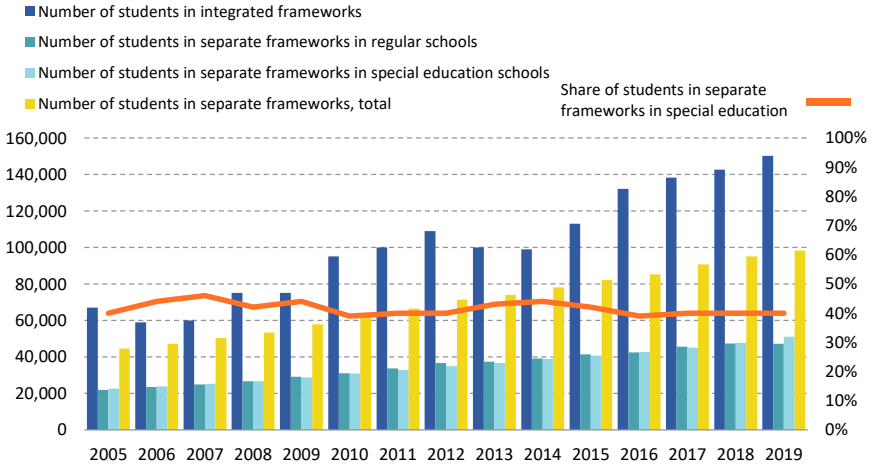
recommendations and announced its intention to conduct a pilot program to examine the feasibility of the Dorner Committee's recommendations relating to changing the budgeting method. Both the Dorner Committee and the Amichai Committee emphasized that any change in the budgeting method must be made only on the basis of experiment and research that will accompany the pilot followed by in-depth discussions of the results afterwards. In retrospect, it can be said that this condition was not met in accordance with the recommendations.

- 2013–2014 — The Holon Pilot program, in which the Dorner Committee's recommendations were implemented for the first time within an experimental framework. A year later, the pilot was expanded to Jerusalem, Ma'ale Adumim, and Tirat Carmel. The pilot programs did not produce clear results, in part because they were conducted with frequent changes in the budgeting rules and because there was no proper monitoring and data collection that would enable a thorough and reliable follow-up study regarding outcomes.
- 2015 — It was decided to conduct an accompanying study of the pilot programs by a team from The Hebrew University of Jerusalem. The study was intended to examine various aspects of the implementation of the Dorner Committee's recommendations, including the recommendation regarding changes in the budgeting method. Due to various delays, the study was launched only in 2017. However, Amendment No. 11 to the Special Education Law, which passed about a year later, obviated the need for both the experimental programs and their follow-up.
- 2018 — Amendment No. 11 to the Special Education Law. The amendment was adopted following professional, public, and legal criticism. The amendment, which ostensibly relies on the recommendations of the Dorner Committee, includes clauses that leave in place the possibility of funding students with special needs with the same disability and the same level of functioning as students in different settings. The amendment also limits the ability of parents of students with high-functioning special needs to choose their child's educational setting. The inclusion of these sections in the amendment to the law is in fact contrary to the main recommendation of the Dorner Committee, which was to act according to the principle of *the budget follows the child*.

In conclusion, it can be said that despite the sweeping consensus among professionals regarding the social and educational importance of integrating students with special needs into regular educational settings, as well as the high rates of integrated students in other countries around the world, in practice the share of children integrated into regular settings has been less than two-thirds of all special education students for decades.

To improve the quality of special education in Israel, we recommend implementing the recommendations of the Dorner Committee, chief among them a significant increase in the number of special education students who are mainstreamed. To do so two basic conditions must be met: a reliable and effective diagnostic tool that is acceptable to the Ministry of Education, parents, and education experts for determining the functional profile of students must be created — this will be the main tool for placing students in the various settings; and all special education students should be evaluated and budgeted based on the definition of their disability and functioning, and not on the basis of the setting in which they study.

Distribution of special education students among educational institutional settings



Source: Nachum Blass, Taub Center | Data: Weissblau, 2015; Ministry of Education Director General's presentation; *Mabat Rahav* (A Wide Perspective) website

Executive Summary

Tracking and Its Long-Term Effects on Educational Achievements and Earnings of High School Students in the 1990s

Eyal Bar-Haim and Yariv Feniger

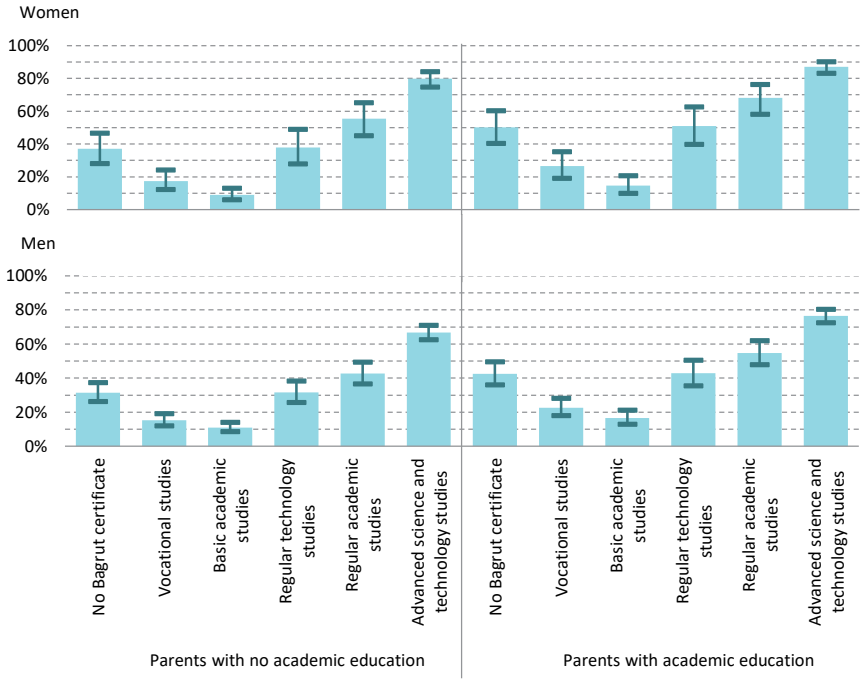
In response to patterns of inequality that had emerged during the early decades following the establishment of the State, the Ministry of Education initiated a series of reforms that changed the structure of secondary education in Israel from the early 1970s until the mid-1990s. Secondary education was transformed from a model of early and relatively inflexible tracking to one of greater diversity in study tracks, academization of the vocational study tracks, provision of choice to students and their parents, and the opportunity to attain a Bagrut (matriculation) certificate in all subjects.

A new study by the Taub Center focuses on the first cohorts that were fully exposed to the reform and who were born between 1978 and 1983 and attended high school during the 1990s. The research demonstrates the long-term effects of the tracking mechanism and the separation between the curricula on the students, including the effect on their likelihood of attaining an academic education and on their earnings in the fourth decade of their lives. The researchers show that inequality in educational opportunity also creates gaps in the labor market and that inequality remains substantial today, even after decades of educational reforms.

* Dr. Eyal Bar-Haim, postdoctoral fellow, Department of Education, Ben-Gurion University of the Negev. Prof. Yariv Feniger, Department of Education, Ben-Gurion University of the Negev; Fellow, Education Policy Program, Taub Center for Social Policy Studies in Israel. The full study was published in May 2022 and can be found on the Taub Center website.

The findings of the research show that, for students whose parents did not go on to higher education, the likelihood of studying in selective high school tracks, such as advanced science-technology track, are quite low. As a result, in practice, it turns out that their chances of attaining a higher degree and high wages later in life are also low. In contrast, for students whose parents have an academic education, the likelihood is higher that they will be in selective high school tracks and enjoy the advantages that it brings later in life.

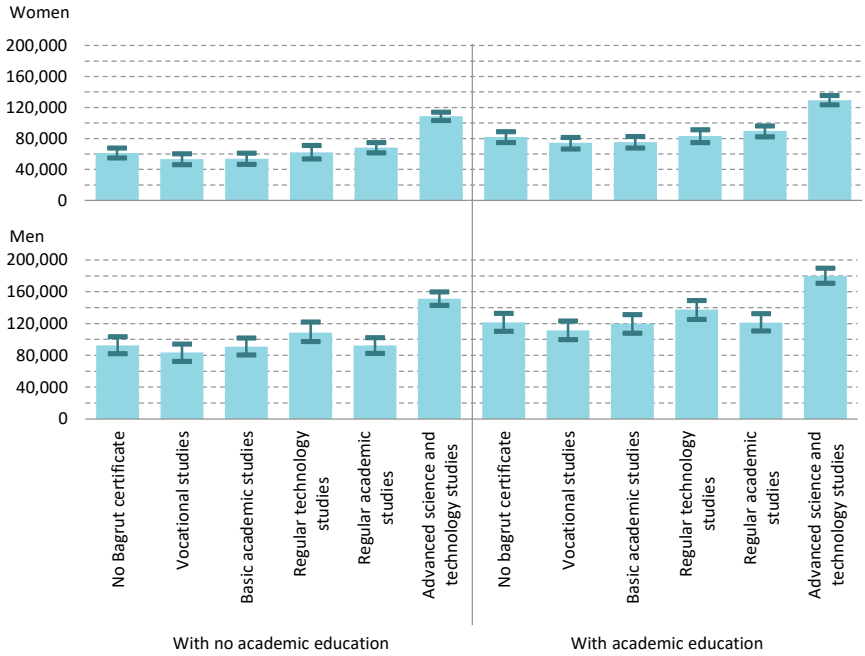
The likelihood of acquiring an academic degree, by high school study track and parents' education level



Note: The prediction is for Jews born between 1978 and 1983 of mixed Mizrahi-Ashkenazi background with an average achievement level, who were in high school in the 1990s. The I-bars represent 95% confidence intervals.
Source: Eyal Bar-Haim and Yariv Feniger, Taub Center | Data: CBS

In general, the study expands upon the existing body of knowledge on the relationship between students' socioeconomic backgrounds and the way in which the education system sorts them into study tracks in high school, as well as the effect of this sorting on their likelihood of acquiring an academic degree and on their earnings in adulthood. The researchers differentiate between five main tracks in secondary education in Israel: the advanced science technology track, the regular academic track, the basic academic track, the advanced technological track, and the vocational track. The findings show that a student's track in high school explains about 30% of the variation in wage gaps. Placement in a track is therefore related to educational and earning gaps later in life, and the tracking mechanism can be seen as a factor in preserving class differences in Israel.

Predicted annual earnings at age 33, by high school study track and educational attainment, NIS



Note: Predictions are for Jewish students whose parents have no academic education, who are of mixed Mizrahi-Ashkenazi origin, and who have average academic achievement The I-bars represent 95% confidence intervals.
Source: Eyal Bar-Haim and Yariv Feniger, Taub Center | Data: CBS

More specifically, the research examines for the first time the solution developed by the Ministry of Education in the 1990s to meet the needs of low-achieving students. Many of these students come from weaker socioeconomic backgrounds, and while in the past most of them were placed in vocational tracks, since the 1990s, many of them are being referred to the basic academic track. Even though this change raised the rates of eligibility for a Bagrut certificate among its graduates, the findings show that they have a lower likelihood of attaining an academic education and they have lower average earnings, which are quite similar to those of graduates from the vocational track.

According to the researchers, the findings demonstrate a major barrier to educational and employment mobility. The reform changed the study tracks but not their outcomes and essentially, the *tracking effect* continues to exist today.

WELFARE

3

Israel's Social Welfare System After the COVID-19 Crisis: An Overview

John Gal, Shavit Madhala, and Ori Oberman

Introduction

Looking at social expenditure in 2021 and the developments in social policy during 2022, it appears that the welfare system in Israel is still in a period of transition: a transition from an era of harnessing the social security and social welfare systems to deal with the social and economic consequences of the epidemic on individuals, families, and communities, to an effort to return to expenditure and policy patterns of the pre-crisis era. In 2021, social expenditure was still considerably higher than in the pre-crisis period, but there was a clear trend toward a decrease in expenditure and a return to the low levels of expenditure that characterized the Israeli welfare state in the past. This trend continued in 2022 as well. During this period, many of the changes introduced in the social security system during the crisis to ease access to unemployment benefits were terminated. Although during part of the period reviewed here the struggle with the consequences of the pandemic was still ongoing, it is clear that policy makers sought to return to dealing with the social problems that preoccupied them before the COVID-19 outbreak. At the center of these efforts were the elderly and people with disabilities. At the same time, initial steps were also taken to formulate tools to deal with new problems that arose with the passing of the crisis.

* Prof. John Gal, Principal Researcher and Chair, Welfare Policy Program, Taub Center for Social Policy Studies in Israel; School of Social Work and Social Welfare, The Hebrew University of Jerusalem. Shavit Madhala, Researcher, Taub Center. Ori Oberman, Research Assistant, Taub Center.

Not only did the COVID-19 crisis shape the developments in this period; economic and political processes also exerted an impact. The end of the crisis led to rapid economic growth and a rapid transition to full employment. Nevertheless, these developments also brought in their wake a widening of income gaps, especially in some sectors of the labor market. It is apparent that the growing wage gaps and the difficulty to adapt social policy tools to this reality have contributed to increased inequality and poverty levels. Increasing prices that characterized the period made it even more difficult to deal with the new reality, especially among those with low incomes. The changes in the political system and the establishment of the *government of change* gave new impetus to the formulation of social policy in several areas, and even though the end of this government's term in mid-2022 interrupted some of the social policy initiatives, its activity had several positive policy results.

Social expenditure in 2021

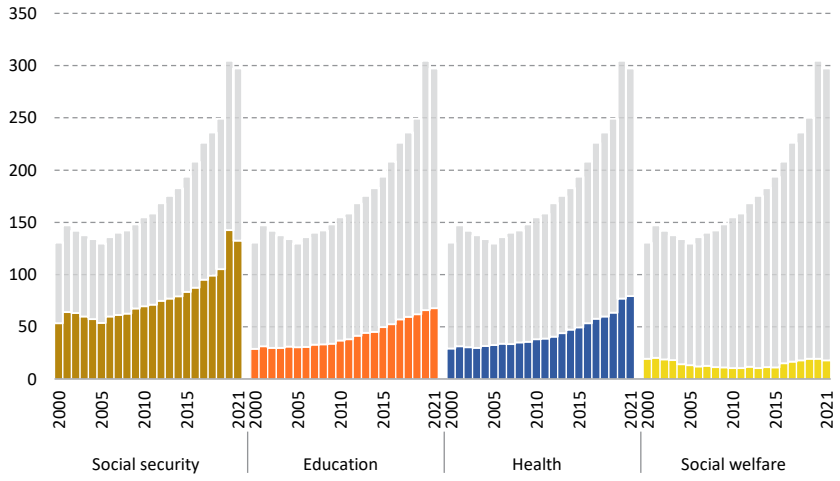
Israel's social expenditure, which consists of expenditure on health, education, social welfare, and social security, was NIS 297 billion in 2021 (Figure 1), a decrease of NIS 7 billion compared to the previous year. As such, expenditure comprised 59% of total government expenditure, which totaled about NIS 500 billion.[1] As can be seen in Figures 1–5, the changes in social expenditure in 2021 reflect different aspects of dealing with the epidemic. While social security expenditure, which was a central tool in dealing with the economic aspect of the crisis, decreased in 2021 by approximately NIS 10 billion compared to the previous year, expenditure on health, which increased in 2020 by approximately 21% (compared to 2019), continued to grow and was higher than the expenditure in 2020 by about NIS 2 billion. In the second component of welfare expenditure — expenditure on social welfare, which

1 Government expenditure includes the entire state budget (not including debts and interest expenditure), the expenditure on the National Insurance Institute (with part of this expenditure offset from the state budget), and the amount transferred to the health funds through the health tax. Expenditure on social security is measured as the total expenditure by the National Insurance Institute, the Authority for the Holocaust Survivors' Rights Authority, the Ministry of Defense's expenditure on family benefits and rehabilitation, and the expenditure on the work grant. Expenditure on social welfare is measured as the total expenditure of the Ministry of Welfare and Social Affairs, the Directorate General of Labor in the Ministry of Economy and Industry, the Ministry of Construction and Housing, the Ministry of Immigration and Integration, and the Ministry of Social Equality.

includes welfare services and non-cash benefits — a decrease of about NIS 2 billion has been recorded compared to the previous year. This decrease is mainly due to a reduction of expenditure on housing and a reduction in the Ministry for Social Equality's budget. The Ministry for Social Equality's budget was NIS 180 million, an amount that represents a cut of almost half of the 2020 budget. The expenditure on housing in 2021 was about NIS 4 billion, a decrease of about NIS 1 billion compared to 2020. No significant changes were recorded in the other items of expenditure on social welfare.

Figure 1. Social expenditure by area out of total social expenditure

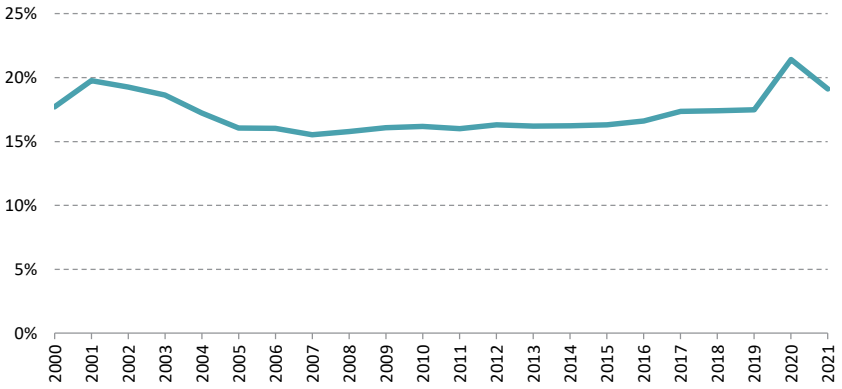
NIS billion, 2020 prices



Source: John Gal, Shavit Madhala, and Ori Oberman, Taub Center | Data: Ministry of Health; Ministry of Finance; NII

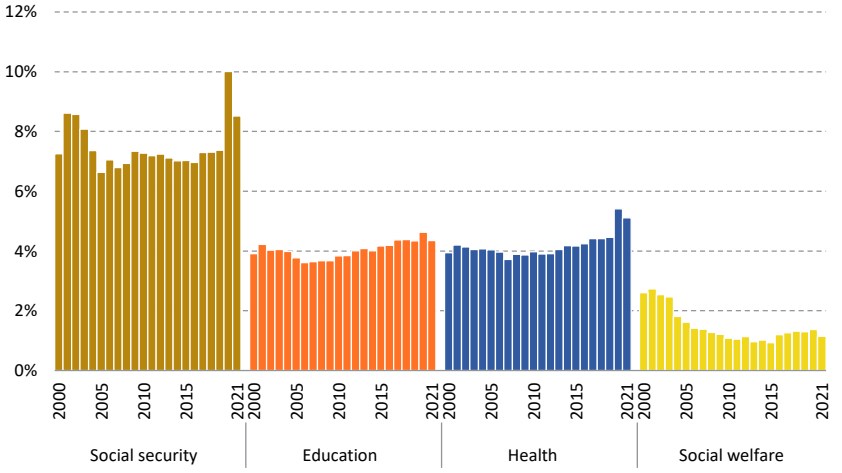
Examining the share of social expenditure in GDP (Figure 2) shows that the decrease in total social expenditure in 2021 brings it back below 20% of GDP at 19%. This level of expenditure as a percentage of GDP is still higher than it was prior to the crisis, but there is a clear trend to reduce the total resources devoted to social issues. Figure 3 shows that the reduction applies to the share of all social expenditure components as a percentage of GDP.

Figure 2. Social expenditure as a percent of GDP



Source: John Gal, Shavit Madhala, and Ori Oberman, Taub Center | Data: Ministry of Health; Ministry of Finance; NII; CBS

Figure 3. Social expenditure by area, as a percent of GDP

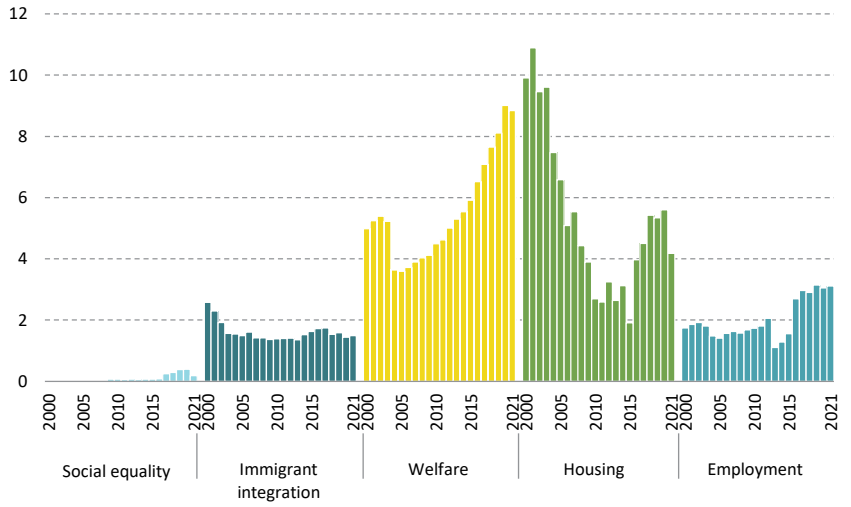


Source: John Gal, Shavit Madhala, and Ori Oberman, Taub Center | Data: Ministry of Health; Ministry of Finance; NII; CBS

When focusing on welfare spending, there are two distinct components — social welfare and social security. The data presented in Figure 4 indicate the various trends in expenditure on social welfare, which in 2021 was about NIS 17 billion. The Ministry of Welfare and Social Affairs is allocated a total of about NIS 9 billion — approximately 50% of all expenditure on social welfare. Smaller amounts were transferred to the other ministries: NIS 4 billion to the Ministry of Construction and Housing; NIS 3 billion to the Directorate General of Labor in the Ministry of Economy and Industry; NIS 1.5 billion to the Ministry of Immigration and Integration; and a relatively small amount of NIS 180 million to the Ministry for Social Equality. In the areas of social welfare where the budgetary expenditure increased relative to 2020 (the area of employment and the Ministry of Immigration and Integration), the increase was fairly small. In the other areas, the expenditure has been reduced, especially in the area of housing, where the reduction is partly due to cutbacks in expenditure on public housing.

Figure 4. The budget allocated to social welfare, by area

NIS billion

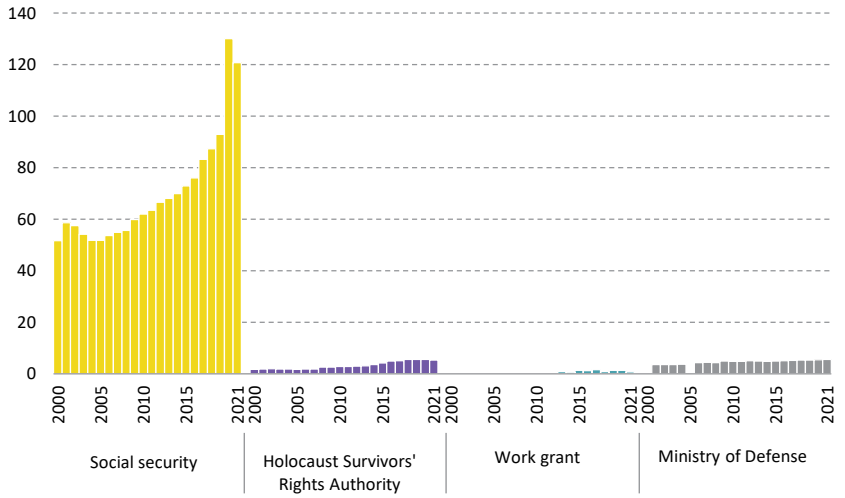


Source: John Gal, Shavit Madhala, and Ori Oberman, Taub Center | Data: Ministry of Finance

With respect to social security (Figure 5), the bulk of the expenditure is devoted in all years to financing National Insurance Institute (NII) cash benefits, especially during the crisis period. The other payments constitute a small part of the total expenditure, with the portion devoted to work grants being particularly small.

Figure 5. The budget allocated to social security, by area

NIS billion



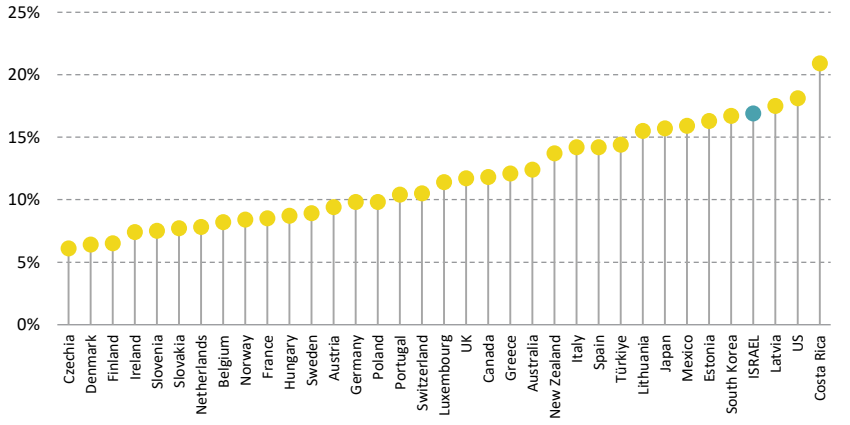
Source: John Gal, Shavit Madhala, and Ori Oberman, Taub Center | Data: Ministry of Finance; NII

Poverty and inequality resulting from the COVID-19 crisis

Dealing with poverty and inequality is a key function of the welfare state. The massive investment in the unemployment insurance program, one-time grants, and financial aid to the self-employed made it possible to prevent the expansion of poverty during the crisis, in particular among those who were fired or placed on unemployment benefits. Although the return to normality enabled the unemployed to reintegrate into the labor market, the reduction in financial support for individuals and families, the transition to full employment, and the rise in inflation may lead to an increase in inequality and the incidence of poverty. The poverty figures reflect these concerns.

An international comparison in the period prior to COVID-19 (Figure 6) shows that the incidence of poverty (the share of the population below the poverty line) in Israel was among the highest among welfare states.

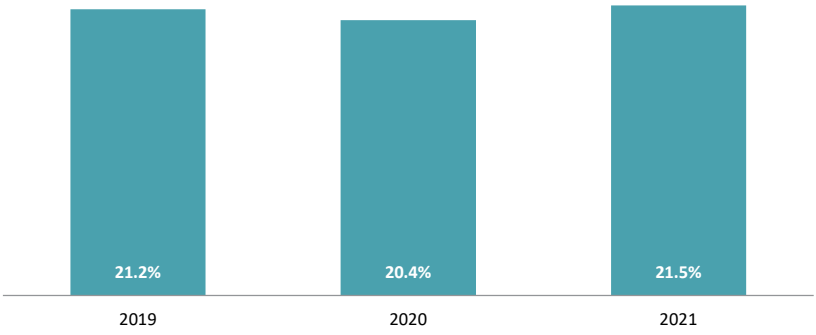
Figure 6. Share of the population living below the poverty line in the OECD countries, 2019



Source: John Gal, Shavit Madhala, and Ori Oberman, Taub Center | Data: OECD

In the absence of access to comprehensive current data from the Central Bureau of Statistics' (CBS) *Household Expenditure Survey* during the crisis, the NII measured the incidence of poverty using administrative data (NII, 2021). The authors of the poverty report based their work on survey data from previous years to impute data that do not exist in the administrative data. This method of estimation makes it difficult to conduct an international comparison or a comparison with the data of the previous years in Israel. Based on this measurement, following government intervention in 2020 through one-time grants and widening the coverage of unemployment benefits intended to help individuals deal with the economic crisis caused by COVID, the poverty incidence among households was 21.4% of households in the country versus 21.2% in 2019. According to the assessment of the researchers of the NII, the expectation is that in 2021 the poverty incidence according to this index will rise to 21.5% (Figure 7) (NII, 2021).

Figure 7. Share of families living below the poverty line in Israel

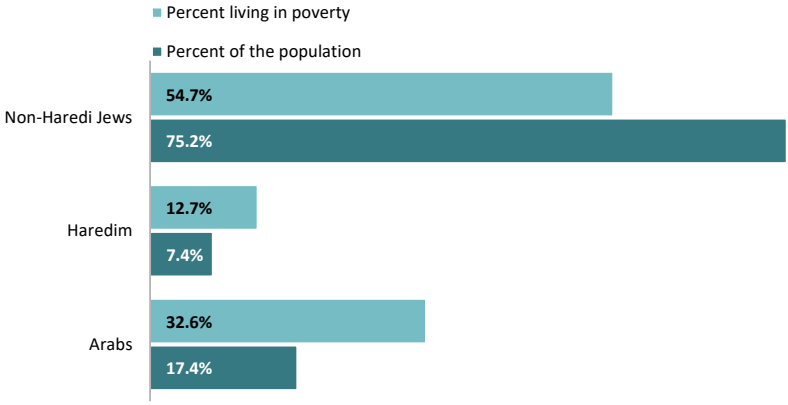


Note: The measurement was based on administrative data.
Source: John Gal, Shavit Madhala, and Ori Oberman, Taub Center | Data: NII

The share of families living in poverty from different population groups among the overall population living in poverty and the population as a whole

Figure 8 shows one of the interesting figures emerging from the 2020 poverty report: the share of each of the three sectors in Israeli society — Jews (not including Haredim (ultra-Orthodox), Arabs, and Haredim — among the general population and the population living in poverty. Although Jewish families (not including Haredi families) make up 75% of all families in Israeli society, their share of the population living in poverty is only about 55%. By contrast, the share of families from the Haredi sector and from Arab society living in poverty is almost double their share in the general population. Haredi families constitute about 7.4% of all families in the general population, but among the families living in poverty their rate is 12.7%, while Arab families constitute one-third (32%) of all families living in poverty, although they constitute only 17.4% of Israel's population.

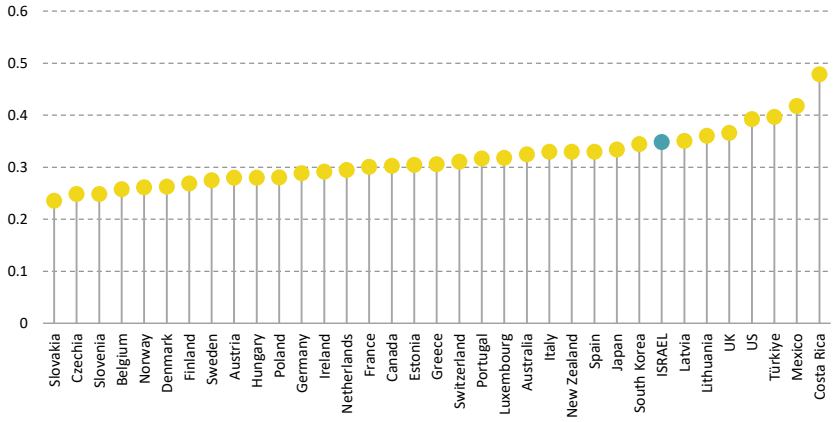
Figure 8. The sectoral share from all families living below the poverty line, 2020



Source: John Gal, Shavit Madhala, and Ori Oberman, Taub Center | Data: NII

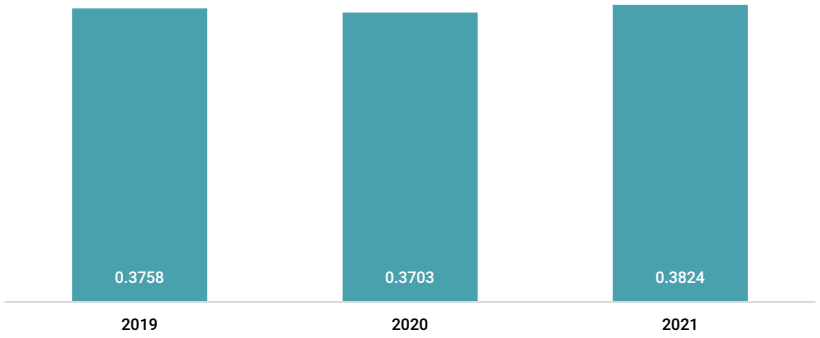
As in the case of poverty, Israeli inequality figures are also high compared to other welfare states (Figure 9). The predicted trend according to the estimates of NII researchers is a trend of greater inequality following the end of the COVID-19 crisis and the acceleration of economic growth. Although in 2020 there was a slight decrease in the Gini index of disposable income inequality compared to 2019 (due to government intervention through unemployment benefits and one-time grants) with an index rate of 0.3703, it is estimated that in 2021, there will be an increase in this index and it will stand at 0.3824 (Figure 10) (NII, 2021).

Figure 9. Gini index of income inequality in the OECD countries, 2019



Source: John Gal, Shavit Madhala, and Ori Oberman, Taub Center | Data: OECD

Figure 10. Gini index of income inequality in Israel



Source: John Gal, Shavit Madhala, and Ori Oberman, Taub Center | Data: NII

The social security system

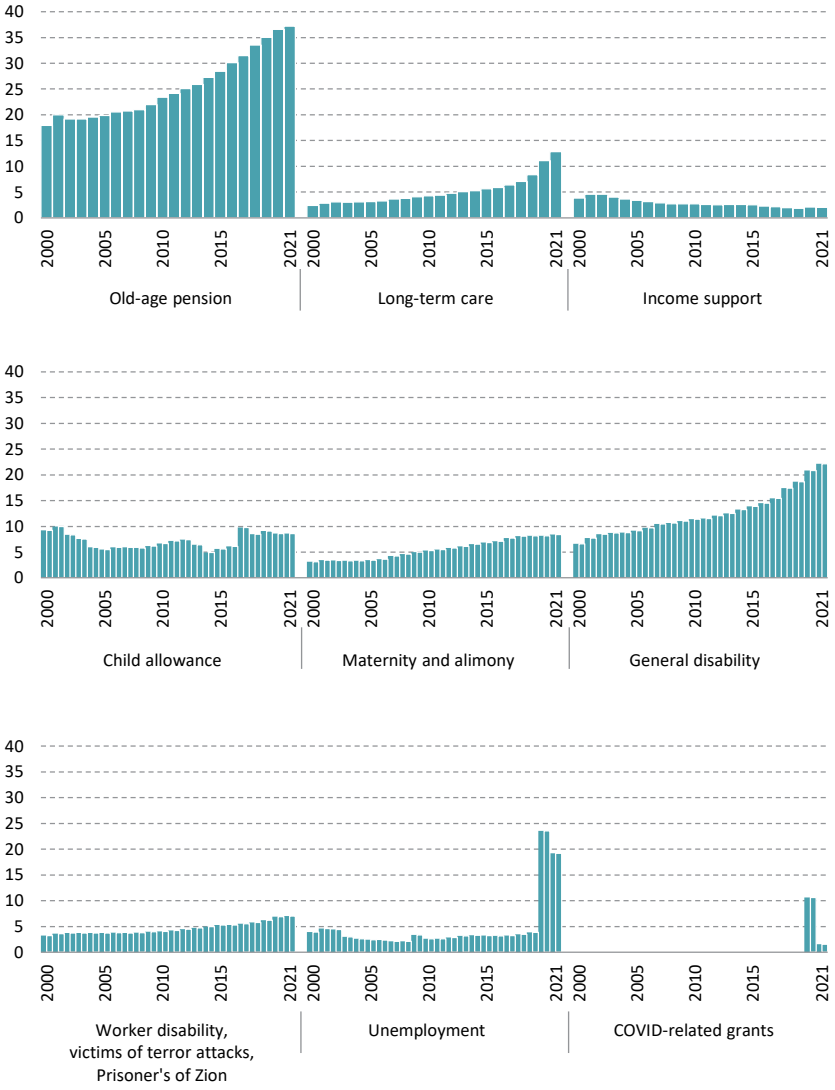
In Israel, as in other welfare states, the largest component of social spending is cash benefits paid to residents by the various agents of the social security system. Expenditure on social security in 2021 amounted to NIS 132 billion, a drop in spending on social security, following abnormal and unusual levels during the crisis. The decrease in expenditure in 2021 stood at NIS 10 billion compared to 2020, mainly due to a significant reduction in expenditure on unemployment benefits and grants paid during the crisis (Figure 11).

The main changes in the social security system were in the scope of benefits paid by the NII, and especially in the unemployment insurance program. Easing of eligibility requirements, extensions of the eligibility period, and the expansion of coverage for those on furlough led to a very considerable expansion of unemployment benefits. This policy tool was central in the government's fight against the impact of the epidemic on the labor market and on household incomes. This is clearly shown in Figure 12. Thus, in 2020, expenditure stood at about NIS 23.5 billion — more than five times the expenditure in 2019, which amounted to about NIS 4 billion. Even in 2021, more unemployment benefits were paid than usual, but the total expenditure on them, about NIS 19 billion, was about 20% lower than in 2020. At the beginning of 2022, unemployment expenditure constituted only about a tenth of the amount during the corresponding period in 2021 (NIS 247 million compared to about NIS 2.5 billion).

Figure 11 shows that along with the increase in expenditure on unemployment benefits, there has also been an increase in expenditure in other branches of the social security system in recent years. This is especially true for general disability, allowances for senior citizens, and long-term care insurance. The increase in expenditure on general disability reflects changes in the program based on an agreement between the government and representatives of people with disabilities in 2018 (see Gal & Bleikh, 2019), while the increase in expenditure in both programs for senior citizens is related to significant changes made in them, as will be discussed.

Figure 11. Distribution of the National Insurance Institute expenditure

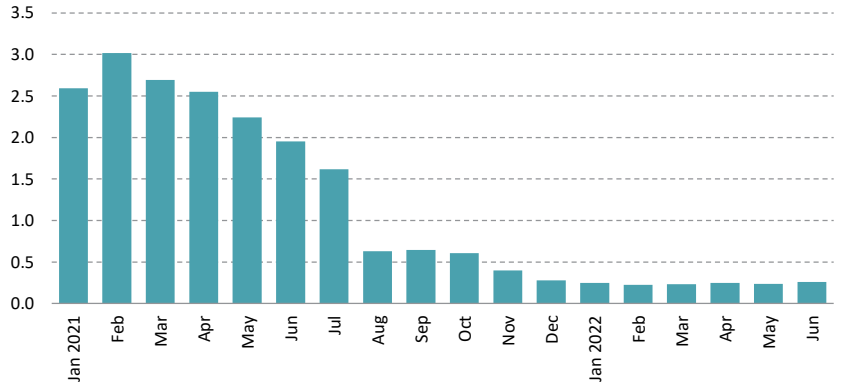
NIS billion



Source: John Gal, Shavit Madhala, and Ori Oberman, Taub Center | Data: NII

Figure 12. Expenditure for the payment of unemployment benefits, 2021–2022

NIS billion



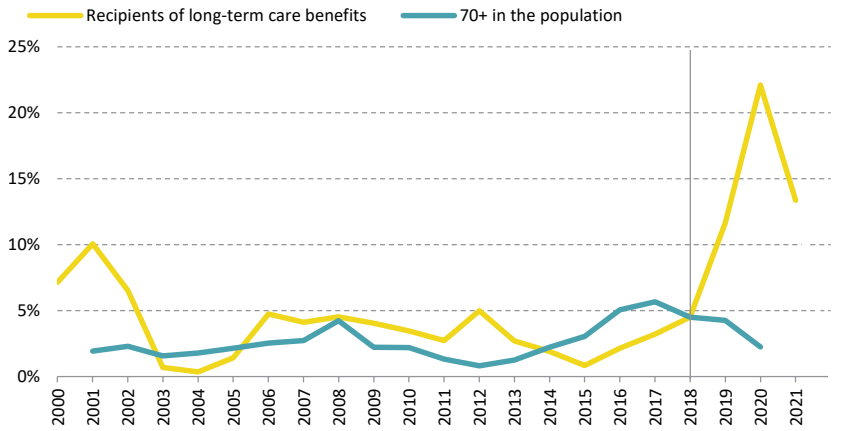
Source: John Gal, Shavit Madhala and Ori Oberman, Taub Center | Data: NII

The Long-Term Care Insurance Law

One of the areas of expanding activity of the social security system in Israel in recent years is long-term care insurance for the elderly. In 2021, expenditure in the area of long-term care constituted one-tenth of total NII expenditure. The observed increase in expenditure on long-term care in the social security system is no accident, and as can be clearly seen in Figure 13, it does not reflect merely an increase in the elderly population, but rather policy changes that eased accessibility and the form in which the assistance is provided. This is a benefit to help finance long-term care for senior citizens who are living in the community and need assistance with activities of daily living. Responsibility for this program and its administration rests with the NII, but non-governmental agencies traditionally have a central role in its operation. Long-term care insurance includes various types of assistance, from services that are included in the service basket (panic buttons, activity centers for senior citizens, laundry services, and personal hygiene products) and provided by for-profit businesses and non-profits, to the financing of personal care for those eligible (also through for-profit agencies or non-profits), including (partial) financing of a foreign caregiver. Until recent years, the benefit was in-kind, apart from

special cases with the benefit being transferred from the NII directly to the service providers. However, in 2018, after a pilot program, a reform in this area was launched. The reform brought about significant changes in the patterns of use of the Long-Term Care Law, and as a result, both the number of those entitled to assistance under it and the budget directed to this area increased substantially.

Figure 13. Rate of change in the number of long-term care benefit recipients and the number of people aged 70 and over in the population



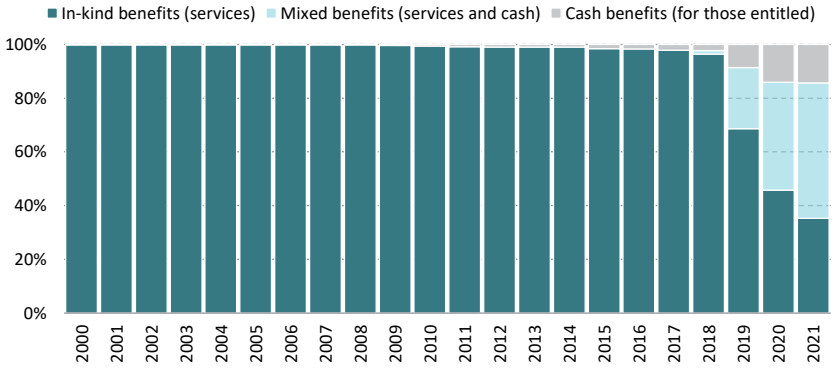
Note: The vertical line marks the beginning of reforms in long-term care benefits.
Source: John Gal, Shavit Madhala, and Ori Oberman, Taub Center | Data: NII; CBS

The reform of the long-term care insurance program included several components. Regarding program accessibility, the changes that were adopted included easing of the eligibility determination process and a change in the dependency test procedure that determines the extent of care provision. In more than 80% of claims, the examination is based on medical documents and a telephone interview with the claimant, and does not involve a personal visit by a nurse to the claimant's home. In addition, the amount of a fixed benefit can no longer be reduced following a new examination. Lastly, unlike in the past, family members may be considered caregivers and receive payment for their work. As part of the reform, the number of benefit levels has been reduced from six to three. Moreover, there has been a fundamental change

in the way the benefit is paid to beneficiaries. In the past, the benefit was paid directly to the service provider. Although the benefit recipients and their family members could participate in the decision on the type of service and the identity of the service provider, generally speaking they were not given cash. The reform transferred the choice of assistance, in whole or in part, in the form of a cash benefit or service in-kind, into the hands of the beneficiary (NII, 2022).

These measures are intended to remove bureaucratic barriers that existed in the long-term care insurance program, to facilitate access, and to ease the application for extension of assistance should the condition of the beneficiary worsen. Indeed, as a result of these measures, the number of those entitled to assistance under long-term care insurance increased considerably: from 176,000 in 2018 to 197,000 in 2019, to 240,000 in 2020, to 273,000 in 2021, and, in the middle of 2022, the number has already reached about 301,000 — an increase of 71% compared to the number of those eligible in 2018. As can be seen in Figure 13, this increase in the number of those eligible is not proportional to the increase in the population at the relevant ages — 70 and over. This population grew by 4% in 2019 and by only 2% in 2020, while the number of those eligible for long-term care assistance increased by 11% and 22% respectively. With the growth in eligibility, the annual expenditure on long-term care insurance has also greatly increased: from an expenditure of approximately NIS 7 billion in 2018 to roughly NIS 13 billion in 2021 — an increase of 86% (Figure 11 above). The reform of the long-term care law is reflected not only in the number of eligible but also in the patterns of benefit use, as is clearly seen in Figure 14. While in 2018 only 3% of those eligible received a cash benefit, three years later there has been a dramatic change in usage patterns, and, in 2022, 65% of all those eligible received a cash benefit or a combination of services and money.

Figure 14. Long-term care benefit recipients, by benefit type



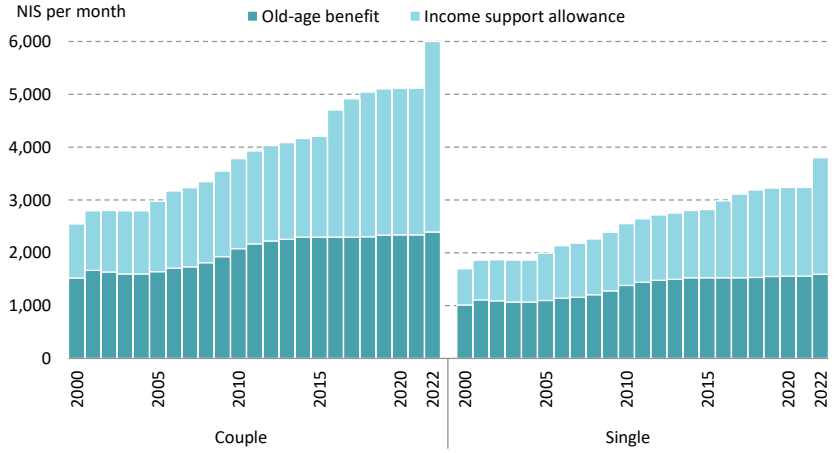
Source: John Gal, Shavit Madhala, and Ori Oberman, Taub Center | Data: NII

Income support for senior citizens

Another significant change in the social security system in recent years is the increase in the level of income support, that is, the supplement given to recipients of an old-age or survivors' benefit whose income is still low. The supplement is paid following a means test (unlike the universal old-age benefit) and is intended to ensure a reasonable standard of living for senior citizens whose sole or main source of income is the old-age benefit. Following recommendations made by the Committee for the War Against Poverty (the Elalouf Committee) in the middle of the previous decade, the benefit was increased in an attempt to significantly reduce poverty among senior citizens. In the middle of 2021, it was decided to further increase the benefit and to also increase the amount of earnings that permissible without affecting eligibility. As can be seen in Figure 15, from January 2022, the amount paid (including the universal old-age benefit) to a single beneficiary increased from NIS 3,237 to NIS 3,799, while couples entitled to income support receive an amount of NIS 6,002 compared to NIS 5,117 before the raise. In 2022, total income support benefits amounted to NIS 4.4 billion — an increase of 47% relative to 2021. Despite concerns following the step, the rise in this expenditure is not the result of an increase in the number of recipients, but represents an increase in income itself to benefit recipients.

Figure 15. The average old-age benefit and income support benefit

Current prices



Source: John Gal, Shavit Madhala, and Ori Oberman, Taub Center | Data: NII

Work grants

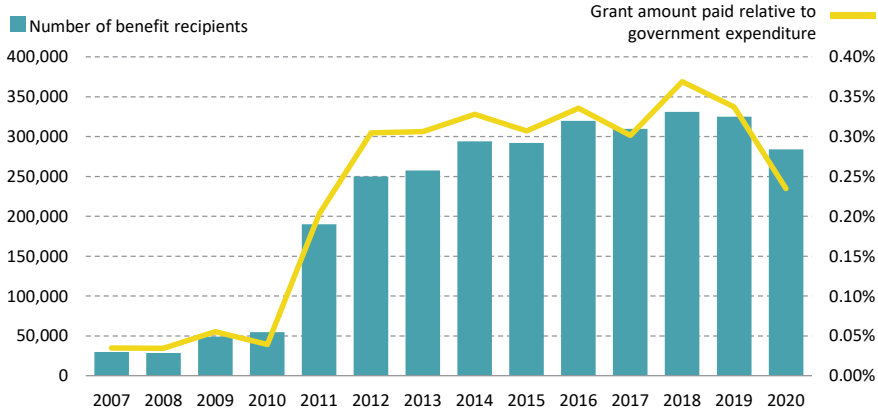
The work grant is intended to increase the income of low-wage workers and to encourage their labor market participation. A pilot of the use of this benefit began in several local authorities in 2007, and, since 2011, it has been rolled out nationwide. According to a Tax Authority's report, approximately 325,000 workers received a work grant in 2019, and the total amount of grants paid was NIS 1.4 billion, an amount equal to approximately 0.34% of total government expenditure in 2019 (Figure 16). The 2020 data indicate a decrease in the total number of grant recipients and in the total number of payments,[2] however, this decrease may be the result of fewer working hours due to COVID-19 restrictions. The grant is not given automatically but requires workers to be aware of the entitlement and to apply. As a result, the

2 These data are not final as at the time of the writing of this report not all of this year's applications had been processed.

take-up rates of the grant are not high and in recent years were about 70%. Among the Arab population and people with disabilities, take-up was even lower (State Comptroller, 2020).

Over the years, several changes have been made to this grant. In May 2022, the Knesset approved a series of amendments that should benefit those entitled to a work grant. These amendments include: an increase of approximately 40% for those entitled in 2022; 30% advance for 2021 (at the expense of the grant for 2022); payment of the grant and the advance in one installment for those eligible for 2021 (instead of four installments spread out until February 2023); allowing a work grant for 2022 at a rate of 40% for those employed by a relative (in contrast to the normal situation, where employment by a relative disqualifies candidates from receiving a work grant); lowering the eligibility age for a work grant for the years 2022 and 2023 from 23 to 21. It is expected that these changes will increase the number of those eligible for the grant and the total government expenditure dedicated to this area in the coming year.

Figure 16. The number of work grant recipients and the grant amounts paid, as a percent of overall government expenditure



Note: The data for 2020 are not yet final.
Source: John Gal, Shavit Madhala, and Ori Oberman, Taub Center | Data: Tax Authority

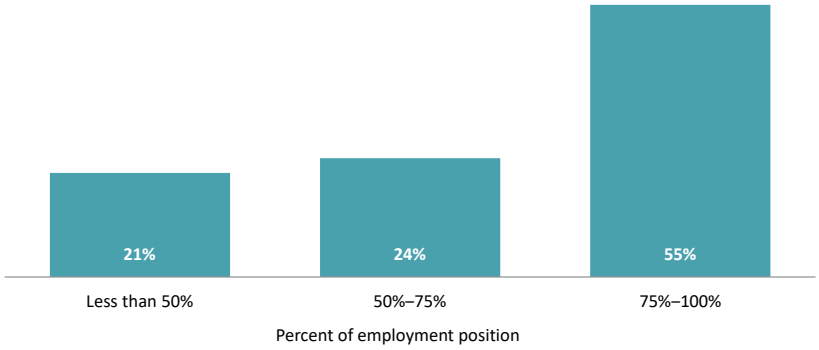
Social welfare

The wage agreement with social workers

Social workers are the central professional component in the social welfare system. There are no precise data on the number of active social workers, but estimates vary between 20,000 and 30,000, about 90% of whom are women. The Israel Union of Social Workers estimates that 60% are employed by government agencies (government ministries, local authorities, and the NII) and the rest by non-profits and businesses that provide outsourced welfare services, mainly for the Ministry of Welfare and Social Affairs. About 12,000 social workers are members of the Israel Union of Social Workers. These are mainly civil servants, although in recent years an effort has been made to organize social workers employed in the non-government sector as well.

Despite the continuous increase in the number of graduates from social work schools each year, many social workers are leaving the profession. The trend is evidenced in the large number of vacancies in the welfare services. Among the positions financed by the Ministry of Welfare and Social Affairs, one-tenth of those in the local authority social service departments are not staffed — 558 positions in total (State Comptroller, 2021). The Union of Social Workers estimates that 1,500 social work positions are not filled. The difficulty in staffing social work positions in the public sector is evident: 24% of all those hired in local authority social service departments leave their positions in their first year of employment (Ministry of Welfare and Social Affairs, 2021). There are various reasons for this mass exit. Some of them are related to social worker salaries, which are lower than salaries for most university graduates. Another reason is the common phenomenon of part-time employment in this field. As shown in Figure 17, this is a widespread phenomenon that characterizes most civil service jobs in this profession.

Figure 17. Distribution of government-employed social workers, by percent of employment position (full- or part-time), 2021



Source: John Gal, Shavit Madhala, and Ori Oberman, Taub Center | Data: Ministry of Welfare and Social Affairs; State Comptroller

The expansion of the privatization of many areas of welfare activity also contributes to the phenomenon, since in many cases it means a lack of job security and adequate protection of working conditions. Other reasons that add to the dissatisfaction among social workers are the heavy work load, the poor physical working conditions in many places, feelings of a lack of personal security following increasing violence from service recipients, and the erosion of the profession's status (Arazi et al., 2020; Tal Spero, 2015). It can be assumed that in a period of full employment, the demand for social workers in other sectors of the labor market and the wage increases in them also have encouraged social workers to leave the public sector government contractors.

In view of the dissatisfaction of many social workers and the tendency to leave the profession, several attempts have been made to deal with its causes. In 2018, the Ministry of Welfare and Social Affairs established a national protection division to handle employee safety in social service departments. In 2019, a division for the social work profession was established in the ministry, and steps were formulated to advance the status of social workers in Israel in collaboration with social workers and academics in the field (Ministry of Welfare and Social Affairs, 2021). At the same time, the professional struggle of the Union of Social Workers to improve their employment conditions was under way. Following a two-month strike in 2020, a new labor agreement was

drafted, which was formulated into a collective agreement and finally signed in May 2022. The agreement is intended to change conditions of social work professionals, including increasing their starting pay to NIS 8,500 per month, and a salary raise for all social workers of 5%–20%. A major emphasis in the agreement was placed on improving the mechanism for salary increases for social workers who are not in management positions, with consideration given to expertise, higher academic degrees, and fulfillment of other professional roles. An expansion order of the collective agreement, which would ensure that social workers who are not civil servants or local authority employees will also benefit from the agreement, is expected to be enacted in January 2023.

The regulation of facilities for people with disabilities

The transfer of responsibility for the provision of welfare services to non-governmental agencies through outsourcing which began in the 1980s has been plagued with flaws and shortcomings from its onset. Even though the extent of outsourcing in the Ministry of Welfare and Social Affairs is especially large and reaches more than 80% of its budget (Madhala-Brik & Gal, 2016), there are still very disturbing issues related to the way in which these services are financed, the process of putting them out to tender, and their regulation (Benish, 2022). This is especially true in institutions for the approximately 17,000 people with disabilities, many of whom suffer from communication difficulties and are limited in their ability to report on the level of care they receive and their living conditions. Despite a regulatory system that is responsible for ensuring an adequate level of care in privatized institutions, and despite attempts to improve the selection process of the non-governmental service providers, no appropriate answers have yet been found to the problems related to outsourcing.

Over the last year, these problems were highlighted by serious incidents that took place in two of these institutions. At the Bnei Zion residence for people with intellectual-developmental disabilities, operated by the Elor non-profit agency, residents suffered from violence and humiliation by the staff treating them. Evidence of this became widely known at the beginning of February 2022, but apparently parents of residents reported this to the Ministry of Welfare and Social Affairs even before the events became public. As a result, a criminal investigation has been launched and four of its employees were arrested, and the Ministry of Welfare and Social Affairs terminated its engagement with the non-profit (Israel Today, 2022). At the Beit Dafna residence in Holon, three

residents died from suspected food poisoning at the beginning of May 2022. Beit Dafna is operated by the Beit Ekstein chain owned by the Danel company, one of the largest companies that provides outsourced services to the Ministry of Welfare and Social Affairs with services in a wide variety of fields (Kashti, 2022).

Following these two incidents and numerous reports of the poor conditions and improper treatment of service users in closed settings operated by non-governmental entities and under the responsibility of the Ministry of Welfare and Social Affairs, the Minister established a public committee to examine managing and operating methods of facilities for people with disabilities. The committee, chaired by Judge Shuli Dotan, was authorized to examine the Ministry's conduct vis-à-vis these institutions and methods to ensure the protection, quality of life, and rights of the service users living in these facilities. In the committee's letter of appointment, the necessity to review the methods of supervision of the institutions for people with disabilities, and the manner in which the Ministry's procedures are followed were emphasized. The committee's findings and recommendations have not yet been submitted.

SPOTLIGHT

The Equal Rights for Persons with Disabilities Law

The most significant legislation in the field of welfare in 2022 is the Equal Rights for Persons with Disabilities Law. This law, which was finally enacted on June 27, 2022, the last day of the 24th Knesset, aims to reshape the way the welfare system provides services to individuals with disabilities. The law is based on the UN Convention on the Rights of Persons with Disabilities (the CRPD), which Israel ratified in 2012, and on the Equal Rights for Persons with Disabilities Law enacted in 1988. The new law also reflects the concepts formed and the experience gained in other welfare states with regard to care for people with disabilities (Beresford et al., 2011). The target population of the law is large. Today the Ministry of Welfare and Social Affairs provides services to 59,000 people with disabilities, about 17,500 of whom are treated in institutional settings. According to professional estimates, the number of potential users of the Ministry's services may reach 320,000 (if it also includes those with intellectual disabilities who are currently treated by the Ministry of Health) when the law comes into effect in about a year and a half (Holler & Kraim, 2022).

The law seeks to lay new foundations for dealing with the needs of people with disabilities. These foundations concern perceptions of the nature of disability, the right of people with disabilities to receive services that will allow them to participate as fully as possible in society and live independent lives in the community, and their right to receive maximum freedom of

choice regarding the services they are entitled to. The law's point of origin is the social model of disability (Holler, 2022) which emphasizes the social context of disability and assumes that the difficulties faced by those with disabilities are not primarily due to a medical disability or their inability to cope with their condition, but are directly related to the way society and its systems treats them. Thus, responsibility for their social and economic integration falls primarily on the state.

The law also proceeds from the assumption that people with disabilities are an integral part of the community, therefore it anchors the concept that the appropriate welfare systems should strive for a dramatic reduction of their care in segregated institutions outside the community. According to this concept, it is preferable to care for the needs of people with disabilities within the community and it is possible to ensure that community frameworks will provide services and solutions that promote optimal performance of people with disabilities and their maximum integration in diverse areas of community life. Finally, the law assumes that people with disabilities, like all other citizens, have the right to autonomy and freedom of choice regarding their lifestyles. Therefore, the law sets in its articles an approach that emphasizes the right of people with disabilities to choose the services that suit them best and that will enable their personal development and social integration.

The law, which was adopted following a comprehensive consultation process with professionals, civil society organizations, and people with disabilities, seeks to create mechanisms that will ensure the fulfillment of these goals. It requires the Ministry of Welfare and Social Affairs to initiate a process to significantly reduce the number of institutions operating outside the community and the number of patients in their care. To this end, it is necessary to prepare for the target population's integration in the community by establishing

apartments, dormitories, and hostels, the number of residents in each of which is not to exceed 24. The law also requires the development of eligibility processes for services and the definition of the needs of the person with a disability according to their level of functioning. In the law itself and the discussions about it, it was emphasized that this process will not focus on the type of disability or the circumstances of the injury, but on the limitations that impair function and social integration.

Ensuring autonomy for those with disabilities to use community services that meet their needs will be done through a *personal budget*. This budget will be given to eligible individuals to fund services. This policy tool has already been developed in several welfare states around the world, and despite the complexity involved in its implementation, it is gaining success and support among service users (Holler & Kraim, 2022). The law clarifies that the personal budget is an addition to allowances and assistance that the individual may receive from other sources. After determining the amount of the personal budget the individual is entitled to based on their functioning level, with or without the help of family or professionals, they will be able to use the personal budget to choose services adapted to their needs and preferences from a basket of services provided in the community and to choose the service agent. The welfare services in the law include residential support services, employment rehabilitation services, transportation services, leisure services, personal caregiver, counseling, and services and counseling for family members. Also included in the law are various services intended to support integration into the community, including services for help with daily living skills, for the purchase of technology aids, and assistance in exercising their rights.

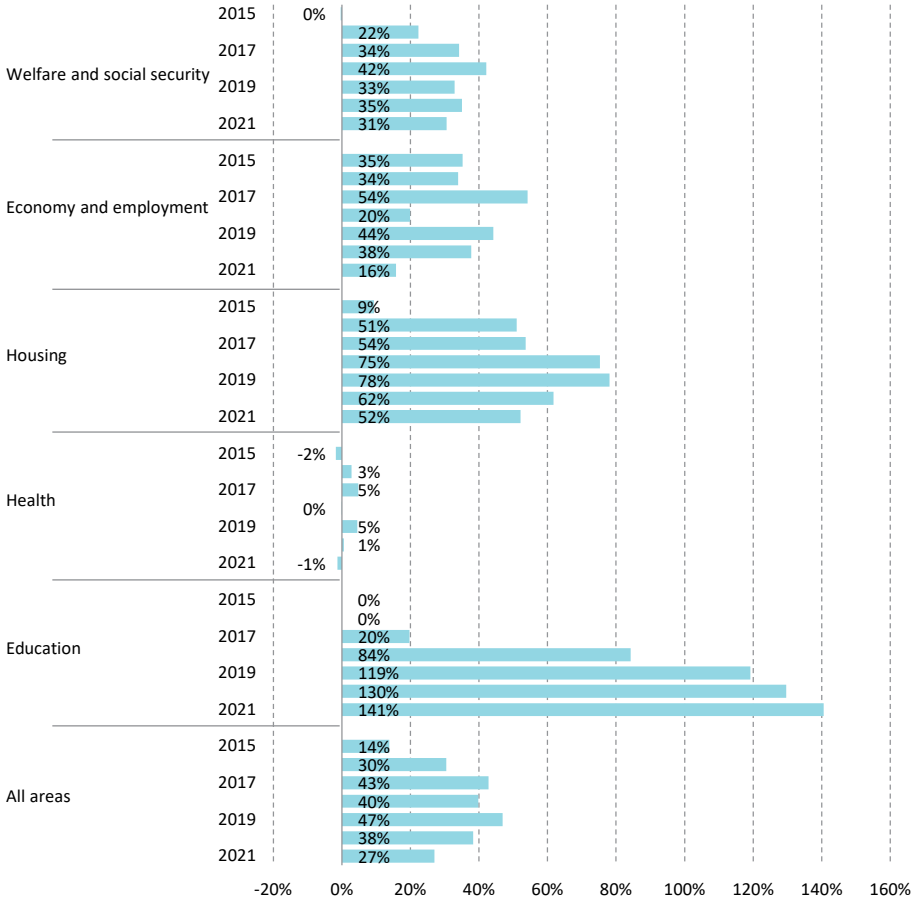
Organizations representing people with disabilities welcomed the Equal Rights for Persons with Disabilities Law. However, it is evident that the law's implementation poses many challenges

to policy makers and professionals alike. The law is budgeted in the amount of NIS 2.15 billion per year, which is an addition to the existing budget in the Ministry for people with disabilities. Nevertheless, if the estimates regarding the significant increase in the number of beneficiaries following the enactment of the law are realized, it will likely be very difficult to implement the law within this budgetary framework. Another challenge is integrating individuals with disabilities who are currently being treated in closed institutional settings into the community. This will require the establishment of many community housing settings and solutions. Engagement of professionals for the changes in the way welfare services are operated and switching the emphasis to the autonomy of the individual will also be complex, and will involve reducing the power and discretion of professionals. The process of determining service eligibility will require the establishment of a new system within the Ministry of Welfare and Social Affairs. Even more complex is the actual implementation of the personal budget and providing real options for choice. To this end, it is necessary to ensure that there will indeed be a selection of relevant services and providers within a reasonable geographic distance and effective mechanisms that will allow individuals to choose among these options. The international experience in this matter shows that the creation of this type of market and the activation of effective selection mechanisms are very complex processes, requiring monitoring and interventions by appropriate government authorities (Fleming et al., 2019).

Monitoring the implementation of the Elalouf Committee recommendations

The Elalouf Committee for the War Against Poverty submitted its recommendations in 2014. The Taub Center has monitored the implementation of the committee's recommendations over the years, and examined the budget additions to relevant items that have been given since the committee's recommendations were adopted (Figure 18). The data of the last monitored year, 2021, indicate a reduction in the total expenditure on the budgetary items of the Elalouf Committee's recommendations. Along with an increase in the budgetary expenditure on the implementation of the recommendations in education, including the establishment of additional day care centers (urban centers that provide integrative services of various types: health, welfare, education, and enrichment), there were also significant decreases in the expenditure on items such as the expansion of the work grant and the expansion of the public housing stock and its maintenance.

Figure 18. Additional expenditure on implementation of the Elalouf Committee recommendations for the War Against Poverty, as a percent of the budget recommendations of the committee



Source: John Gal, Shavit Madhala, and Ori Oberman, Taub Center | Data: Ministry of Finance; State budget for various years; Ministry of Education; Ministry of Health

Summary

The end of the COVID-19 crisis and the sharp drop in unemployment rates during 2022, the expansion of welfare state systems during the crisis, and the state's achievements in dealing with its health, social, and economic aspects created an expectation of far-reaching and long-term changes in social policy in Israel and prospects for dealing with the existing high levels of poverty and inequality. The establishment of the *government of change* heralded a greater willingness to adopt policies to deal with some of the social problems that existed prior to the crisis. This review of the social welfare systems shows that as the epidemic subsided and ceased to cloud the lives of most of the country's residents, some impressive steps were taken in various social fields, mainly in addressing the needs and rights of people with disabilities, in reducing poverty among senior citizens, in the care of senior citizens who have difficulties performing daily living activities, and in improving accessibility to work grants. Furthermore, there is a great willingness to promote actions to improve the status of social workers, the crucial professionals of the social welfare systems. However, political instability, trends that point to a renewed shrinking of the welfare state, processes in the labor market that create a basis for deepening inequality, and the threat posed to marginalized groups by rising prices raises concerns that the lessons of the COVID-19 crisis have not been learned, and that a return to normalcy also means a return to the limitations of the Israeli welfare state and its inability to provide sufficient solutions to the social problems faced by its residents. The available data on poverty incidence and inequality and the estimates regarding the increase in social gaps, all confirm this conclusion. It seems that after the crisis, some parts of the social welfare system have improved, but others have returned to their former limitations. Unfortunately, it is not at all clear if there is a willingness to take the necessary steps to deal with these issues in a better way than in the past, and if there will be the necessary political stability for this to happen.

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Executive Summary

Family Income in Childhood and Its Effect on Academic Achievement

Dana Shay and Yossi Shavit

The socioeconomic background of families in general, and family income specifically are factors that exert a major impact on child development in many areas, especially during the first years of life. Many studies have shown that a child's initial thousand days — from the beginning of the mother's pregnancy and until the child reaches age two — are the most crucial period for child development in terms of shaping the course of their life. This study examines the effect of family income through the lives of children, beginning in the year prior to their birth and until the age of 11, on their academic achievements in primary school.

The study was based on a database of the Central Bureau of Statistics for those born in Israel between 2000 and 2002 and 2004 to 2005. It includes information on family income from work for each year of the child's life, family size, parents' education, gender, sector, and birth weight; the data is from the beginning of the mother's pregnancy and until the child reaches age 11. At this age, children typically take the Meitzav exams (a standardized measure of academic performance) in Grade 5.

* Dana Shay, Researcher, Taub Center; doctoral student, Department of Sociology and Anthropology, Tel Aviv University. Prof. Yossi Shavit, Principal Researcher and Chair, Taub Center Initiative on Early Childhood Development and Inequality; Professor Emeritus of Sociology and Anthropology, Tel Aviv University. The Initiative is generously funded by the Bernard van Leer Foundation, the Beracha Foundation, and Yad Hanadiv. The full study was published in November 2022 and can be found on the Taub Center website.

The research findings show that family income during the initial thousand days of a child's life, from the onset of the mother's pregnancy and until the child reaches the age of two, has long-term effects on their academic achievements in primary school. Belonging to the bottom quintile in the income distribution in the first thousand days of life has a negative and statistically significant effect on the achievements on the Meitzav exams — math, science, English (as a second language), and language arts (Hebrew mother-tongue) — while statistically controlling for family income in later periods of life and other socio-demographic variables as noted. In contrast, belonging to the top quintile in the income distribution in this critical initial period of life shows a positive and statistically significant correlation with higher academic achievements on the Meitzav exams. The family income at older ages usually does not have such an effect, except in the years close to the exams (ages 10 to 11).

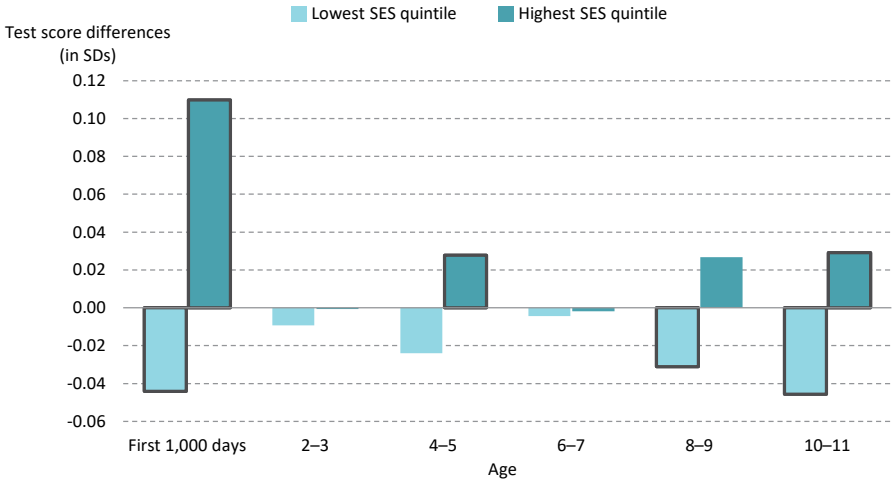
Compared to other OECD countries, in Israel there are large income disparities in the population, especially between those with high incomes and those at the bottom of the income distribution. This also means that economically stronger population groups differ from the rest of the population in the educational achievements of their children. This group is able to support its children better thanks to its additional resources, which can provide mother and baby with high-quality nutrition, medical and diagnostic care, participation in high-quality private preschool settings, and so on.

The study validates two well-known claims from the academic literature. First, that poverty experienced at young ages in life has negative and statistically significant effects on later performance. Second, that when the gaps between upper socioeconomic classes and the rest of the population are very wide, as is the case in Israel, members of the stronger classes have an advantage in their future academic performance as well. Especially in Israel, it is important to consider this, since economic inequality and relative poverty rates among children are considerably higher than in other developed countries.

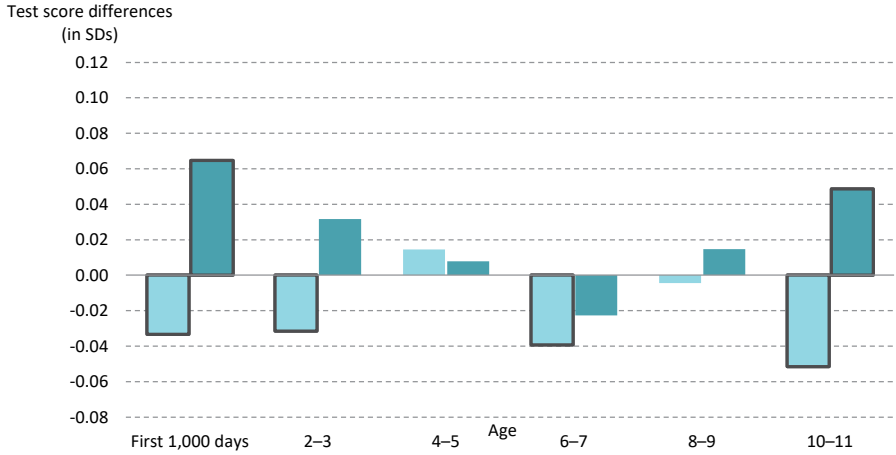
The study corroborates the claim that family income during the initial thousand days of life has a significant effect on future academic achievements.

Test score differences on the Meitzav exams in mathematics, science, English (as a second language), and language arts (Hebrew mother-tongue) in Grade 5 and family income in the highest and lowest SES quintile (relative to the middle SES income level)

Mathematics



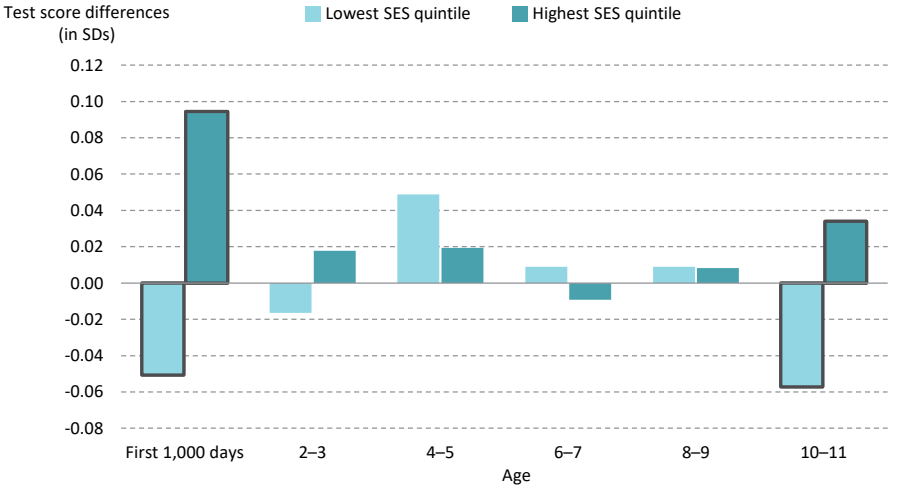
Science



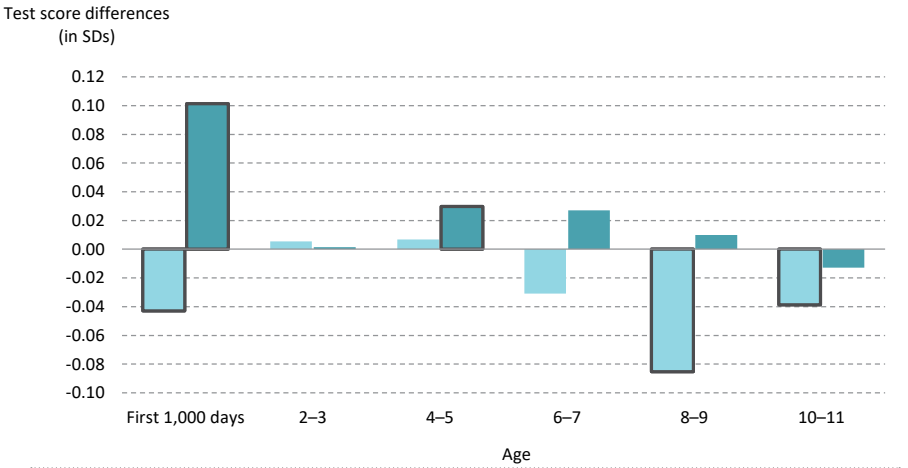
Note: Columns outlined in grey represent statistically significant differences in scores between children growing up in households with low or high family income and those from middle income families.
Source: Dana Shay and Yossi Shavit, Taub Center | Data: CBS

Test score differences on the Meitzav exams in mathematics, science, English (as a second language), and language arts (Hebrew mother-tongue) in Grade 5 and family income in the highest and lowest SES quintile (relative to the middle SES income level)

English (as a second language)



Language arts (Hebrew mother-tongue)



Note: Columns outlined in grey represent statistically significant differences in scores between children growing up in households with low or high family income and those from middle income families.
Source: Dana Shay and Yossi Shavit, Taub Center | Data: CBS

Executive Summary

Employment Characteristics of Parents of Children in Early Childhood

Noam Zontag

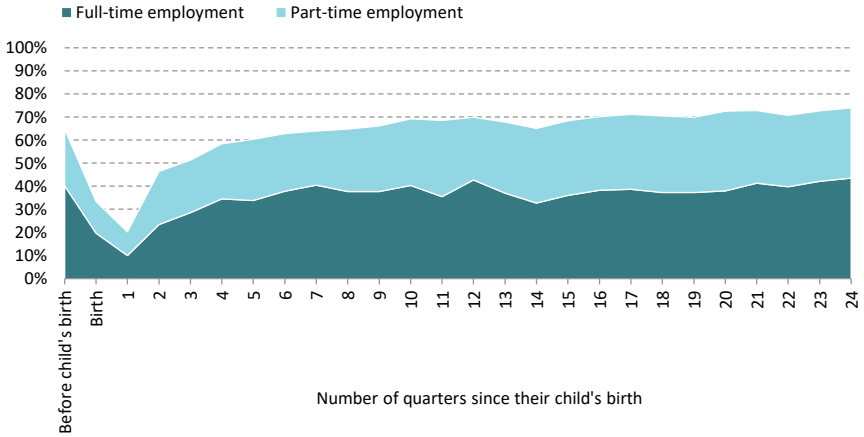
The employment of parents of children in early childhood is a topic of concern in many countries, but in Israel it is of particular importance due to the high fertility rate and high employment rates of parents, especially mothers. International research indicates a weakening in a number of employment indices of mothers after the first birth, which is reflected in a decline in their employment rates and number of work hours. This decline is liable to impact the accrual of professional experience as well as choices in career paths to those that are more family-friendly, despite the fact that, in some cases, this might not be the optimal choice for the mother's professional development or future professional advancement. The decline in employment data for mothers after the first birth is referred to in the research literature as the *motherhood penalty*, and is considered one of the main causes of gender gaps in the labor market.

A new Taub Center study examines the employment characteristics of parents of children in early childhood and focuses on the period of maternity leave and additional variables that are related to the employment of parents with children of this young age. As expected, the research shows that the employment rate of mothers declines substantially following a child's birth across all population groups due to maternity leave. Groups differ, though, in their rate of return to work. In particular, the following are some of the key findings:

* Noam Zontag, Research Department, Bank of Israel. At the time of writing, he was a researcher at the Taub Center for Social Policy Studies in Israel. The full study was published in September 2022 and can found on the Taub Center website.

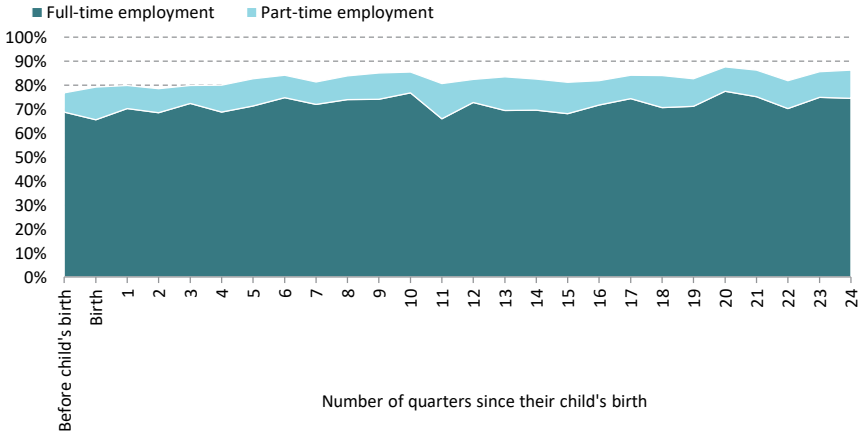
- The process of returning to work for those mothers with higher education is faster relative to mothers with lower levels of education, especially those without a Bagrut (matriculation) certificate.
- Regarding fathers, employment rates for Jews and Arabs alike are relatively unaffected by the birth of a child.
- For families with additional children under the age of 6, lower levels of employment are found among Jewish and Arab mothers and Jewish fathers. This is less often the case among Arab fathers.
- The well-known correlation between level of education and employment is more significant among mothers, and especially among Arab mothers.

Employment rate of non-Haredi Jewish mothers, by the number of quarters since their child's birth and their employment status



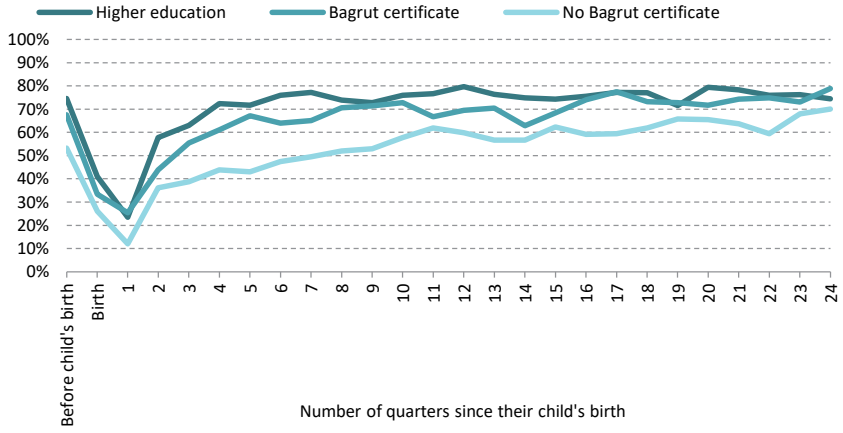
Note: The figure is based on actual work hours in the week of the survey/sample. The threshold for division between full-time and part-time employment is set at 35 hours of work per week.
Source: Noam Zontag, Taub Center | Data: CBS

Employment rate of non-Haredi Jewish fathers, by the number of quarters since their child's birth and their employment status



Note: The figure is based on actual work hours in the week of the survey/sample. The threshold for division between full-time and part-time employment is set at 35 hours of work per week.
Source: Noam Zontag, Taub Center | Data: CBS

Employment rate of non-Haredi Jewish mothers, by the number of quarters since their child's birth and their education level



Source: Noam Zontag, Taub Center | Data: CBS

DEMOGRAPHY

4

Demographic Trends in Israel: An Overview

Alex Weinreb and Kyrill Shraberman

During 2020 and 2021, Israel's population grew by 1.6% and 1.7%, respectively. These were the lowest annual growth rates experienced by Israel since the founding of the State, with the sole exception of 1985–1988. In 2022, Israel's population growth rate climbed back to its more normal level, around 1.9%, and Israel's population is therefore expected to reach 9.65 million at year's end, up from 9.45 million at the start of the year. A number of symbolically important markers of growth were also exceeded during 2022. For the first time, Israel's Jewish population surpassed 7 million, its Arab population surpassed 2 million, and its other population — people who are neither Jewish nor Arab — surpassed 0.5 million.

The return to 1.9% population growth may look like a return to business as usual. It is not. During 2022, Israel experienced some new and non-standard patterns in the relative contributions of fertility, mortality, and migration to population growth. These trends are the main focus of the first half of this chapter.

The second half of the chapter turns our attention to a select number of issues at the nexus of demography, environment, and climate change. Increasing concern about environmental and climate change was suppressed during the COVID-19 pandemic. In 2022, however, many of the wealthy countries that are Israel's primary reference group experienced record-breaking heat waves, droughts, wildfires, and rainfall. Alongside the accelerated melting of glaciers and snow caps, these events pushed climate change and environmental issues back into the headlines. Given its size, Israel has little impact on global emissions or related global measures that are driving the anthropogenic component of these changes. However, Israel is an increasingly wealthy country in a climatologically sensitive region of the world; and it has the fastest growing population of any wealthy country. Each of these factors has implications for resource use, greenhouse gas emissions, and, therefore, the environment.

* Prof. Alex Weinreb, Research Director, Taub Center for Social Policy Studies in Israel. Kyrill Shraberman, Researcher, Taub Center.

Comprehensive coverage of the relationship between population, environment, and resources will follow in future publications. Here we briefly survey two issues at the nexus of population and environment in Israel: land cover and environmentally-related premature deaths.

Shifts in core demographic components

Fertility

Basic trends

In past years, we have reported how, from around 2005 to 2010, Israel's national Total Fertility Rate (TFR) rose from around 2.85 to 3.0 children per woman, and that it then stabilized in the 3.0–3.11 range until about 2016. This is an extraordinarily high TFR for a developed country. Across this period, fertility accounted for roughly 80% of Israel's total population growth rate.

In the few years preceding the COVID-19 pandemic, signs of a reduction in Israel's fertility began to appear. Between 2017 and 2020, it fell from 3.11 to 2.90. Yet, as we reported last year (Weinreb, 2021), trends in the General Fertility Rate (GFR)[1] suggested that fertility in the Jewish/other population bounced back to their 2019 levels during the first nine months of 2021. We also reported that in the Arab population fertility remained at the lower 2020 levels for the first six months of 2021, and then increased towards the higher 2019 levels.

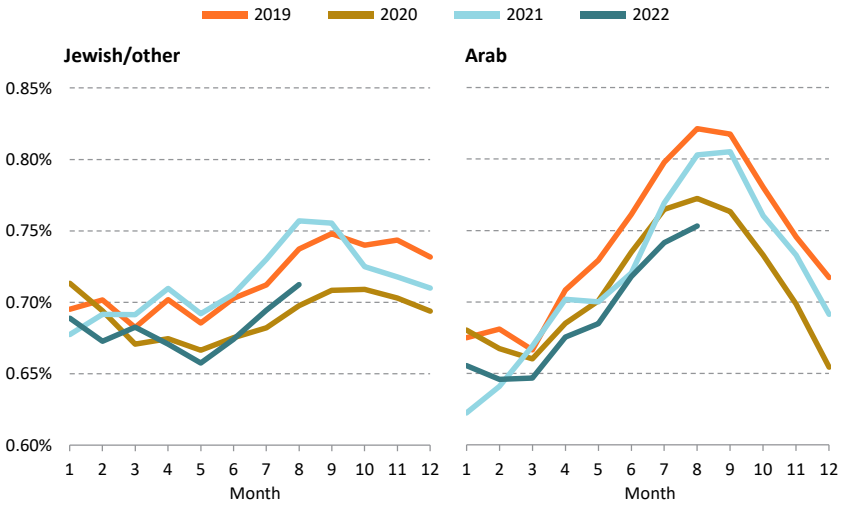
Official TFR data released by the Central Bureau of Statistics (CBS) since then have confirmed these trends. In 2021, Israel's TFR increased by 0.1 child to 3.0 children per woman. This was mostly driven by the 0.13 increase among Jewish women. Among Muslim women, in contrast, TFR increased by a mere 0.02 children, among Druze women by 0.06 children, and among women categorized as *other* by 0.04 children. Only among Christian Arab women did the TFR continue to fall: by 0.08 children.

1 The *General Fertility Rate* (GFR) is the total number of births in the population in a given period divided by the number of women aged 15–49 in that period. By restricting the denominator to women of reproductive age, it is a superior measure of fertility levels than the *Crude Birth Rate* (CBR), widely used outside demography. It is not as good as the TFR, however, which is basically the sum of age-specific fertility rates, where each of the latter is: the number of births to women aged x divided by the number of women aged x.

Data on the number of births in 2022 suggest that this initial fertility boost seen in 2021 in Israel's largest subpopulations has now faded. As shown in Figure 1, the GFR up to the end of July 2022 was 0.7% lower than in the same period in 2020 in the Jewish/other population (3.2% lower than in 2021), and 2.6% lower in the Arab population. In other words, after a minor COVID-related fertility boost, trends in fertility have returned to their pre-COVID downward trajectory.

Figure 1. General Fertility Rate (GFR), 2019–2022, by month and subpopulation

Share of women aged 15–49 giving birth



Source: Alex Weinreb and Kyrill Shraberman, Taub Center | Data: CBS

This decrease in fertility rates will not immediately lead to a reduction in the number of births in Israel. The reason is that the number of births is a product of fertility rates multiplied by the number of women of reproductive age (15–49), and in both the Jewish/other population and the Arab population the latter has been increasing annually over the last few years by around 1.2% and 2.5%, respectively. In fact, increases in the number of women of reproductive age in each group are offsetting decreases in fertility rates. As a result, as shown in Table 1, the number of births in each subpopulation has remained relatively stable, thus far at least.

Table 1. Number of births by end of July in each calendar year, by mother's sector

	Jewish/other	Arab	Total
2019	78,717	24,556	103,273
2020	77,607	24,339	101,946
2021	80,371	24,308	104,679
2022	78,150	24,491	102,641

Source: Alex Weinreb and Kyrill Shraberman, Taub Center | Data: CBS

Fertility by district, cities, and subpopulations

We use annual TFR data released by the CBS for all 136 towns and cities with at least 10,000 residents to see where in Israel these reductions are occurring, and in which subpopulations. These data allow us to distinguish fertility trends by district and size of the town or city, and also to broaden our focus beyond the standard Jewish/other versus Arab categories to look at other subpopulations. Unfortunately, these data are only available for the 2014–2020 period, so shifts cover the pre-COVID period in the timing of conceptions, if not births.

We begin by looking at variation by district, as shown in Table 2. There are two notable trends. First, there are substantial differences in TFR across Israel's districts. As of 2020, the low-fertility cluster (by Israeli standards) included Haifa, the North, Tel Aviv, and Central districts. TFRs here were in the 2.30–2.55 range. TFR in the Southern district was 3.15, in Jerusalem 3.9, and in Judea/Samaria 5.26.

Table 2. Total Fertility Rate (TFR) by district and reductions in TFR

		TFR				Change (number of children)		
District	Number of town/cities	2014	2016	2018	2020	2014–2020	2016–2020	2018–2020
Judea/Samaria	6	5.77	5.72	5.58	5.26	-0.51	-0.46	-0.32
Jerusalem	4	4.04	4.05	4.04	3.91	-0.13	-0.14	-0.13
South	19	3.28	3.35	3.41	3.15	-0.13	-0.19	-0.26
Central	32	2.81	2.78	2.76	2.55	-0.26	-0.23	-0.21
Tel Aviv	11	2.70	2.69	2.61	2.47	-0.23	-0.22	-0.14
North	38	2.66	2.66	2.64	2.40	-0.26	-0.26	-0.23
Haifa	26	2.49	2.47	2.47	2.30	-0.19	-0.17	-0.18

Source: Alex Weinreb and Kyrill Shraberman, Taub Center | Data: CBS

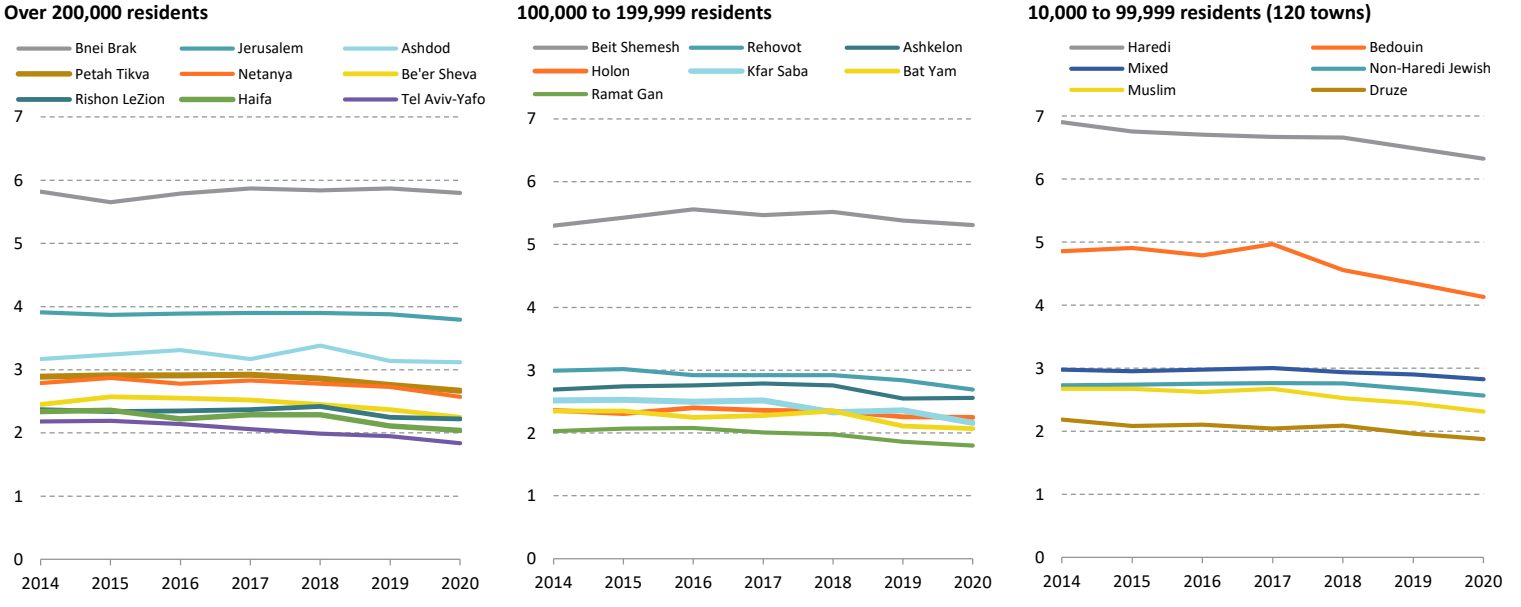
Second, the magnitude of fertility decline largely varied in the same way. Between 2014 and 2020, TFRs fell by 0.19–0.26 children in the four low fertility districts, by only 0.13 children in Jerusalem and the South, and by 0.5 children in Judea/Samaria. However, the timing of these declines varied. In all but two districts more than 80% of the decline occurred after 2018. The exceptions are Tel Aviv and Judea/Samaria. In both of these districts, meaningful declines begin in 2016.

Looking at TFR at the level of towns/cities provides more detailed perspective on these trends, as shown in the three panels in Figure 2. The left-hand panel shows trends in the largest cities — defined here as having at least 200,000 residents. In six of them, TFR fell relatively consistently, beginning in Tel Aviv and Be'er Sheva (2015), Netanya and Petah Tikva (2017), and Haifa and Rishon LeZion (2018). Parallel trends can be seen across six of the seven cities in the secondary tier of cities (in terms of size), those with between 100,000 and 200,000 residents. These are shown in the middle panel of Figure 2.

Most of these reductions in TFR are in the 0.2–0.3 child range. In some cases, they have pushed TFR to unusually low levels for Israel. As of 2020, for example, TFR had fallen to below *replacement-level* in Tel Aviv and Ramat Gan (1.84 and 1.80, respectively), and was around replacement-level and on a downward trend in a number of other Israeli cities: Haifa, 2.04; Bat Yam, 2.07; Be'er Sheva, Rishon LeZion, Kfar Saba, and Holon, all around 2.2.[2] In fact, the only large cities (over 100,000 residents) where TFR remained relatively stable were those that are wholly Haredi (ultra-Orthodox Jewish) (e.g., Bnei Brak), largely Haredi (e.g., Beit Shemesh) or have major Haredi subpopulations (e.g., Jerusalem, Ashdod). But even in these, mild reductions could be seen in 2020. Local reductions of this sort can be the result of one of two effects: a *behavioral effect* in which people choose to have fewer children, or to delay having a child; or a *selection effect* in which people with higher fertility move away to smaller towns. Without individual-level data, it is not possible to formally identify which effect drove lower fertility in the larger cities between 2014 and 2020. Informally, however, trends in smaller towns, seen in the right-hand panel of Figure 2, suggest that it is more of a behavioral effect. Even outside the larger cities, and among all population groups, fertility in Israel is starting to fall.

2 *Replacement-level* fertility refers to the level of fertility necessary to maintain population size where net migration is zero. In countries with very low mortality (e.g., Israel), replacement-level fertility is around 2.05 children per woman.

Figure 2. Total Fertility Rate (TFR), in 136 towns/cities with more than 10,000 residents



Note: Total Fertility Rate (TFR) is the average number of children that a woman will give birth to across her lifetime, assuming current age-specific fertility rates remain stable. Average by ethnic-religious identity of the majority, weighted in each category by the size of the population of child-bearing age (15–49).
Source: Alex Weinreb and Kyrill Shraberman, Taub Center | Data: CBS

To show this, we categorized the remaining 120 towns/cities with between 10,000 and 99,999 residents (as of 1.1.2020) by majority ethno-religious group, and then estimated an average TFR for each category, weighted by the total number of people aged 15–49. In non-Haredi Jewish towns and mixed towns, the reductions began in the second half of the period and averaged a relatively moderate 0.2 children. In both Bedouin and non-Bedouin Muslim towns, fertility began to fall earlier, and it has fallen further. They ended the period with TFRs of 4.1 and 2.3 children, respectively. That is 0.7 and 0.3 children fewer than in 2016. Likewise, fertility also fell steadily in smaller Haredi towns, from 6.9 to 6.3 children. Though that is still higher than the TFR in Bnei Brak and the other older Haredi centers, whose TFRs remained more stable, a 0.6 child reduction in 6 years is substantial.

Finally, these trends in smaller towns also point to the emergence of below-replacement fertility patterns in Druze communities. This means that the Druze are the third of Israel's subpopulations — the fourth if we count the *State of Tel Aviv* as a distinct category — to have joined what, in almost all other developed countries, is the modal demographic category, those with below-replacement fertility. The two groups in Israel that preceded the Druze are the Christian Arab population, and what the CBS calls others.

The beginning of a new low-fertility regime?

It is premature to talk about Israel joining other developed countries (and emerging economies) in the low-fertility club. However, we expect these reductions in TFR to continue for two reasons. First, although fertility decisions appear to be less sensitive to income in Israel than in most, or perhaps all, other developed countries, especially among religious Jews, rising living costs and anxiety about those costs (see Bental & Shami, 2022; Gal et al., 2022) will at least delay some fertility. Any bounce back in fertility as the economy recovers will only partly compensate for that delayed fertility since only some of the delayers will subsequently choose to have a child, or be able to have one.[3]

3 Women's ability to conceive a child and carry it to term — *fecundability* in the demography literature — falls with age, and medical interventions cannot resolve all such problems.

Second, the number of low-fertility women and families in Israel appears to be on the rise, as is the rise in low fertility discourse. Signs include:

- Ongoing increases in women's age at first birth — between 2000 and 2020 it increased by 1.9 years among Jews, 1.4 years among Muslims, and 3.5 years among both Druze and Christian Arabs.
- Falling rates of marriage — a 12.5% reduction in the Total Marriage Rate (below age 40) across all of Israel's major religious groups between 2015 and 2019 (Weinreb, 2022).
- Sharp increases in divorce rates at younger ages in Israel's Muslim population (where there is almost zero non-marital fertility) (Weinreb, 2022).
- Increasingly vocal discourses legitimizing being *childfree* in a pronatalist society, especially in a world facing substantial environmental strains and stressors.

As is clear from the large scholarly literature on the Second Demographic Transition,[4] once the low fertility genie is released, it is difficult to get it back in the bottle. Institutional, cultural, and commercial mechanisms click into place that make subsequent increases in fertility more costly, both socially and economically. Identities become forged around attitudes to fertility including low fertility or zero fertility. Israel is not there yet. But certain sectors seem to be on the way.

Mortality

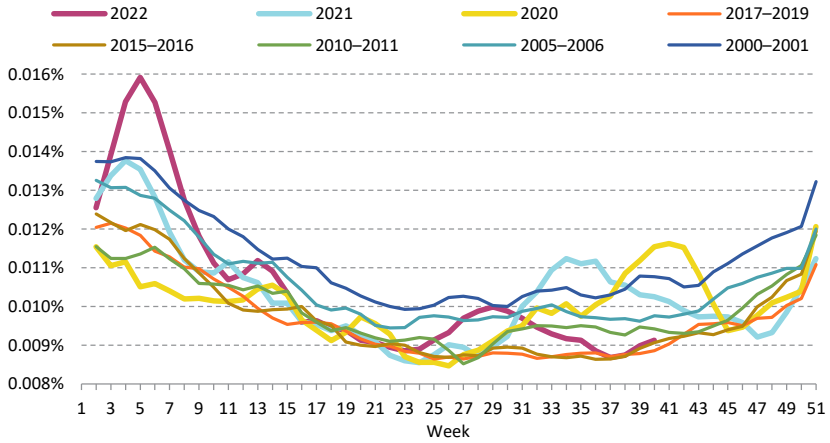
Driven by extremely high mortality rates in late January and early February of 2022, overall (age-standardized) mortality rates across the first 40 weeks of the year were the highest for almost 20 years: 5.7% higher than in 2021, 11.6% higher than in 2020, and 9.8% higher than in 2017–2019. This is shown in Figure 3. Further explorations of age-specific mortality trends — not presented here — show that this excess occurred at all ages above 55.

COVID-19, especially the Omicron variant, is clearly a major part of this pattern. However, it is worth noting that in both prior COVID years, there were at least short periods in which overall mortality fell to its lowest level ever.

4 Broadly, this refers to a rise in life expectancy following substantial improvements in medical care and the prevention of death at younger ages, alongside reductions in fertility rates to levels below replacement, sometimes far below. For a succinct account, see Lesthaeghe, 2020.

Over the first 40 weeks of 2022 that has not occurred. Instead, even when mortality was not significantly elevated it has been a little higher than normal. The gap between higher cumulative mortality in 2022 over both 2020 and 2021 will likely close by the end of the year. In both those years, there were significant increases in mortality in the late summer and autumn months. Now that COVID is largely endemic and the vast majority of residents have either had at least three vaccinations or have been infected, there is unlikely to be a parallel bump in mortality.[5]

Figure 3. Age-standardized total mortality by week, selected years
Up to week 40 in 2022



Source: Alex Weinreb and Kyrill Shraberman, Taub Center | Data: CBS

Finally, it is worth noting that this elevated mortality will delay Israel's anticipated return to year-on-year increases in life expectancy. Those increases occurred for several decades prior to the COVID pandemic. The earliest Israel can return to that upward trajectory is 2023.

5 A more worrying explanation that may account for at least part of this elevated mortality over the first 40 weeks of 2022 — unlikely, but we shall only know for sure once cause-of-death data are released for 2022 — is that it was caused by other factors. For example, it could be the indirect, longer-term consequence of the singular focus on the pandemic that pulled resources away from other factors, especially during the upsurge in the Omicron variant and a similar seasonal uptick in flu infections and deaths alongside long-term burnout of medical staff.

Migration

The flattening number of births shown in Table 1 and elevated mortality rates, despite ongoing improvements in population health, suggest that Israel's population growth rate should be slowing. Yet we have already seen that this is not the case in 2022. Growth rates are higher than in the previous two years.

The reason is migration, the third component of demographic change. In-migration to Israel has been rising, and out-migration appears to be falling. As a result, gains from net migration have outweighed the reduction in the number of births and the somewhat higher number of deaths. Over the first nine months of 2022, 52,578 people officially immigrated to Israel. This included an additional 1,375 immigrating citizens (Israeli citizens born outside Israel to Israeli parents). This is almost twice as many as arrived in all of 2021, 30,000 more than in 2020, 15,000 more than in 2019, and 20,000 more than in 2018.

Relative to 2021, all of this excess immigration is from the former USSR European countries. Over the first nine months of 2022, there were 41,833 immigrants from these countries, accounting for about 82% of all immigration to Israel. In the equivalent nine-month period in 2021, there were 7,675 immigrants from those countries, accounting for about 44% of all immigration. Immigration from all other countries fell slightly, from 9,821 in 2021 to 9,374 in 2022.

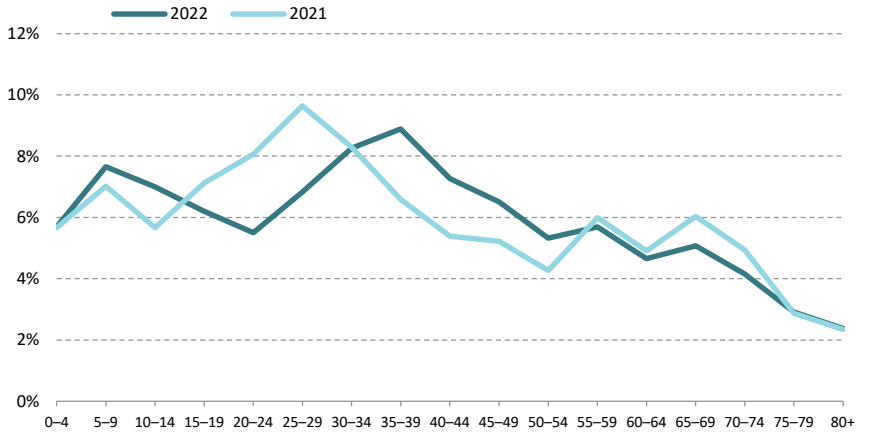
What this means is that even if migration flows fall to their normal levels for the remaining months of 2022 — not likely given the trajectory of the Russia-Ukraine war and economic dislocations in general in countries with large Jewish communities — Israel will end the year with close to 65,000 new immigrants. Assuming that more than 90% of these remain in Israel into 2023 — this is not a certainty[6] — that means that net immigration will account for more than 30% of Israel's population growth in 2022, considerably higher than the standard 20% that held over the decade preceding the COVID pandemic.

Another characteristic distinguishes the 2022 immigrants to Israel from their counterparts in 2021: their age. This is shown in Figure 4. The 2021 immigrant population has the classic age distribution of a migrant population. Peak migration ages range from the early 20s to early 30s, with a relatively small share of children and another much smaller post-retirement bump.

6 Since most have fled a war and are not ideological migrants, it is reasonable to assume that a significant share will leave sometime after the active phase of the Russia-Ukraine war ends.

The 2022 immigrant population has a different age distribution. The modal age is late 30s — 10 years older than the modal age of 2021 immigrants. In addition, the share of children migrants — on average about 30 years younger than that peak age — is therefore also substantially higher (since mean age at childbirth is around 30).

Figure 4. Age distribution of immigrants into Israel in the first 9 months of the year, 2021 and 2022



Source: Alex Weinreb and Kyrill Shraberman, Taub Center | Data: CBS

One final thing to note about this enlarged pool of immigrants in 2022 is their clustering in a number of locations within Israel. Not surprisingly, there is a high positive correlation (0.76) between the absolute number of new immigrants arriving in a given location and its population. But this does not explain everything. Notably, Haifa, Tel Aviv, and Netanya each received more than 5,000 new immigrants during the first nine months of 2022, whereas Jerusalem, with a population 2–4 times the size, only received 3,700. More interesting, yet, new immigrants increased the population of some smaller communities, Beit Alfa, Yehiyam, and Eynot, by more than 7% over the first nine months of 2022. New immigrants also added around 3% to the population of Nahariya, Nof Hagalil, and at least 2% to Netanya, Bat Yam, Harish, Haifa, and Akko.

To look at variation in the share of new immigrants in 2022 as a percentage of the population more systematically, we estimated a simple set of regressions. The first three look at new immigrants in general. The final model focuses on new immigrants from the former Soviet Union.

Results are shown in Table 3. We note two findings. First, new immigrants arriving in the first nine months of 2022 are more likely to have landed in the poorest towns/cities (Cluster 1–3), and least likely to have landed in the wealthiest towns/cities (Cluster 9–10). Second, new immigrants in 2022 were less likely to land in places with higher rates of natural growth — typically associated with a more religious composition. Instead, they favored places where there has been disproportionate recent growth in the immigrant population, pointing either to the appeal of immigrant enclaves, or perhaps the greater experience of such places in appealing to immigrants. And, in the case of new immigrants in general, though not immigrants from Russia and Ukraine, they have moved to places with a larger share of older people.

An important caveat to these patterns is related to the difference between an initial landing spot and permanent settlement. As we mentioned earlier, at least some of these new arrivals are likely to leave Israel in the near term, and certainly in the medium term. Even among those who stay in Israel, a proportion will move from their initial landing spot to a more permanent location. That being said, the slightly older profile of the 2022 migrants makes them less mobile than their younger and more childless counterparts in 2021 or most other years.

Table 3. Regression results (p-values) of new immigrants entering Israel between January 1, 2022 and September 30, 2022 as a percent of the population on January 1, 2022

	All immigrants			FSU immigrants
	(1)	(2)	(3)	(4)
Socioeconomic Cluster 1–3 *(reference group)*				
Cluster 4–5	-0.232	-0.304	-0.505**	-0.402*
	(0.374)	(0.221)	(0.0463)	(0.0662)
Cluster 6–8	-0.514**	-0.555**	-0.811***	-0.535***
	(0.0286)	(0.0130)	(0.000582)	(0.00827)
Cluster 9–10	-0.848***	-0.887***	-1.164***	-0.758***
	(0.00155)	(0.000505)	(1.39e-05)	(0.000977)
Percentage of growth in 2020 stemming from:				
Natural growth (Births > Deaths)		-0.00109***	-0.00104***	-0.000752***
		(0.00105)	(0.00146)	(0.00764)
New immigrants		0.00661***	0.00640***	0.00536***
		(4.02e-09)	(8.09e-09)	(2.13e-08)
Returning Israelis		0.000664	0.00108	-0.000362
		(0.832)	(0.727)	(0.892)
Share of 2020 population aged 65+			3.674***	1.116
			(0.00163)	(0.264)
Constant	1.178***	1.205***	0.995***	0.829***
	(3.43e-08)	(3.51e-09)	(2.23e-06)	(4.73e-06)
No. of towns/cities	330	330	330	330
No. of immigrants	52,300	52,300	52,300	42,236
R^2	0.038	0.140	0.166	0.126

Notes: OLS regression; p-values in parentheses; significance levels at: *p < 0.10; **p < 0.05; ***p < 0.01.
Source: Alex Weinreb and Kyrill Shraberman, Taub Center

Land use and environmentally-related premature deaths

As mentioned in the introduction, 2022 was awash with signs of climate change, especially in the wealthy countries of Western Europe and North America that serve as Israel's favored reference group. As of August 2022, after experiencing the worst drought indices since records began in 1950 (Toreti et al., 2022), Europe was also on track for a record-breaking wildfire season (Weise, 2022) with record amounts of damage (Kirk et al., 2022). Equivalent records have been set in China, continue in the American West and Southwest, and correspond to global markers of climate change such as the lowest recorded levels of Antarctic Sea ice (UN, 2022).

As home to just 0.12% of the global population, Israel contributes little to the anthropogenic causes of these shifts. But like all wealthy countries, its contribution is disproportionate to its size. And as a country with a growing population — from 4.6 million in 1990 to 9.6 million today to more than 12.5 million projected by 2040 (even with anticipated reductions in fertility) — that contribution has grown and will continue to grow unless reductions in per capita generation of greenhouse gases (GHGs) outweigh growth in the number of people. In the same vein, this growing population needs to be housed and provided with the range of services that modern states habitually extend to their citizens. Each of these services also consumes resources, including space.

In this section we briefly survey two distinct aspects of the relationship between population and environment that touch on these issues: changes in land cover, including built-up areas; and premature deaths associated with selected environmental conditions. This brief survey should be viewed as an introduction to more comprehensive and multidimensional coverage in future Taub Center publications, where other aspects of the relationship between population and environment, including air pollution, greenhouse gas emissions, waste management and recycling, will be investigated in greater depth.

Changes in land coverage

All modern societies regulate land use. Regulation is particularly important in countries with limited land area and a growing population. Both of these conditions apply to Israel.[7]

7 In this chapter, we treat the amount of land as a relatively fixed resource. In the long-term it may not be. Projected rises in sea level, alongside anticipated storm surges, will shrink available land in many countries, including in Israel, where the Krayot area between Haifa and Akko is particularly susceptible. On the other hand, artificial islands are being planned in Israel to house tens of thousands off the coast of Gush Dan, paralleling plans in other places (Dubai, the Maldives, Solomon Islands).

Here we focus on three remote-sensed measures of land coverage that are associated with population growth. *Land cover* refers to an OECD measure of the percentage of total land covered by trees, grassland, wetland, swamps, sparse vegetation, cropland, bare areas, inland water, and artificial surfaces (buildings, roads, and similar). *Built-up areas*, also an OECD measure, refers to the percentage of total land covered by buildings (roofed structures). It excludes other artificial surfaces such as paved surfaces (roads, parking lots), commercial and industrial sites (ports, landfills, quarries, runways) and urban green spaces (parks, gardens). Finally, *protected areas* are areas set aside within natural habitats. These last are from the World Database on Protected Areas (WDPA), a joint project of the UN Environment Programme and the International Union for Conservation of Nature (IUCN).

None of these measures fully capture patterns of land use. However, together they give a much more valid and comprehensive picture than the commonly used measure population density. Population density is a simplified and misleading comparative indicator of population-environment interactions since it cannot account for the difference between urban sprawl and building-up.[8]

Over the last four decades, Israel's record on each of these measures has been mixed, though the overall picture appears to be more positive than it was ten years ago.

The first two rows of Table 4 show data on land coverage in Israel and European members of the OECD in 2019. Israel clearly has a very different pattern, reflecting its location in the Eastern Mediterranean and its large expanse of semi-arid and arid zones in the southern half of the country. Whereas more than 51% of European OECD countries are covered by trees, grassland, wetland, and swamps, that is only the case for 3.2% of Israel. On the other hand, 56.5% of Israel is categorized by the OECD as bare areas (the arid and semi-arid areas in Israel's south), relative to 1.8% of European OECD countries.

On most other measures, Israel and European countries are quite similar, though it is clear that a larger share of Israel than European countries is covered by artificial surfaces: 5.2% versus 2.5%, respectively; and on the flipside, less of

8 An example: take two settings with 1,000 people living in a square kilometer. In the first, each person resides in their own home on 0.1 hectare with a fenced-in garden of another 0.4 hectares. In the second, all 1,000 people live in four 12-story apartment blocks, each covering 1 hectare (including surrounding shared gardens and buildings). These two settings have identical population density. In contrast, the measure of built-up area will give the first a score of 100 hectares of built-up areas, and the second a score of 4 hectares.

Israel is covered by cropland than is the case in Europe: 29.2% as opposed to 38.5%, respectively.

The remaining rows of Table 4 document the shifts in land coverage on each of these measures between 1992 and 2019. Three notable changes can be seen.

Table 4. Land cover (% of total area) in Israel and European OECD countries, 2019, and changes since 1992

	Tree cover	Grassland, wetland, swamps	Sparse vegetation	Cropland	Artificial surfaces	Bare area	Inland water
ISRAEL	3.0	0.2	3.6	29.2	5.2	56.5	2.3
OECD-Europe	36.3	15.2	3.2	38.3	2.5	1.8	2.7
Change (percentage points): Israel							
1992–2004	-0.01	0.01	-0.28	-0.10	1.26	-0.70	-0.19
2004–2019	0.32	0.01	-0.19	-1.32	2.15	-0.96	-0.01
Total	**0.32**	**0.02**	**-0.46**	**-1.42**	**3.41**	**-1.66**	**-0.20**
Change (percentage points): OECD-Europe							
1992–2004	-0.15	-0.04	-0.09	-0.60	0.91	-0.02	0.01
2004–2019	0.17	0.11	-0.11	-0.43	0.32	-0.06	0.01
Total	**0.02**	**0.07**	**-0.21**	**-1.04**	**1.23**	**-0.09**	**0.02**

Source: Alex Weinreb and Kyrill Shraberman, Taub Center | Data: OECD

First, not surprisingly given the relative pace of both population and economic growth, the share of land covered by artificial surfaces has grown much faster in Israel over the last few decades than in Europe's OECD countries. From 1992 to 2019 Israel's share increased by 3.4 percentage points — around 765 km^2 — relative to a 1.2 percentage point increase in Europe.

Second, although the modal source of that growth in Israel has involved conversion from bare areas, there has also been a 1.4 percentage point reduction in cropland, with most of this happening since 2004; European countries experienced a 1.0 percentage point reduction in this measure. There has also been a worrying 0.2 percentage point reduction in inland water, though that was almost completely concentrated in the 1992–2004 period.

Third, and more positive from Israel's perspective, total tree cover[9] increased between 2004 and 2019 much faster than in Europe. In Israel it grew by 0.32 percentage points (an increase equivalent to around 80 km^2 although this is likely a mild underestimate[10]), while in Europe, the increase was only 0.17 percentage points. That said, and as noted, the baseline levels of tree coverage are so much lower in Israel that even if these differential rates of increase in tree coverage were to continue, it would take several hundred years for Israel to reach half of the average European level.

Trends in built-up areas in Israel also look more positive (Figure 5). In 1975, Israel's level of built-up areas per capita was just below that of the average of countries that would become members of the OECD, and it was half that of the US. As of 2014 (latest OECD data), these per capita measures had risen in almost all OECD countries. In Israel, in contrast, the per capita measure of built-up areas fell by around 35%, despite the sharp rise in standards of living in general and in the size of new housing stock relative to housing built in the 1960s and 1970s. This gave Israel the 8th lowest level on this measure in the OECD (Figure 5). Only Mexico, Costa Rica, South Korea, Iceland, Türkiye, Chile, and Colombia were lower.

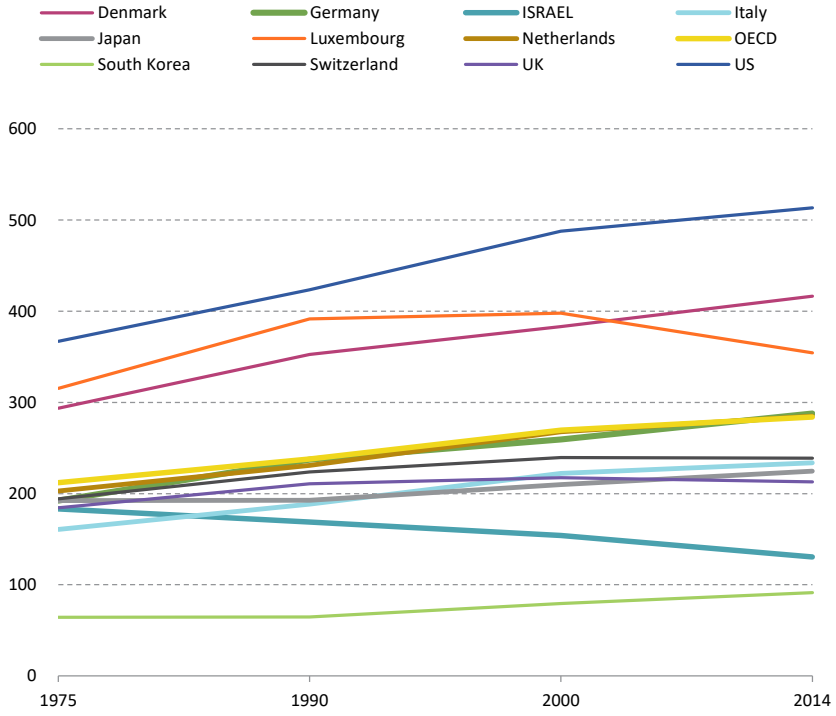
Of course, as we have shown, despite this reduction in the per capita measure, total built-up area and its share in total land area have continued to grow in Israel. The decrease in the per capita measure simply means that the built-up area has grown at a slower rate than the population. In other words, Israel has become better at fitting more people into a small vertical space, even as living standards have continued to improve. Likely explanations for this phenomenon include the larger size of typical Israeli households relative to most OECD countries, and the trend toward taller apartment blocks — which has intensified further since these 2014 data. Therefore we expect future measures to continue showing a per capita decline, even as the aggregate levels of built-up area rise.

9 Enlarging tree cover contributes to better absorption of carbons from the atmosphere and reduces overall sun radiation load by 67%, compared to bare land (Rotenberg et al., 2021). Other methods of carbon capture and sequestration (CCS) have been developed but are not yet feasible on a large-enough scale to offset these effects of reduced vegetation coverage. This is one of the main factors underlying contemporary environmental concerns with population growth.

10 Without high resolution mapping (10m spatial resolution at a minimum), large tree coverage is often missed in urban landscapes (Ottosen et al., 2020). These are precisely where much new development has been occurring in Israel. Young trees are also much more likely to be missed.

Figure 5. Built-up area per capita, selected OECD countries

Square meters per person



Source: Alex Weinreb and Kyrill Shraberman, Taub Center | Data: OECD

A final indicator of patterns of land coverage in the last few decades can be found in measures of protected areas. On average across the OECD, 16.0% of the total land area was protected as of 2021, up from 9.7% in 2000. Among *European* OECD countries, the share of protected land was higher: 24.8% in 2021, up from 14.9% in 2000.

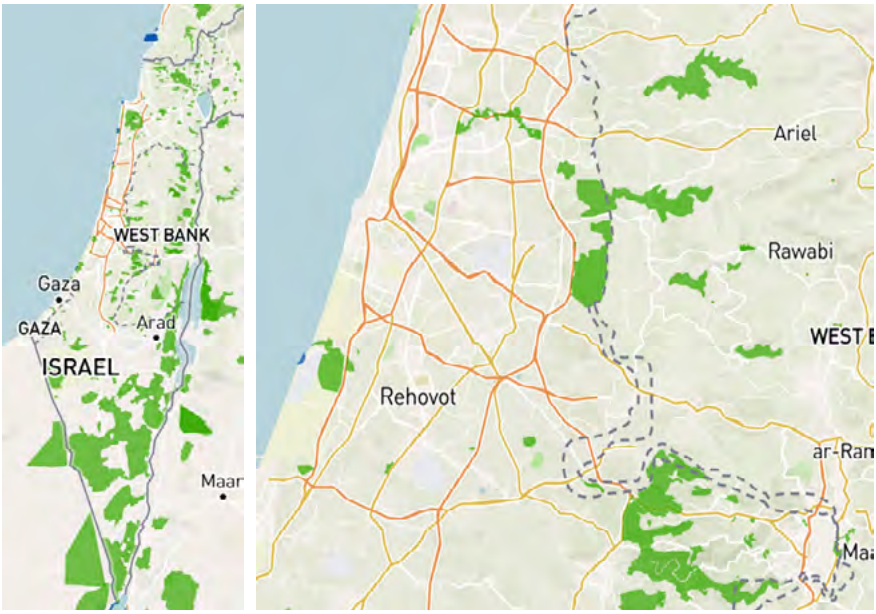
Israel largely followed the European pattern. It was ranked 13th in the OECD in 2021 with 23.9% of the land categorized as protected areas, up from 15.3% in 2000. This means that even as Israel's population grew by 48%, the amount of land officially devoted to protected natural habitat increased by 56%, largely on par with European countries whose demographic growth is very low.

Here, too, however, the picture looks less sanguine when we map those protected areas. As shown in the left-hand panel of Illustration 1, it is not just that the vast majority of protected areas in Israel stretch from the Negev Highlands down to the Arava and Eilat, far from Israel's main population centers. It is also that those main population centers, especially in the Gush Dan region, seen in the right-hand panel, have very limited protected areas. Of course, there are other types of open areas in this region. But open areas lack an important layer of protection from urban development. So even with the long-term trends toward lower per-capita measures of built-up areas described above, population growth will threaten those remaining open areas over the next decades, unless there is determined opposition from local actors, or careful urban planning that includes protection of existing open areas, and the development of new ones.[11]

11 An illustration: In a conversation with one of the authors of this chapter in 2022, the mayor of Kiryat Gat, just slightly to the south of the area on the right-hand panel of this map, claimed that his city would surpass Be'er Sheva in population by 2040, as part of a string of urban areas stretching from the northern Negev to Tel Aviv and beyond.

Illustration 1. Protected areas in Israel

August 2022



Source: Alex Weinreb and Kyrill Shraberman, Taub Center | Data: World Database on Protected Areas (WDPA)

Premature death

Premature death is a relatively new and important indicator in comparative demography and epidemiology. Simply, it is an estimate of years of life lost based on the difference between age at death and the standard life expectancy (SLE) at that age. There are ongoing scholarly debates about the best SLE thresholds to use but the key point from our perspective is that so long as the same standard is used across countries at a roughly similar level of economic development, measures of premature mortality are useful indicators for comparative analyses, especially when using age-standardized measures, as is the case here.

We focus specifically on three causes of premature mortality: general exposure to ambient particulate matter PM2.5; occupational exposure to carcinogens and hazardous gas fumes; and high temperatures. The first two causes are associated with human activity, including commercial and building activities arising from economic development and population growth. The third is a more direct indicator of climate change.

We use estimates from the International Health and Metrics Evaluation (IHME) project at the University of Washington. These are the gold standard data on mortality by cause. The underlying estimation assumptions and methods used to generate these estimates are described by Martinez et al. (2019).

Exposure to ambient particulate matter

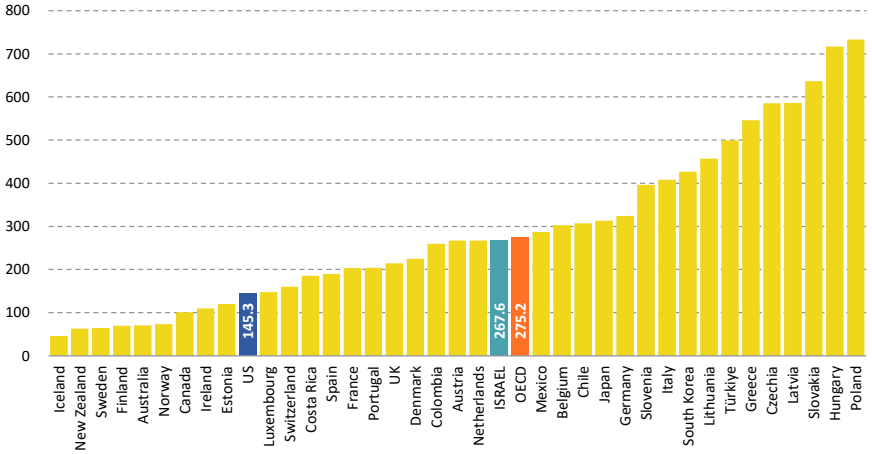
Fine particulate matter (PM2.5) is the air pollutant that poses the greatest risk to health globally, affecting more people than any other pollutant. Chronic exposure to PM2.5 considerably increases the risk of mortality and morbidity due to respiratory, cardiovascular and cerebrovascular disorders, and diabetes (Sharma et al., 2020). Research released in September 2022 suggests that it is also a key to understanding the emergence of cancers (e.g., lung, throat, mouth) caused by PM2.5-related inflammation (Crick Institute, 2022).

The main sources of PM2.5 are sulphates, nitrates, and ammonium (all soluble) and organic matter (insoluble). Increasingly, wildfires are raising PM2.5 levels — this is one of the main reasons that an increasing number of Americans are exposed to unhealthy air, and that 7 of the 10 most polluted cities in the US are in California (American Lung Association, 2022). Dust and sea salt, common in countries with deserts and sea coasts, also serve as an additional vehicle for transporting PM2.5, especially in close proximity to industrial areas.[12]

Premature mortality from ambient particulate matter was responsible for about 5% of deaths in Israel in 2019. The underlying rate — 267 deaths per million — is right on the OECD average (Figure 6). Most of the countries with higher levels of premature mortality from PM2.5 are the heavily industrialized areas of Eastern and Central Europe. Japan, South Korea, and Germany also score more poorly than Israel.

12 Due to a chemical reaction between sea salt and pollutants such as sulfates and nitrates, the airborne concentrations of free chlorides increase. Additionally, heavy metals and substances that cause damage to tissues in the respiratory system can accumulate on sand (Hopke et al., 2020).

Figure 6. Estimated premature deaths per million caused by particulate matter, 2019



Source: Alex Weinreb and Kyrill Shraberman, Taub Center | Data: IHME

It is tempting to consider Israel's proximity to the OECD mean as tolerable or satisfactory. The same is true when looking at trends in these deaths across time. Both in Israel and in the OECD in general, premature deaths ascribed to PM2.5 fell by about 35% between 2000 and 2019. The problem with this temptation is that, as noted earlier, premature mortality from PM2.5 largely expresses itself in respiratory and cardiovascular diseases and in diabetes, but only after cumulative exposure, sometimes over decades. This is where Israel's more recent performance in terms of PM2.5 exposure gives cause for concern as shown in Figure 7.

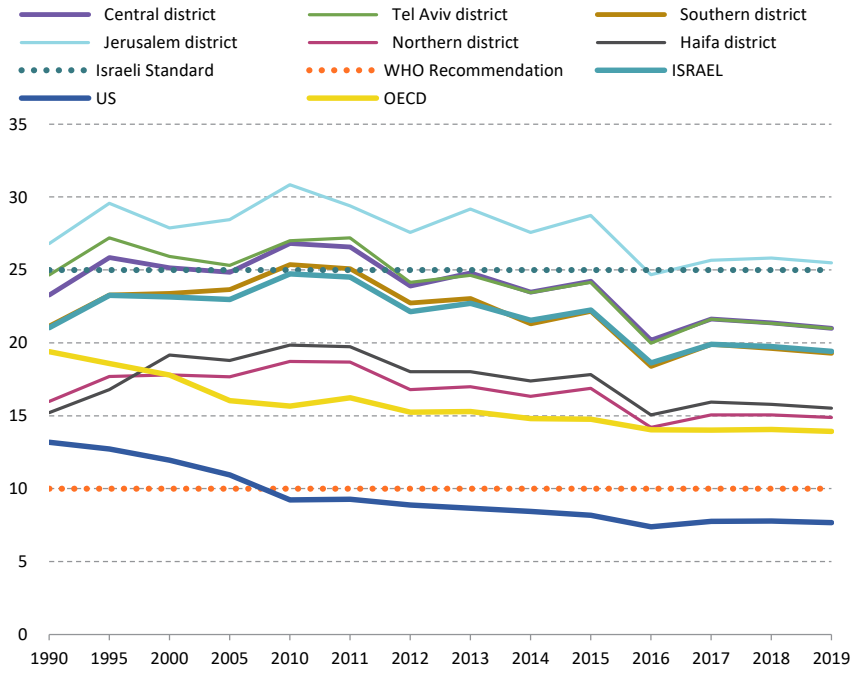
In 1990, average exposure to PM2.5 in Israel was similar to that of the OECD average. Since then, however, Israel has climbed above the OECD average. By 2010, PM2.5 exposure in Israel was almost 60% higher than the average in the OECD. This alone suggests that PM2.5-related mortality will climb above that of the OECD even though, since 2011, exposure to PM2.5 has fallen back to levels last seen in the 1980s.

Similarly, although the reductions in PM2.5 exposure in Israel are clearly a good thing, as of 2019, Israel's national exposure levels were 39% higher than the OECD average, twice as high as in the US, UK, Spain, and Denmark, and

about three times as high as in most Scandinavian countries, Australia, and Canada.[13] In fact, in not a single district in Israel, even the Northern district, where PM2.5 exposure levels are the lowest, did they fall below the average in the OECD.

Figure 7. Average exposure to ambient particulate matter (PM2.5) in the US, OECD, and districts in Israel

Micrograms per annum



Source: Alex Weinreb and Kyrill Shraberman, Taub Center | Data: OECD

There is much more to say about mitigating exposure to ambient particulate matter and greenhouse gases in general. For now, however, we simply point to the fact that the relatively high levels of exposure in Israel over the last 20 years suggest that, barring earlier medical interventions or the emergence of

13 It is also worth noting that exposure levels considered safe by Israel's Ministry of Health are more than twice the recommended WHO level of exposure (Berman & Barnett-Itzhaki, 2020).

new medical technologies that can reverse the effects of exposure, premature mortality from PM2.5-related conditions will likely become somewhat higher than the OECD average in the near future. Likewise, attempts to reduce exposure to more polluted air may reduce physical activity outside, which might negatively impact cardiovascular health. Together, each of these will probably slow ongoing gains in life expectancy.

Occupational exposure to carcinogens and gases

In terms of premature mortality from exposure to carcinogens and hazardous gas fumes, Israel has much better outcomes than the US or OECD on average. This has been the case since the 1990s at least.

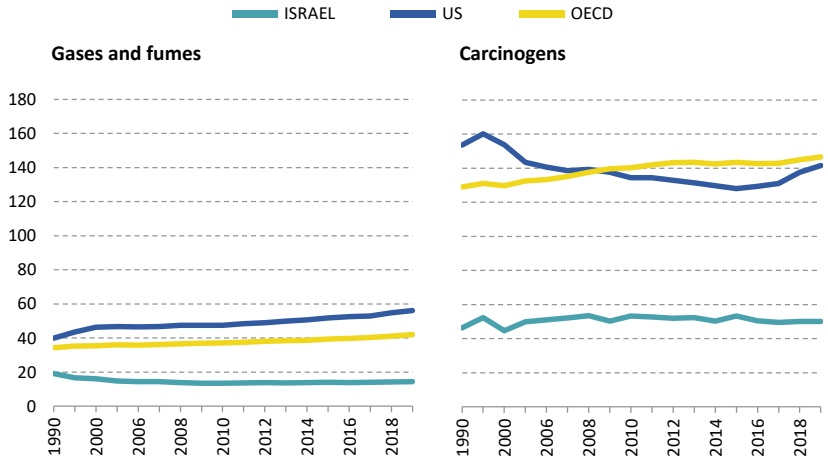
Since 2005, Israel has experienced 50–54 premature deaths per million from occupational exposure to carcinogens every year (Figure 8). As of 2019, this was about 35% of the levels in the US and the OECD in general, both of which were experiencing upward trends — since 2015 in the US, after a long decline since the 1990s, and a more gradual longer-term increase in the OECD in general.

The difference in premature deaths from occupational exposure to gases and fumes are even greater, at least in relation to the US, where levels are four times higher than in Israel's 14 premature deaths per million. Here, too, Israel's trends are different to those in the US and OECD in general. In Israel it declined from the 1990s until around 2005. Since then, it has remained relatively stable. Over the same 1990–2019 period, premature mortality from this cause rose by 30% in the US and 24% in the OECD in general.

These relatively low mortality levels in Israel may be related to the smaller share of industry and manufacturing as a whole in Israel's GDP. World Bank data show that these two sectors account for 19% and 11% of GDP in Israel, respectively, as opposed to 22% and 13% in the OECD in general, and 27% and 18% in industrial powerhouse Germany. However, given the magnitude of the differences in premature mortality, that smaller industrial and manufacturing base is not a sufficient explanation. It also does not explain why rates are so much higher in the US, where industry and manufacturing account for a very similar share of GDP as in Israel (18% and 11%, respectively). So, in addition to Israel's smaller industrial and manufacturing base, something else is going on, perhaps related to different types of industry and manufacturing, different concentrations relative to population centers, or perhaps to more qualitative aspects of the health system, with more effective diagnosis and treatment of associated medical conditions (Shraberman, 2022).

Figure 8. Premature death from occupational exposure to gases, fumes, and carcinogens

Deaths per million population



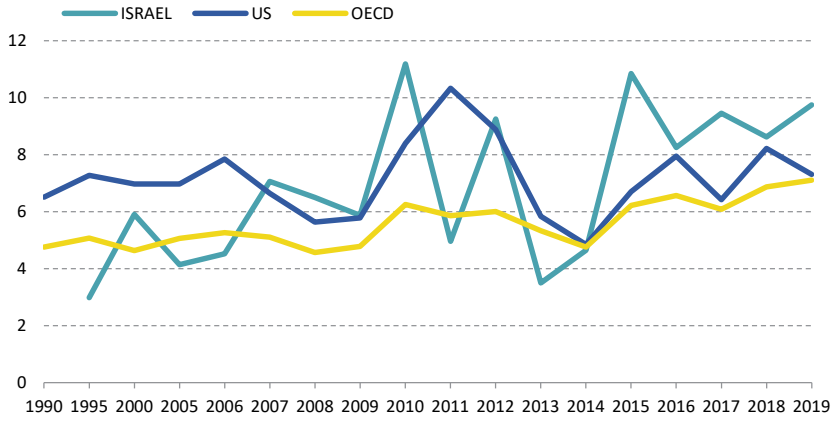
Source: Alex Weinreb and Kyrill Shraberman, Taub Center | Data: OECD

Exposure to high temperatures

Average annual temperatures in Israel have been rising since the 1980s and are expected to climb even more until the end of the 21st century (WHO, 2022). Unsurprisingly, the heavier heat loads associated with these rising average temperatures — and the more frequent anomalous heat events that have been driving up that average — are starting to take their toll. Premature mortality from high temperatures (Figure 9) is climbing in the OECD in general, including in Israel. Thus far, the direct effects on mortality in Israel are very small. Between 2016 and 2019, it fluctuated between 8–10 deaths per million. That is only about 0.18% of all deaths. Yet this is double the level in 2000–2005. It is also high relative to other OECD countries. Only Australia, Colombia, and Mexico experienced higher levels of premature mortality from heat in the OECD in 2018–2019. On the other hand, since most OECD countries are in more temperate climatological zones, it may be fairer to compare Israel to other countries in the region that have effective health care systems. Here, Israel looks better. Rates of premature mortality in 2018 and 2019 were roughly 30% higher in Cyprus and Jordan and 10 times as high in Saudi Arabia and the UAE.

Figure 9. Premature mortality from high temperatures, selected countries

Deaths per million population



Source: Alex Weinreb and Kyrill Shraberman, Taub Center | Data: OECD

Again, however, it is important not to be complacent. Medium-to-long-term climate projections suggest that in terms of heat, Israel's climate is moving towards that of the contemporary UAE, that is, toward much higher heat loads. That demands policy interventions and changes in health behavior to prevent rising heat from compounding other health problems that lead to premature mortality. Examples include: reduced physical activity and rising levels of obesity as outdoor exercise falls during longer and hotter heat waves (Obradovich & Fowler, 2017); and minimizing the spread of infectious disease associated with ecosystem disruptions and changing vector patterns.[14] A comprehensive model illustrating how this could influence child health is shown by Helldén et al. (2021).

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14 A specific example: ongoing increases in heat indices and anomalous rainfall patterns may help new mosquito species settle in Israel. Some of these are vectors for mosquito-borne diseases more prevalent in other regions of the world (e.g., Dengue, Chikungunya, West Nile Virus), which will likely lead to autochthonous transmission of these viruses within Israel (as opposed to infections associated with returning travelers) (Leshem et al., 2012).

Reducing the anticipated heat-related effects on population health and mortality will require adjustments of living space to increasingly higher temperatures, such as shading streets and open public spaces — with careful selection of trees that are able to withstand the increasing heat loads (Esperon-Rodriguez et al., 2022) — and also implementing green standards for construction. In this regard, Israel has some advantages over many other developed countries: it is building a lot more, including new neighborhoods and towns; it has considerable experience expanding green spaces and an ideological commitment, since the early days of the Zionist movement, to doing so (Troen & Rabineau, 2014); and it is easier and cheaper to incorporate these climate-related adjustments, including more environmentally friendly and health-augmenting designs such as polycentric 15-minute cities or walking cities in general, in new urban plans, than to retrofit existing buildings or neighborhoods completed prior to climate awareness. This means that an increasing share of Israel's growing population can be pulled into more climatologically suitable housing and neighborhoods, which, in turn, should either reduce premature mortality or other health problems associated with rising temperatures, or at least inhibit their rise.

Summary

Israel's population is continuing to grow at a fast rate. Even with signs of mild but ongoing declines in fertility, migration rates remain strongly positive, and mortality low. As a result, Israel's population remains on target to grow by about 3 million people by 2040.

Ongoing patterns of climate and environmental change make it all the more important to carefully consider how to accommodate this growth. Here, we have limited ourselves to a few indicators of those changes that are directly implicated by population growth. They are sufficient to show that despite rapid demographic growth, Israel has been relatively successful over the last 20 years in increasing tree coverage nationally and in limiting aggregate expansion of built-up areas by making its growing number of urban areas denser. Alongside these positive trends are more worrying ones. Among them: Israelis are more exposed to fine particulate matter than their contemporaries in most developed countries — that will likely raise levels of morbidity and mortality in the future; Israel has limited protected areas in the most populated areas of the country, especially in the Dan region — making these

tempting sites for urban or suburban expansion that pushes the region closer to becoming Israel's first megalopolis; and Israel's location in an area of the world that is projected to experience substantial increases in temperature will make it more susceptible to heat-related disruptions, including more wildfires, that will significantly affect morbidity and quality of life in the short-term, and somewhat increase mortality in the longer-term.

Since the late 18th century, Malthusian observers — most visible in ecology since Paul Ehrlich began to publish his series of jeremiads in the late 1960s (*The Population Bomb in 1968*, *The Population Explosion in 1990*) — have repeatedly forecast crisis and collapse in the face of these types of challenges. Demographers and economists are generally skeptical of such claims since they have repeatedly been proven wrong by ongoing increases in human health and welfare thanks to technological advances (Desrochers et al., 2021; Simon, 1980).

For Israel, specifically, Tal (2016) provides the most scholarly Malthusian account. In future work we shall carefully delineate where we share his concerns and where we differ. For now, however, we will only say that in general we are more optimistic about the direction of demographic, economic, and ecological trends in Israel, and we think that most of the problems he and others identify that are related to rapid population growth are surmountable. We shall end with an illustrative example. Population density in Tel Aviv (7,600 people per km^2) may look high in Israeli eyes, but it pales in comparison to population density in Paris (20,500 people per km^2), Athens (19,100), Seoul (17,300), or New York City (11,300). It must be emphasized that the key to housing a growing population is good planning. That is what allows successful global metropolitan areas to be densely populated. And that is the challenge that Israel's rapid and ongoing demographic growth poses to its urban planners and policy makers.

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Recent Trends in Marriage and Divorce in Israel

Alex Weinreb

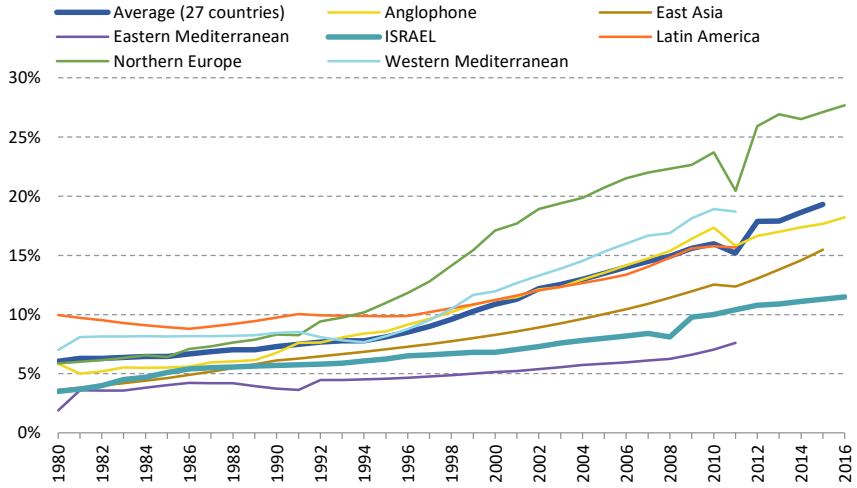
Introduction

One of the quiet global social transformations of the last 40 years has been the movement away from near-universal marriage among younger cohorts. Clear signs of this can be seen in Figure 1, which graphs the percentage of women aged 40 who have never married in 28 countries representing several distinct regions or culture areas.[1] Across the 1980s, even with sharp rises in this percentage observed in Northern European and Anglophone countries, variation remained within the 3–10% range. By 2016 — within a single generation — the share of women never having married by age 40 had climbed to 28% of women in Northern European countries, was pushing toward 20% of women in Anglophone and Western Mediterranean countries, and was trending upward almost everywhere.

* Prof. Alex Weinreb, Research Director, Taub Center for Social Policy Studies in Israel.

1 Trends are similar for men.

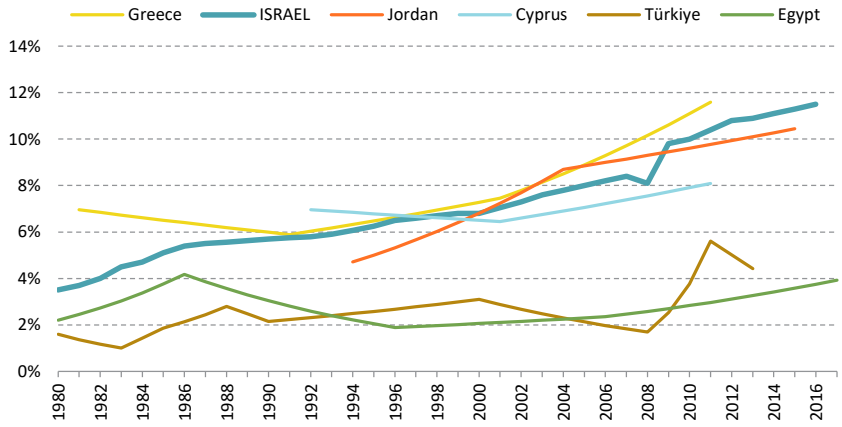
Figure 1. Percent of women age 40 who have never married, by region



Note: *Average* does not include Israel. Northern European countries: Belgium, Denmark, Germany, Netherlands, Norway, Sweden; Western Mediterranean countries: France, Italy, Portugal, Spain; Anglophone countries: Australia, Canada, UK, US; Latin American countries: Argentina, Brazil, Chile, Mexico; East Asian countries: Japan, Singapore, South Korea; Eastern Mediterranean countries: Cyprus, Egypt, Greece, Jordan, Türkiye.
Source: Alex Weinreb, Taub Center | Data: United Nations

Upward trends in Israel over the same period, alongside other countries in the Eastern Mediterranean region, were more modest, pointing to a region-wide retention of more traditional marriage norms (Figure 2). In Israel, in particular, the percentage of women who had never married by age 40 rose from less than 4% in 1980 to almost 12% in 2016. Similar trajectories and levels were found in Cyprus, Greece, and Jordan.

Figure 2. Percent of women age 40 who have never married, selected countries in the Eastern Mediterranean



Source: Alex Weinreb, Taub Center | Data: United Nations

There is an extensive scholarly literature across the social sciences on factors driving this change, distinguishing it from non-marital cohabitation, looking at variation by class, race, and ethnicity, and judging whether or not it is a good thing for societies across a range of personal and societal dimensions (Bloome & Ang, 2020; Cherlin, 2004; Grossbard-Schechtman et al., 2003; Perelli-Harris et al., 2019; Waite, 1995). The goal of this chapter is not to summarize that literature,[2] or explain why societies in the Eastern Mediterranean, including Israel, have been adopting these new patterns more slowly.

2 Among the key reasons: a rise in women's education and employment allowing for more financial and emotional independence, and less gender specialization in household and market work; increasing individualization of marriage and deinstitutionalization of marital norms like monogamy; the rise of *emotional capitalism* (economic and political models of exchange and equity increasingly influencing emotional relationships); a decoupling of marriage and fertility and growing acceptance of cohabitation and non-marital relationships in general; escalating university-related debts and rising costs of living in general, which delay marriage for the poor in particular, sometimes indefinitely; the decline of manufacturing employment for the less educated; and underlying ontological goals shifting toward personal fulfillment and heightened autonomy — augmented by contemporary consumer culture's drive to accumulate — rather than family-formation (Addo et al., 2019; Autor et al., 2019; Becker, 1973; Bumpass et al., 1991; Cherlin, 2004; Goode, 1963; Illouz, 2007; Lesthaeghe, 2020).

Rather, it is to provide a brief empirical survey of more recent trends in age-specific marriage and divorce rates across Israel's distinct subpopulations.

Returns to marriage

Tracing trends in marital patterns is important because, despite the rise in non-marital cohabitation across wealthy countries, families, legitimized through publicly recognized marriage, remain the core unit of social and economic organization in most contemporary societies. This is certainly the case in Israel, where rates of marriage have historically been higher than in most developed countries (Lavee & Katz, 2003; Peres & Katz, 1981). Identifying trends in marriage and divorce, therefore, helps us understand emerging patterns of poverty, inequality, employment, welfare, and health — the classic foci of the Taub Center.

More specifically, although any given marriage may not be good for its two key players, wealthy societies in general benefit from more and more stable marriages, especially egalitarian or *companionate* marriages (Grossbard-Schechtman et al., 2003). Among these benefits:

- Married couples have more disposable income than their unmarried counterparts, and increasingly so given the rise in assortative mating on educational characteristics. These higher levels of disposable income stem from greater selection of wealthy and educated individuals into marriage (as opposed to cohabitation), pooled resources of two incomes, or a *marriage premium*. Deviations from the pooled resources model are reviewed in a recent issue of the *European Journal of Population* (Lersch et al., 2022), and the marriage premium in Israel is discussed in detail by Debowy et al. (2022).
- Where both partners work, or where marriage has facilitated greater accumulation of wealth, or can allow for more flexible labor supply at the household level, married households are less susceptible to economic shocks (Blundell et al., 2016).
- Married couples' higher household income facilitates more saving and more investment in children. Respectively, these have positive macroeconomic effects and influence social mobility, and intergenerational inequality (Lundberg & Pollak, 2015).

- Married couples have higher levels of subjective well-being (Kapelle et al., 2022) and also tend to be healthier and live longer, conditional on mutual contributions (Stolzenberg & Williams, 2008). Note that these effects are seen after controlling for health-related selection into marriage — that is, healthier people are more likely to marry in the first place.
- Married couples are more likely to be connected to other important social institutions (e.g., religion) that increase the marginal benefits on health and subjective well-being (Kapelle et al., 2022), and that are also associated with higher levels of volunteering.
- Being married can also provide a psychosocial anchor that limits irresponsible behavior, especially among young men in areas that have experienced educational expansion (Hudson & Boer, 2005; Weber, 2019).

These are general returns to marriage across countries. In Israel, additional factors may magnify some of these effects. First and foremost, people of all classes have frequent interaction with family members, especially intergenerationally, and there are higher levels of emotional connection (affect and consensus) than in many European countries (Katz, 2009). Non-religious prime-aged individuals in Israel also receive considerable material and in-kind assistance from grandparents. This is one of the mechanisms that underlies Israel's extraordinary high fertility (Okun & Stecklov, 2021).

All these factors suggest that Israeli society has benefited from its high historical rates of marriage, relative to most other wealthy countries. Put simply: were it not for Israel's high levels of marriage, levels of inequality would likely be higher, life expectancy lower, and people less happy. For this reason, any shift in Israel's marital regime, like those implied in Figures 1 and 2, deserves attention. The effects of falling marriage rates will not be limited to individuals and their close support circles. They will also be felt across society at large.

Changing marital norms?

The rising share of Israelis remaining unmarried at age 40 arguably reflects compositional changes within Israel's national population, the percent choosing to cohabit, and shifts in public discourse about marriage. I briefly review these connected issues.

Relative to other OECD countries, the special characteristic of Israeli marriage is the absence of civil marriage. Like its Arab neighbors, Israel does not recognize civil marriages conducted in the country. Instead, domestic marriages must be conducted by recognized authorities within a single religious faith. All this is well known by the Israeli public. Given the absence of civil marriage, it is impossible for people of different religions to wed in Israel — one partner must convert to the other partner's religion. Israeli law also makes it impossible for people categorized as having *no religion* (חסרי דת) to wed within the country, since there is no religious official who can give a formal certificate. This is problematic in terms of sheer numbers since those characterized as having no religion are the fastest growing population in Israel — there are around 0.5 million people in this group — and they are fully integrated into secular Jewish society in terms of residence, schooling, military service, language, participation in the labor market, and so on. The shared social spaces that arise from this high level of integration create a fertile environment for romantic relationships, some of which develop into long-term partnerships and marriage.

Within the Jewish population, there are even more limits on marital choice since only the Orthodox rabbinate is recognized. As a result, a halachically Jewish Israeli cannot wed someone who is not halachically Jewish according to Orthodox interpretations of Jewish law, even if that partner is ethnically Jewish on the paternal side, or would have citizenship rights because of Jewish heritage up to two generations before. The Orthodox rabbinate's hold on marriage also bars same-sex marriage, marriage between a male *Cohen* (member of a priestly family) and a divorcee or convert, and other marriages where doubt can be cast on the religious, marital, or birth status of either partner (e.g., *mamzerut*, which broadly refers to conceptions arising from a range of prohibited sexual relations).

The quantitative effects of these legal barriers on marriage rates are not fully known. Coverage of these issues by journalists and advocates (e.g., the organization *Hidush*) reveals quite varied estimates. What is clear is that many who cannot wed in Israel, and some who can, contract a civil marriage

overseas[3] — some data on this are presented below. Equally clear, many Jewish couples who can marry in Israel choose to engage rabbis associated with organizations like *Tzohar*, which offer halachically Jewish weddings that are one step removed from the standard state-rabbinical framework, or *Mavoi Satum*, which offers completely independent religious weddings while also adding other benefits like more protection for the wife in case of divorce (e.g., through halachically-anchored prenuptial agreement guaranteeing a woman's rights to divorce).

These different pathways into marriage, and their associated discourse, are important to understand as a cultural phenomenon, and as pointers to debates and emerging divisions within Israeli society, especially within its Jewish majority. But from the narrow empirical perspective of this paper, because official statistics include marriages conducted both by religious authorities in Israel and by civil authorities overseas, these alternative pathways into marriage are largely irrelevant. They only become relevant when a couple decides to cohabit and forego traditional marriage entirely. Only then is there an actual effect on marriage rates.

Recent trends in cohabitation in Israel

Foregoing marriage in this way has become a more common and legitimate path in many developed countries, as implied in Figure 1. In absolute term, this is also true in Israel. There were 87,000 unmarried cohabiting couples in Israel in 2015 and 101,000 couples in 2020. This increase is also reflected in other developments. Notably, Domestic Union certificates issued by the New Family organization — basically recognition of Common Law marriage that has legal

3 I include *Utah marriages* in this category, that is, marriages officiated virtually from Utah, and the couple does not need to physically travel overseas.
Note, too, that this type of marriage is not only the choice of people categorized as lacking religion, or wanting to wed a same-sex partner. A significant share of heterosexual couples now do this even where they could halachically get married in Israel. Between 2010–2014, between 2,000–2,400 foreign weddings were registered every year in which both partners are Israeli. In 1,300–1,500 cases per year over this period, both partners were registered as Jewish in the Ministry of Interior files, and of these, between 0.9 and 4.5% were same-sex marriages. Roughly 5,000 more weddings per year were also registered with the Ministry of Interior in which only one partner was Israeli, though it is unknown how many of these couples reside in Israel.

weight in EU countries — have become more popular: 2,800 of these were issued in Israel in 2008. The numbers increased every year up to 2014, when 5,400 were issued.[4]

In percentage terms, however, unmarried cohabitation has remained remarkably stable. The share of cohabiting couples choosing to remain unmarried was around 5% across the entire 2013–2020 period. In other words, the rise in absolute numbers of unmarried cohabiting couples reflects growth in the number of couples, not a compositional change in type of union. It is also worth noting that this 5% figure is much lower than the share reported in other developed countries at the beginning of this period (2013): 12% in the US, 13% in Germany, 14% in Ireland, 21% in the Netherlands, 24% in Denmark, and 27% in Norway (Tal Spero, 2015).

Looking at the data in more detail — specifically, disaggregating them by birth cohort and year — shows that this stable 5% share is actually hiding two distinct patterns. This is where emerging signs of change can be seen, as shown in Table 1.

First, among couples in their 30s and early 40s in 2015, there was substantial movement toward marriage by 2020. This was most notable among people aged 30–34 in 2015 (born in the late 1980s). In 2015, 13.8% of women in this birth cohort who were cohabiting with someone, and 18.2% of men, were not married. By 2020, the share in this same birth cohort had fallen to 6.8% and 9.5%, respectively. Reductions with age can also be seen in groups aged 35–44 in 2015. In other words, there is a clear *age-effect* in terms of movement toward marriage.

4 Data after 2014 are not available on the organization's website.
A less popular option is provided by the State. Since 2010, people with *no religion* have been able to request that their relationship be legally recognized. After five years on the books, only 120 couples had requested this change in status.

Table 1. Percent unmarried and cohabiting out of all coresident couples, 2015 and 2020, by birth cohort

			Women		Men	
Year of birth	Age (2015)	Age (2020)	2015	2020	2015	2020
1996–2000	20–24	25–29		14.8		18.2
1991–1995	25–29	30–34	11.8	14.1	13.6	18.0
1986–1990	30–34	35–39	13.8	6.8	18.2	9.5
1981–1985	35–39	40–44	5.8	4.7	7.9	4.9
1976–1980	40–44	45–49	4.1	3.2	4.1	3.8
1971–1975	45–49	50–54	3.5	4.6	3.4	4.1
1966–1970	50–54	55–59	2.6	4.2	2.9	3.5

Source: Alex Weinreb, Taub Center | Data: CBS (from tables released annually in honor of Family Day)

In contrast, and this is the second pattern, among both younger and older couples there are signs of *increasing* rates of non-marital cohabitation. In the 1991–1995 birth cohort (aged 25–29 in 2015), for example, the share of unmarried cohabiting couples increased from 11.8% to 14.1% among women between 2015 and 2020, and from 13.6% to 18.0% among men. We cannot yet know how many of these cohabiting individuals in their early 30s will follow the older cohorts into marriage.

Among older couples, too, there appears to be a small rise in the percentage of unmarried cohabiting couples. In 2020, around 4.4% of cohabiting women born in the 1966–1975 period were unmarried, up from around 3.1% in 2015. A more modest increase — from 3.2% to 3.8% — can also be seen among older men. These almost certainly reflect second relationships after a divorce.

In summary, there has been a moderate increase in non-marital cohabitation in Israel at the national level. But it remains quite uncommon above age 40, the threshold age used in Figures 1 and 2. This implies that most of the increase in the percent of people remaining unmarried reflects an increase in the share of people who are single, not cohabiting.

Marriage and divorce

We now look at trends in marriage and divorce data in more detail, including by religion, since this is the principal divider between marriage markets within Israel's population, and it also overlaps with distinct educational and aspirational gaps between young women and men in Israel (Fuchs, 2017; Weinreb, 2021). We look specifically at age at marriage, age-specific marriage rates, and the total marriage rate; then at crude and age-specific divorce rates. Overall trends in these measures point to signs that the incidence of marriage is falling in all subpopulations, but this appears to be a relatively recent, post-2016 phenomenon. In addition, in most Israeli subpopulations, the incidence of divorce is also rising. Together, these trends point toward a moderately less marriage-centered society.

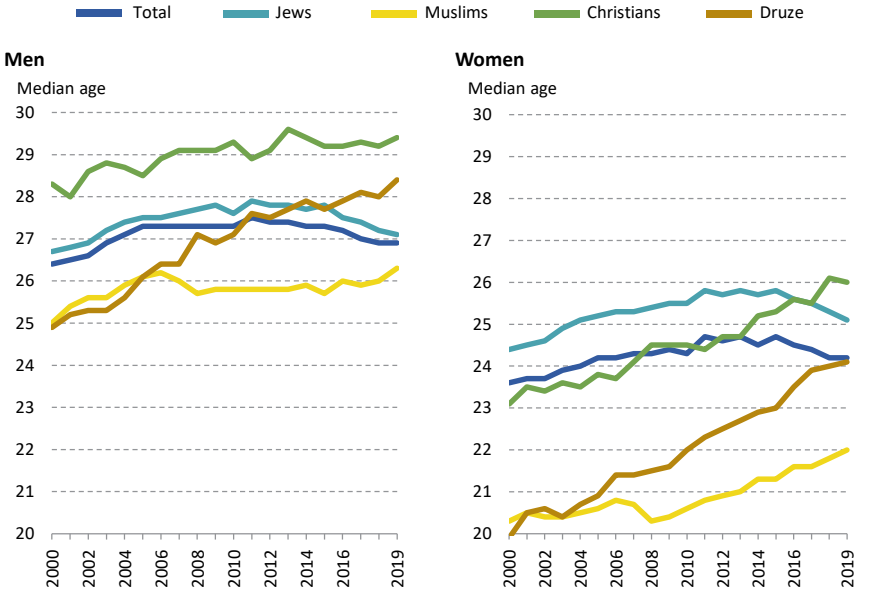
Marriage

Age at marriage

Trends in the median age at first marriage over the 2000–2019 period look quite different across Israel's subpopulations. Among both men and women, there was a distinct curvilinear change. This is shown in Figure 3. For men it increased from 26.5 in 2000 to 27.5 in 2011 before falling again to 26.9 in 2019. Among women, it increased from 23.7 in 2000, peaked at 24.7 in 2013, and then fell to 24.2 in 2019. Among both men and women, these average fluctuations at the national level largely reflect the shifts in median age at first marriage in the Jewish population.

In Israel's three other subpopulations, the trends across time look quite different. There were particularly sharp increases across the entire 2000–2019 period among Druze women and men (both exceeding 3.5 years) and Christian women (3 years). Among Muslims, women's median age at marriage was initially quite stable. It began to increase in 2008, rising by 1.7 years by 2019. At the same time, men's stayed quite stable, suggesting that there has been a reduction in spousal age difference.

Figure 3. Trends in median age at marriage, by subpopulation



Source: Alex Weinreb, Taub Center | Data: CBS

A rise in median age at marriage is expected, especially in populations undergoing a rapid expansion in enrollment in higher education, as is the case in all of Israel's subpopulations. Higher education delays marriage. It also increases men's and women's available choices about who to marry and also, crucially, the choice of whether to marry (Manglos-Weber & Weinreb, 2017).

This makes the curvilinear change in the Jewish population all the more puzzling, at least at first glance. For the fall in the median age at marriage in Israel's Jewish population could also reflect a weakness of this measure: the median age at marriage is only based on the ages of those who actually marry. This begs the question: what proportion of people marry in Israel, and is that changing?

Age-specific rates of marriage

The most conclusive way to answer this question would be to wait until everyone in a given birth cohort had reached a given age — say 50 — and then estimate the proportion that ever married. Since that approach does not allow us to look at ongoing or recent shifts in marriage at younger ages, we use an indirect measure based on age-specific rates of marriage.

Those age-specific rates of marriage are shown in Figure 4 for each of Israel's major religious subpopulations. They are presented as the annual percentage of men and women in a given age group that have a first marriage. There are two notable sets of results: those related to variation in modal age group of first marriage across the four subpopulations; and those related to shifts in this modal age group within the 2010–2019 period.

Among women, there is considerable variation in modal age group at marriage across these four subpopulations. Marriage rates are highest at ages 20–24 for Muslim and Druze women, very similar across the 20–24 and 25–29 age groups for Jews, and among Christian women there was a marked shift across the 10-year period. In 2010/2011, 7–8% of Christian women aged 20–24 married in any given year. By 2018/2019 their marriage rate at this age had almost halved, though this was partly offset by a relatively sharp rise in rates in marriage rates in women's late 20s.

In percentage terms, the reductions in marriage rates in the non-Jewish populations were even sharper below age 20: they fell by around two-thirds in the Druze and Christian populations and by around 40% in the Muslim population. Interestingly, the marriage rates of Jewish women below age 20 remained relatively stable. This group is almost certainly dominated by Haredi (ultra-Orthodox Jewish) and religious women.

Finally, in all four subpopulations, marriage rates of women aged 35+ were low and stable across the 10-year period. Even in the Jewish and Druze populations, where rates were highest at these ages, they never exceeded 0.4% of women per year, a fraction of the 6–8% rates of women in the modal marital age groups. The low and relatively stable rates in themselves imply that any rise in women's median age at marriage, as noted above, is hardly extending into age groups above 35. The rise is being driven by shifts from early-20s into late-20s, or from late-20s into early-30s.

Figure 4. Age specific marriage rates (first marriage only) of women and men, by religion

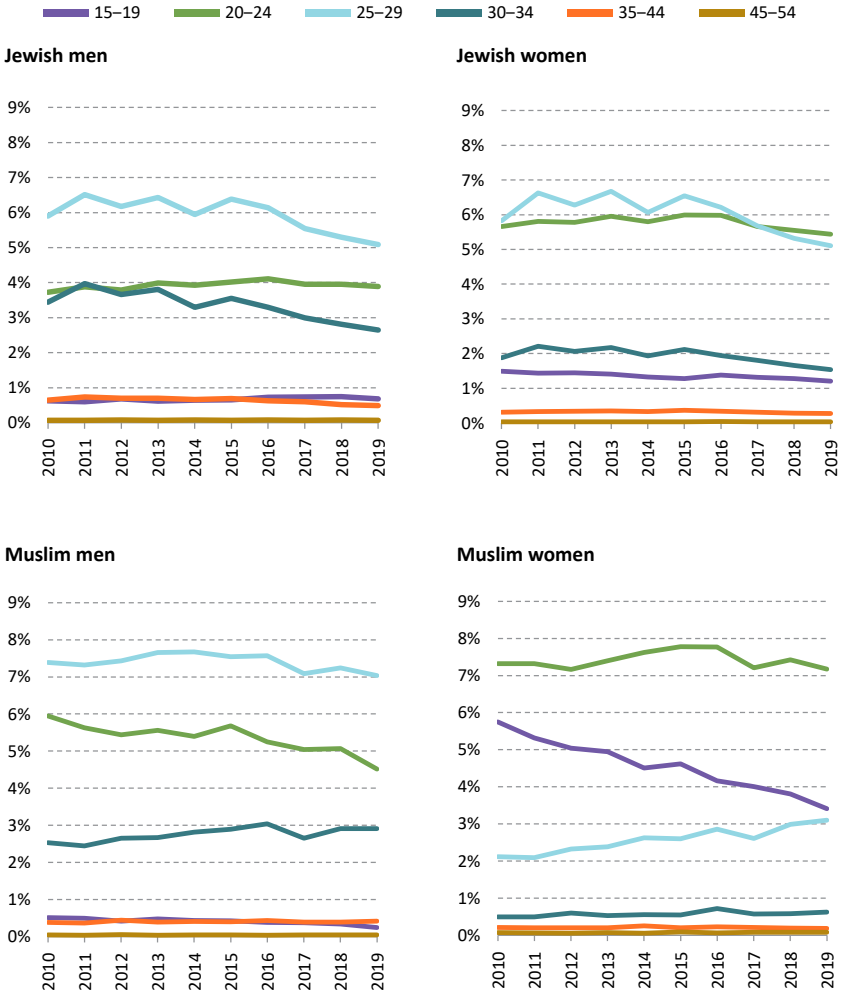
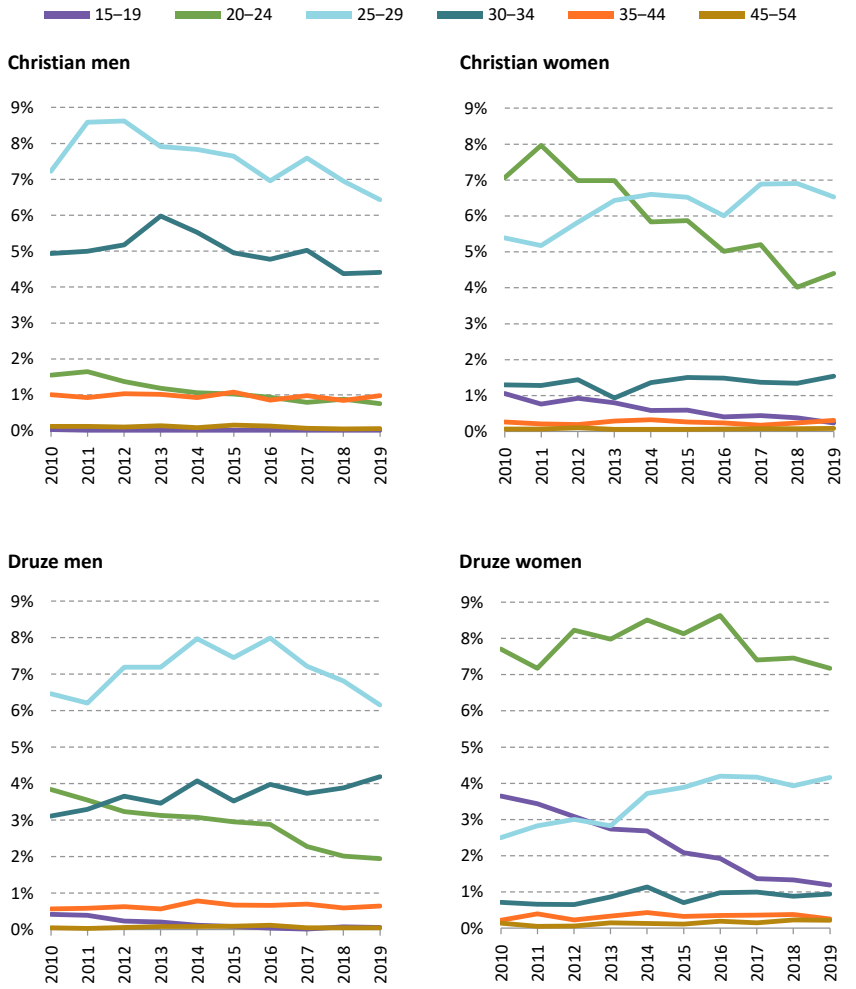


Figure 4 (continued). Age specific marriage rates (first marriage only) of women and men, by religion



Source: Alex Weinreb, Taub Center | Data: CBS

Men's modal age group at first marriage in the 2010–2019 period did not vary. It was uniformly highest in the 25–29 age group. Variation across groups was found in the next highest age group, and in trends over time for this second-

and third-highest age group. For Jewish men in 2010–2013, marriage rates were very similar in the 20–24 and 30–34 age groups. Thereafter, marriage rates fell steadily at ages 30–34, even as they remained stable at ages 20–24. No other Israeli subpopulation has this pattern. Marriage rates of Muslim and Druze men both fell at ages 20–24 and increased at ages 30–34. Marriage rates of Christian men fell in both age groups.

These trends across the 2010–2019 period point to a potentially important shift in marriage in Israel. Across Jewish, Muslim, and Druze men and women, 2015–2016 appears to have been a pivotal period, especially for marriage in the three most important age groups, 20–34. Among Jews, age-specific marriage rates began to fall for women in all three age groups, and for men ages 25–34, beginning in this 2015–2016 period. Among Muslim women, from 2015–2016 we see reductions at ages 20–24, slower increases in marriage rates at ages 25–29, and no continued increase at ages 30–34. Among Muslim men, there are reductions at ages 20–29, and no continued offsetting increase at older age groups. And among the Druze, this is the period where women's rates of marriage at ages 20–24, and men's rates at ages 25–29, start to decline, and where the pace of decline for men at ages 20–24 accelerates, and among women in the 25–29 age groups flattens out. Only in Israel's Christian population is there no clear difference in marriage rates between the pre- and post-2015/2016 period.

Proportion marrying

To estimate the proportion marrying, I sum these age-specific marriage rates (ASMRs) into a Total Marriage Rate (TMR).[5] Figure 5 presents the TMR for Israel. Among both men and women in all four subpopulations we see reductions in the TMR across time, though timing varies across gender and group.

5 Sometimes referred to as the *total first marriage rate*, this is an estimate of the proportion of men or women that would marry at least once if they survived to the end of a marital window and experienced the observed age-specific marriage rates (ASMRs) up to that point. It is conceptually identical to a period Total Fertility Rate (TFR) in that it provides an estimate for a hypothetical cohort, based on cross-sectional data. As such,

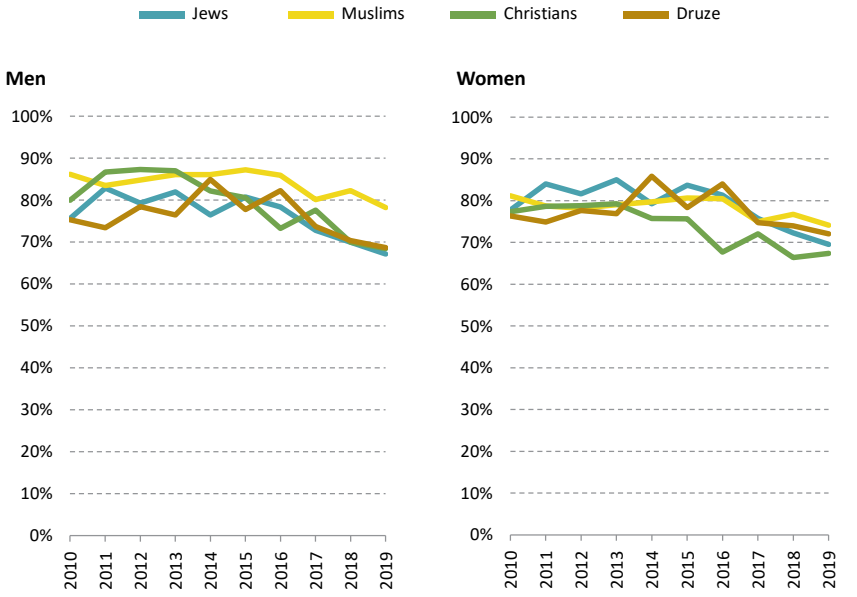
$$\text{TMR} = n \cdot \sum_{x=\alpha.n}^{\beta-n} M_x$$

where α and β are the minimum and maximum ages at marriage — 15 and 55 in these calculations — M is the marriage rate, x indexes age, and n is the size of the age-interval (typically 5 years, as in 15–19, 20–24, and so on).

Among women, despite quite different age-specific marriage rates in the Jewish, Muslim, and Druze populations, the TMR follows a very similar trajectory across most of these 10 years, but especially since around 2015. The TMR in these populations declined from around 80–84% in 2016 to 70–74% in 2019. Note that for Jewish women, this is a particularly sharp decline: from more than 80% in 2012–2014 period to 70% in 2019. The TMR of Christian women declined earlier and has been around 70% since 2016.

Among men, the TMR was a little more varied at the beginning of the period, with lower rates among Jews and Druze. Among Christian men, as with the case with Christian women, the decline in the TMR began a little earlier. By 2015, it had converged to the TMR of Jews and Druze, and together these three declined to below 70% by 2019. The decline in TMR for Muslim men began later. Between 2010–2016, it averaged in excess of 85%. By 2019, it had fallen to 78%.

Figure 5. Total marriage rate by religion



Source: Alex Weinreb, Taub Center | Data: CBS

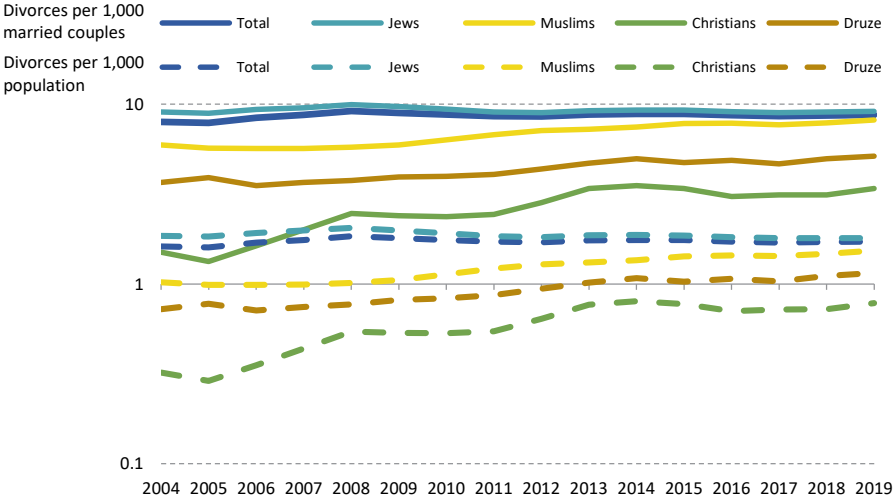
These reductions are very substantial. They hint that Israel is becoming less marriage-centered. After all, if the observed 2019 age-specific marriage rates remain stable for the next 30 years, at least a quarter of women in Israel will never marry; 30% of Jewish, Druze and Christian men will never marry; and 20% of Muslim men will never marry. We revisit some of the implications of these trends, and the limitations of these measures, in the summary.

Divorce

Figure 6 presents two types of crude divorce rate by subpopulation. The solid line is the annual number of divorces per 1,000 couples in the subpopulation. The dashed line is the annual number of divorce per 1,000 people in the subpopulation. Given the differences in denominator, the y-scale is logged.

The overall patterns in both are very similar. They point to relatively stable national trends, with a slight reduction since around 2008. Across the four subpopulations divorce rates are highest in the Jewish population, though between 2008 and 2019, those fell from around 10 to 9.1 per 1,000 couples. Rates in the Muslim population increased from around 5.6 per 1,000 couples in the 2005–2007 period to 8.2 in 2019, coming close to levels in the Jewish population. Rates have also been increasing in the Druze and Christian populations, though from much lower levels. By 2019, rates in these populations were, respectively, around 60% and 40% of the level in the Jewish population.

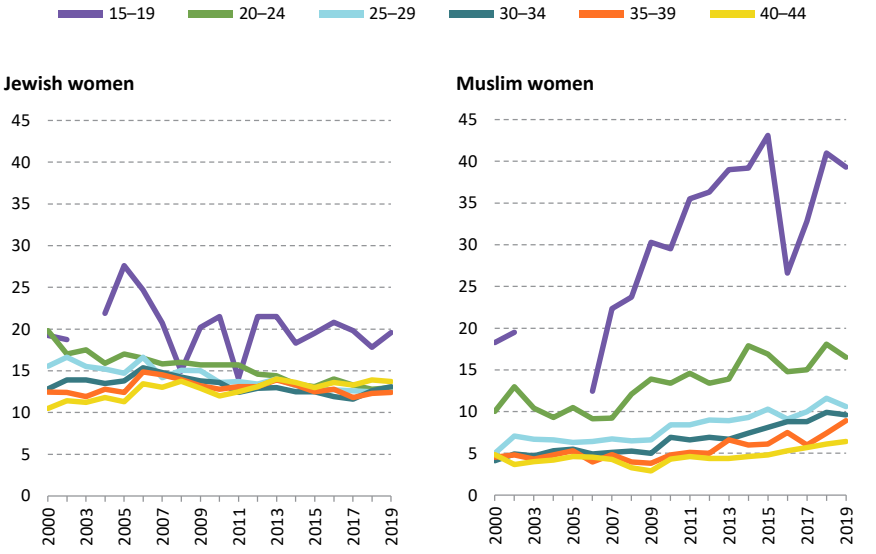
Figure 6. Crude divorce rates by subpopulation



Notes: All rates are cumulative 3-year averages. The solid line is the annual number of divorces per 1,000 married couples. The broken line is the annual number of divorces per 1,000 population.
Source: Alex Weinreb, Taub Center | Data: CBS

More specific information on these trends can be found in age-specific divorce rates. The only disadvantage of these is that the relatively small size of the Druze and Christian populations in Israel, alongside the generally low levels of divorce in those populations, means that we focus only on the Jewish and Muslim populations. These are shown in Figure 7.

Figure 7. Women's age-specific divorce rates per 1,000 married women in the same age group, by religious subpopulation



Source: Alex Weinreb, Taub Center | Data: CBS

In 2000, among Jews, for every thousand married women in each age group between ages 20–44 — we ignore trends in women under age 20[6] — between 11 and 20 women divorced. Age-specific rates were lower at higher age groups: they were highest at ages 20–24, somewhat lower at ages 25–29, and so on.

By 2019, the age-specific divorce rates above age 20 had converged into a much smaller range, all between 12–14 divorces per 1,000 marriages per year. This convergence points to an interesting phenomenon: the relative stability in divorce rates in the Jewish sector as a whole — reflected in the crude rates seen in Figure 1 — disguises divergent trends across different age groups. Among younger women, divorce rates fell: by around 18% among women aged 20–29; and by around 9% among those in their 30s. Yet among older women, divorce rates increased: by 3% among women aged 40–44, 17% among women aged 45–49, 23% among women aged 50–54, and 11% above age 55.

6 There are an insufficient number of marriages below age 20 to generate reliable estimates every year, but all indications are that rates are even higher at these youngest ages — this is a standard pattern across all wealthy countries (Kalmijn, 2007; Kennedy & Ruggles, 2014).

Among Muslim women in 2000, divorce rates were less than half of those of Jewish women. This is an even larger difference than that implied by the crude rates. At all ages 25 and over, only around 5 women divorced per 1,000 marriages. It was higher at ages 20–24, though still only half the level in the Jewish population.

By 2019, Muslim women's divorce rates had climbed in all age groups: by 33% at ages 20–24; 70% at ages 25–29; 90% at ages 30–34; and more than 100% between ages 35–44. Overall, even though it remains below the levels observed in the Jewish population, especially lower at older ages, the rates are converging. And under age 25, divorce rates in the Muslim population are much higher than among Jews.

There is one final noteworthy trend in terms of divorce: its visibility. One measure of visibility is the change in the absolute number of divorces, which is a joint product of changes in the number of people and in the rate of divorce. In the 2002–2019 period, the annual number of divorces in the Jewish population increased by 25%. Since age-specific rates of divorce were falling, this increase in absolute number is driven solely by population growth. The Muslim population, in contrast, experienced both increases in population and increases in the age-specific divorce rates. As a result, the annual number of divorces increased by 130%, from around 1,100 each year in the 2000–2007 period, to almost 2,600 in 2018 and 2019.

Summarizing divorce

Overall divorce rates in Israel over the last 20 years have been quite stable. However, that stability is largely the product of offsetting trends in different age groups within Israel's Jewish population. While divorce rates have been falling among Jews below age 30, they have continued to rise among older Jewish couples, especially above age 40. They have also been rising sharply — albeit from much lower levels — in all age groups in the Muslim population. Crude divorce rates have also risen substantially in the much smaller Druze and Christian communities, though we cannot identify discrete age-specific patterns in those populations.

These trends raise a number of questions. First, and perhaps most important, to what extent do the reductions in divorce rates among younger Jewish women and men reflect differential selection patterns into marriage? Given the rise in age at marriage and reduction in marriage rates, selection has likely played a role in the reduction in divorce.

Second, what is driving the increasing frequency of divorce, especially in Arab communities? Assuming that this increasing frequency is also boosting the visibility of divorce, what sociocultural effects is this having on Arab communities, in particular on younger Muslim women's and men's marital choices? Assessing these effects is outside the purview of this paper. But in a society undergoing a wide array of transitions, these are important questions.

Conclusion

Israelis have historically married at high rates, relative to other developed countries, and Israeli society has reaped the rewards of this marriage-centered norm. Were it not for its high levels of marriage, inequality would likely be higher, life expectancy lower, and people less happy.

This chapter has documented some signs of change in these patterns, especially in the 2015–2019 period, that point toward Israel becoming a less marriage-centered society. In all four religious subpopulations in Israel, both men and women experienced substantial reductions in marriage at peak ages and in the total marriage rate (TMR) in those pre-COVID years. Among women, despite quite different age-specific marriage rates in the Jewish, Muslim, and Druze populations, the TMR declined by about 10 percentage points to 70–74% in 2019. Among men, the TMR of Jewish, Druze, and Christian men was in a tight cluster around 70%. The TMR of Muslim men, which between 2010–2016 averaged in excess of 85%, fell to 78%.

These are significant shifts. They primarily reflect an increase in the share of people who are remaining single. In other words, Israel is not yet experiencing a substantial movement towards non-marital cohabitation as a long-term substitute for marriage, at least as a share of the total number of unions. We know this because alongside the reduction in TMR in all groups, the percentage of cohabiting partners who are unmarried remained stable at around 5% of all unions from 2013–2020.

That said, cohabitation rates are increasing in particular pockets of Israeli society. They are rising at older ages, these are likely to be second (or later) partnerships. This parallels the increasing divorce rates at older ages among both Jews and Muslims. They are also rising among younger Jews, though this may be an artifact of them lasting longer before, say, a transition to a first marriage.

A related shift documented here is the increasing divorce rates at younger ages among Muslims. This is consistent with the rising educational and employment prospects of Arab women, and the emerging gender gap between them and their male counterparts on these same parameters. Among younger Jews, in contrast, divorce rates have been falling, likely a function of lower marriage rates and more careful selection into marriage at younger ages.

Even if these changes in marital patterns in Israel are more modest than their parallels in most developed countries, they hint at important behavioral shifts *downstream* that will affect Israeli society in a number of ways: the loss of the marriage-premium among those who elect to remain single — discussed in the following chapter; reductions in Israel's fertility levels — since more than 90% of fertility in Israel is within marriage; increased demand for smaller apartments suitable for singles rather than the 4–5 room models that predominate today; leisure and consumption patterns centered around older single and childless/childfree individuals rather than *breeders*, as the former sometimes refer to those with children.

It is beyond the goals of this chapter to document the motives driving these mild movements away from marriage. A priori, we assume this transition is concentrated among more secular Israelis in all religious sectors. As such, we assume that it reflects Israel's increasingly heterogeneous and transnational population, and also the same type of ideational and ontological shifts that have driven parallel movements in other western countries. These include a reorientation of meaning-seeking life goals away from *bourgeois* concerns with family formation and home-owning toward more egocentric goals shaped around enriching experiences. These and similar ideational characteristics are associated with what demographers call the Second Demographic Transition (2DT). Israel is late to this transition — it has not even completed the primary Fertility Transition — and its large traditional, religious, Haredi, and Arab populations will almost certainly prevent it from converging to 2DT norms on the national level. But subpopulations within Israel are on that 2DT path, or close to its starting point.

It is worth ending on a more general note. Even if marriage rates are falling in Israel, they remain high relative to most developed countries — this is one of the take-away messages of Figure 1. There is some irony in this resilience given that one of the frequent critiques about limitations on marital freedom in Israel is that it depresses marriage rates. The empirical patterns documented here point in the other direction. This makes it at least plausible to suggest that the limitations placed on marital freedom in Israel have, ironically, helped sustain Israel's high marriage rates above the international average. This unintended effect would be consistent with what can be called the *forbidden-fruit* principle of public policy. That is, by placing limits on a given phenomenon, governments in liberal societies augment that phenomenon's symbolic value and importance. There are other examples of this effect. Americans are more religious than Europeans despite the much clearer separation of church and state in the US than in Europe, and the fact that state-sponsored expressions of religion are prohibited in the US; post-totalitarian regimes (and European Catholic countries) experienced lower fertility earlier despite leaders' more pronatalist polemics. By extension, limits on marital freedoms in Israel may have sustained the symbolic value of marriage in much the same way. In turn, that suggests that arguments to remove those limitations may be better framed in terms of citizenship rights than in terms of likely effects on marriage rates themselves.

To return to the main focus of the analyses. The empirical bottom line is simple. Despite the rising share of people who are not in a long-term cohabiting relationship — a share that rose more sharply in the final pre-COVID years — marriage has largely retained its allure for those who choose to be in such a relationship. Marital norms in Israel remain quite different to those in most wealthy European and American societies. Change is nibbling at the edges, but it is not yet threatening the core.

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LABOR MARKETS

5

The Marriage Premium in the Israeli Labor Market

Michael Debowy, Gil S. Epstein, and Avi Weiss

Introduction

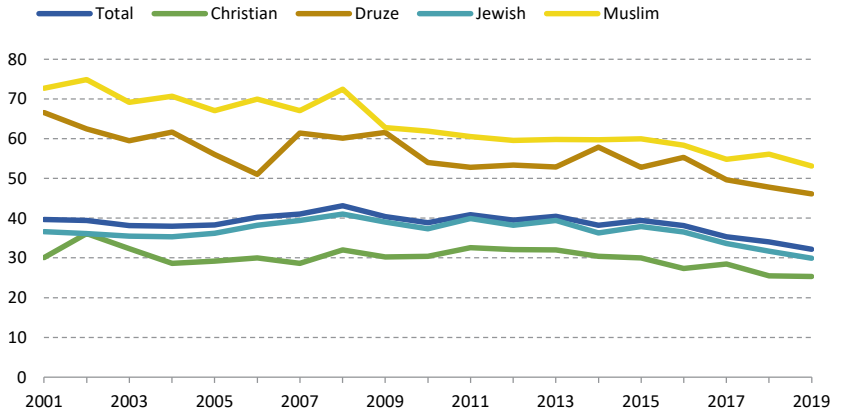
A well-known phenomenon in the labor market is the existence of a *marriage premium* — the consistent tendency of married men to earn more than their unmarried colleagues, even after taking into consideration other factors that affect wages, such as age, education, and occupation. The phenomenon has been documented since the second half of the 20th century among men (especially in the US, see Hill, 1979; Korenman & Neumark, 1991), and has expanded in recent decades so that today it also exists for women. In many developed countries, marriage premiums are documented for both men and women, although the premium tends to be lower for women. Furthermore, the phenomenon has been documented on various scales for same-sex married couples (Burn & Jackson, 2014; Martell & Nash, 2020) and cohabiting unmarried couples (Barg & Beblo, 2009; Cohen, 2002).

In the Israeli context, it appears that only Sharabani (2004) has examined this issue using data from the 1983 and 1995 censuses. Since then, though, there have been wide-ranging developments in family structure and the institution of marriage in Israel — developments that combined with demographic, economic, and social processes that began earlier. Alongside changes in fertility and a considerable increase in women's employment rate, in recent years there has been a decline in marriage rates, an increase in the marriage age, and a delay in the age at which women give birth for the first time. The rate of people getting married out of all unmarried people began declining in 2009 among Jews and Muslims, in 2010 among Druze, and in 2014 among

* Michael Debowy, Researcher, Taub Center for Social Policy Studies in Israel. Prof. Gil S. Epstein, Principal Researcher, Taub Center; Professor of Economics and Dean of the Social Sciences Faculty, Bar-Ilan University. Prof. Avi Weiss, President, Taub Center; Department of Economics, Bar-Ilan University

Christians (Figure 1). Several factors contribute to this decline, including an increase in the rate of couples who choose to marry without official state recognition and the increase in the rate of couples cohabiting (Figure 2).[1] There has also been a consistent increase in the marriage age: in 2019, the population's average age of grooms and brides was 27.3 and 24.9, respectively (and specifically among Jews — 27.4 and 25.6) — more than a two-year increase in the age of grooms since 1970, and a four-year increase in the age of brides (CBS, 2021). Accordingly, the percentage of single men aged 25–29 more than doubled (from 28% to 63%) between 1970 and 2019, and the percentage of single women in the same age group jumped from 13% to 48% (Figure 3). There was even a large increase in older singles. These processes and others have a significant impact on the labor market and the behavior of individuals in it. Relationships, families, and joint household management have an impact on employees' preferences, constraints, bargaining power, and ability to manage risks from potential employers.

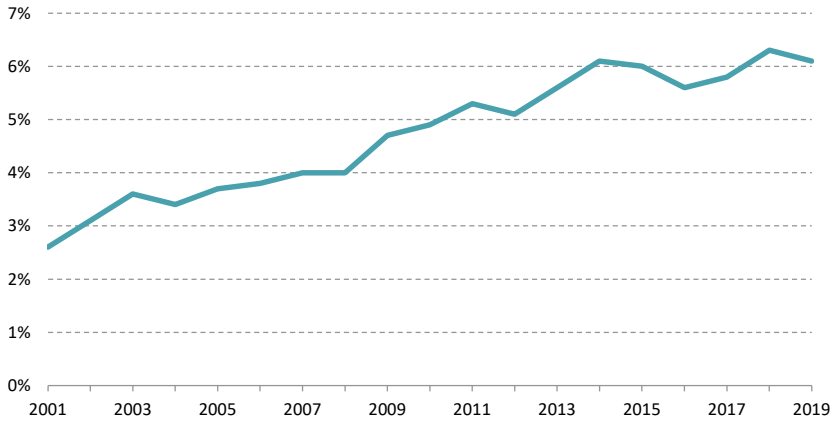
Figure 1. Number of people getting married per 1,000 unmarried people ages 15 and over, by religion



Source: Michael Debowy, Gil Epstein, and Avi Weiss, Taub Center | Data: CBS, 2021

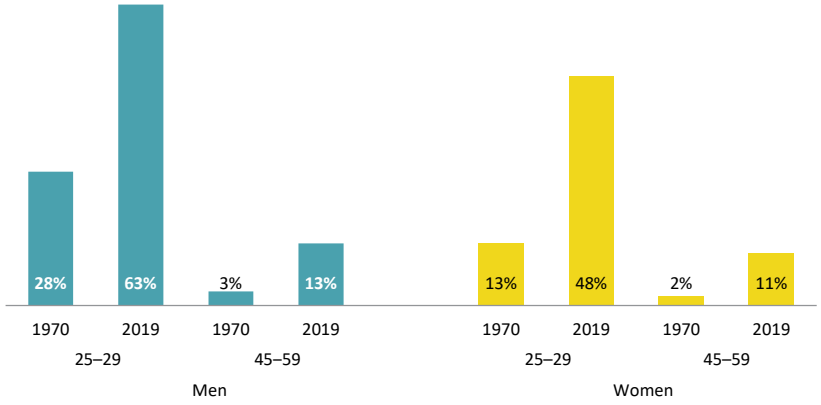
1 A couple who are not married to each other and living together in a joint residence.

Figure 2. The share of individuals living together out of all Jewish couples



Source: Michael Debowy, Gil Epstein, and Avi Weiss, Taub Center | Data: CBS, 2021

Figure 3. The share of singles in selected age groups, 2019 vs 1970



Note: The data are based on the marriage registry for marriages in Israel and abroad of the Israel residents registry.
Source: Michael Debowy, Gil Epstein, and Avi Weiss, Taub Center | Data: CBS, 2021

In developed countries that have undergone similar processes, effects of these demographic developments have been observed within the labor market, particularly with regard to the relative situation of married and unmarried workers. In comparison to these countries, Israel is unique in many ways. For instance, in Israel, marriage rates among all groups are higher, divorce rates are lower, and only about 8% of children are born outside of marriage (compared to almost 50% in the US, for example). Our goal is to examine the relationship between marriage, employment, and wages in the Israeli labor market in recent years using updated data — especially in light of the changes in family structure and marriage behavior in Israeli society — and to estimate the *marriage premium* for workers from different populations.

The database we used is the Central Bureau of Statistics (CBS) *Household Expenditure Survey* for 2017 and 2018, which includes individual-level data on employment, wages, work hours, education, age, gender, marital status, level of religiosity, ethnic origin and nationality, occupation, economic sector, and geographic district. As with other CBS surveys of this type, most of the data are based on self-reporting, including marital status. Therefore, the definition of marriage is based on the individual identifying as *married* and not on the State institutions' official recognition. The database contains about 34,000 observations of working-aged individuals, of which about 61% were married at the time of the survey and another 9% were previously married — a group that includes divorced men and women (6.1%), widows and widowers (1.6%), and separated couples (people who are still legally married but who do not live in a joint household, 1.1%).

Our analysis shows significant differences between the married and single populations over and above differences resulting from the age distribution. Among men, there appears to be a significant correlation between marriage and employment, with marriage corresponding to a 10-percentage point increase in the probability that a man of working age will be employed. Among Jewish women, the likelihood of employment is similar or slightly higher for married women than for single women, while for non-Jewish women, marriage entails lower employment rates than for single women. It also appears that marriage entails significantly higher wages for all workers: married men and women earn 30% and 20% more than their unmarried colleagues, respectively (21% and 12%, respectively, after controlling for a possible bias that can stem from factors that affect the likelihood of both employment and marriage). When differentiating between workers with different occupations, this result holds

for *blue-collar* workers, while married workers from *white-collar* occupations earn 16% more than their single colleagues, regardless of gender. Moreover, women in white-collar occupations who were married but are no longer are expected to continue seeing a wage advantage of about 12% over their single co-workers, while the men's advantage disappears.

Literature review

There is no single agreed-upon explanation among economists, demographers, and sociologists for the phenomenon of the marriage premium, and the literature offers several possible explanations. One explanation is that there is no direct relationship between marriage and wages, but rather an indirect relationship driven by unobservable factors — such as the character traits of the individual — that affect both salary and the probability of marriage. Personal characteristics such as perseverance, dedication, loyalty, or charisma cannot be found in the data, but are likely to affect both salary and marital status of the employee, creating a spurious correlation between the factors. Another example, which has been documented indirectly, is health. Studies have shown that health affects the likelihood of marriage on the one hand and employment and wages on the other, but a single database with information on health, wages and marriage is almost nonexistent. Therefore, it is usually impossible to control for the health variable despite its known effect.[2]

Another explanation derived from the same approach is that salary affects marriage and not the other way around. In other words, men whose wages are adequate or who have the potential to make a decent living are perceived as more desirable partners, and, therefore, their marriage rates are higher than those of their peers who are perceived as less desirable. Ludwig and Brüderl (2018) tested this theory using cross-sectional data that tracked American workers from 1979 to 2012, finding that a high wage base or the prospects of a high salary increase boosts men's chances of getting married. They claim that there is no marriage premium, but that workers with higher earning potentials exhibit higher marriage rates. Between 1979 and 2003, Chen (2007) made a comparable estimation for workers in Taiwan (which is more similar to Israel than the US in terms of marriage rates) and reached a similar conclusion.

2 For a discussion of how health affects the probability of marrying, see, for example, Guner et al., 2018. For a discussion of how health impacts employment and wages, see, for example, Halla and Zweimüller, 2011.

The findings of Cornaglia and Feldman (2011) challenge this theory. They examined the direct relationship between employee productivity and marriage among a unique group — American baseball players — whose performance (i.e., productivity) is documented in detail. They showed that there is no connection between the marital status of the athletes and their performance (at any given moment or future forecast), and that controlling for their productivity in wage estimations does not affect the marriage premium. In their opinion, an alternative explanation is that unmarried athletes are discriminated against, although they mention that this may be a phenomenon unique to the American world of sports, and it does not necessarily reflect the labor market as a whole.

Another explanation for the marriage premium concerns household dynamics — the division of labor and the *economy of scale* available from joint household management. Couples can share household chores, leaving more time for work (in traditional societies, this means increasing the working hours of the man at the expense of the woman's working hours). Ahituv and Lerman (2005) tested this hypothesis and analyzed the development of working hours and salaries of single and married men (based on the same 1979–2012 US data used by Ludwig & Brüderl, 2018). As a result of marriage, a sharp increase in men's working hours was noted, and a moderate increase in salary is seen after a notable delay. According to them, the findings suggest that the marriage premium involves a substantial increase in the productivity of married men due to an accelerated accumulation of experience since they can afford to work more hours than their unmarried counterparts. The researchers, therefore, determine that the combination of high salaries and the tendency to remain married are mutually reinforcing.

Pilossoph and Wee (2019) also showed that the *safety net* provided by the shared household allows the couple to invest more time and resources in job searching, to find jobs that better utilize their skills, and to demand higher wages instead of compromising on a job that is easy to obtain but pays less. The researchers add that in such a situation, the couple has an additional incentive to find a high-paying job as it will provide the safety net that they will spread for their partner when they seek higher-paid employment.

McConnell and Valladares-Esteban (2020) focused on identifying the causal effect of marriage on salaries. They examined cross-sectional data from 1977–2018 in the US and focused on the assumption that cultural norms affect the probability of individuals getting married regardless of their salaries.

The researchers attempted to estimate these norms by a rough calculation for each individual of the marriage rate among other individuals with the same level of education who live in the same area and are several years older. This *percentage of those who are married and similar to me* served as an instrumental variable to identify variance in personal status that is *exogenous* to the individual, where the relationship between this variance and the variance in the salaries of individuals constitutes the causal effect of marriage on wages. Using this method, the researchers discussed the development of the marriage premium for American women over the years. In the 1970s and 1980s it was negative, and at the time of the study (2020) it was positive and was about 9% (compared to about 20% for men — a figure that remained stable throughout most of the period).

In Israel, the literature regarding the marriage premium is scarcer. In her study of the impact of family structure on gender wage gaps, Sharabani (2004) estimated the marriage premium in Israel based on data from the 1983 and 1995 censuses. The researcher focused on full-time employees aged 23–44 who comprise the core of the Israeli labor force. She found that controlling for background variables, the marriage premium for men was stable throughout the two periods, at about 11%, while the marriage premium for women — also positive — increased from 6% to 7% over that period. As we will show in the summary, the great difference between our findings and Shahrabani's findings arises mainly from the selection criteria used in her research. Duplicating Shahrabani's estimation procedure (including the selection criteria) using the more recent data used in this study yields similar results to those in the 1980s and 1990s for men, while for women we found that the marriage premium has increased slightly.

Employment, wages, and marriage in Israel: A statistical analysis

To examine whether there is a *marriage premium* in employment and wages, we ran a multivariate model that examines the relationship between several observed characteristics. The model included the marital status of the individual, and distinguishes between *currently married* (those married at the time of the survey), *previously married* (a group that includes divorced, separated, and widowed individuals), and workers who *have never been*

married.[3] The two-stage model uses the Heckman correction and includes a preliminary estimation of the effect of various factors on the probability of the individual working. Therefore, the marriage premium is estimated after correcting for possible bias from the impact of various factors, including marriage, on employment.[4] The estimated model is almost identical to that presented by Debowy et al. (2021) and includes a number of control variables such as education, experience, occupation, economic industry, working hours, geographic location, gender, ethnicity (including separate dummy variables for *others*[5] and Arabs), and religiosity. The resulting estimates are presented in Appendix Table 1. In addition, another series of estimations was conducted in the framework of a two-stage model that relies on double selection in the first stage — that is, a simultaneous estimation of the individual's likelihoods of being married and being employed. In this manner the estimated marriage premium accounts for unobservable factors that affect both marriage and employment (see Appendix Table 2).[6]

3 We distinguish between currently married and previously married in the multivariate model only. The distinction is insignificant with respect to the descriptive statistics, partly due to the fact that there are relatively few individuals who were married in the past and not in the present (less than one-seventh of all previous and present marriages in the sample) and they are relatively similar in demographic characteristics to those currently married.

4 For the first stage, we used two instrumental variables: the number of children under the age of 10 in the household and the *prevailing wage* in their labor environment, whether they work or not (the average wage of working individuals belonging to the same gender, ethnicity, level of education, geographic subdistrict and age group of the individual). Estimation of the model using only the second instrumental variable (*prevailing wage*) yielded almost identical results.

5 Arabs are just over three-quarters of the non-Jews, and *others* are just under a quarter of this group. When the model is separately estimated for Arabs and others, most of the effects presented here for non-Jews are similar in direction and size to those estimated for Arabs only, while for others, no significant effects were found (in part because this is a very small subsample in the survey data).

6 This model roughly follows Wetzels and Zorlu (2003), but it estimates the probability of being married and working in a simultaneous Probit model (compared to a double selection in the Heckman-Probit model in their paper). The instrumental variables that are used to predict the probability of being employed are the prevailing wage and the number of children under the age of 10 in the household, and the instrumental variable for predicting the probability of being married is the marriage rate of other individuals from the same gender-ethnicity-religiosity group of the individual and in the age range of up to five years older or younger, as a rough measure of the sociocultural marriage norm faced by the individual.

The Israeli employment premium

Table 1 presents the results of the first phase of the regression — an estimate of the correlation between marriage and employment given all the other observable factors that affect employment. The probability that a currently married man will work is 10 percentage points higher than that of his colleague who has never been married, and previously married men have a 3 percentage point advantage in the likelihood of working over their colleagues who have never been married. Based on the mechanisms discussed in the literature review, it is likely that this advantage reflects unobservable factors that affect the likelihood of both being employed and belonging to the *previously married* group, or, that this advantage reflects a long-term effect of marriage on the employment of the individual, an effect that persists for the previously married. Among women, the importance of the distinction between past and current marriage is even greater: the probability that a currently married woman is employed is about 2 percentage points lower than that of a single woman, while divorced, separated, and widowed women are 2 percentage points more likely to be employed than single women.

Table 1. The difference in the probability of working by marital status

In percentage points

		Total	By subpopulation and sector			
			Ashkenazi Jews	Jews, parents Israeli-born or from different continents	Mizrahi Jews	Non-Jews
Currently married vs never married	Men	**10.0**	**8.9**	**8.7**	**8.4**	**15.8**
	Women	**-2.2**	-1.5	**3.2**	2.5	**-2.7**
Previously married vs never married	Men	**3.0**	1.0	**7.4**	**3.7**	2.7
	Women	**2.2**	1.8	**9.6**	**3.8**	**-7.2**

Note: Each cell displays the point estimate for the group. Blue numbers show statistically significant values. The findings presented in the table are based on an estimate of the average marginal effect (AME) of dummy variables for current and past marriages given age, education, experience, geographic location, religiosity, gender, ethnicity, employment status, the value of the home owned by the household, and the number of children under the age of 10 in the household. The model's findings are presented in Appendix Table 1.

Source: Michael Debowy, Gil Epstein, and Avi Weiss, Taub Center | Data: CBS

Substantial differences were found when examining the results by ethnicity.[7] The employment probability of married Jewish men is 8–9 percentage points higher than that of their unmarried colleagues, while among non-Jews, it is 15.8 percentage points higher. Among male Jews whose parents were born in Israel or on different continents (hereinafter referred to as *third-generation or of mixed origin*) this gap decreases slightly for those previously married, among Mizrahi Jews it is halved, and among Ashkenazi Jews it disappeared altogether. The lower probability of a currently married women to be employed obfuscates opposing effects for women of different ethnicities. The employment probability of third-generation or mixed origin married Jewish women is higher than that of single women. The predicted employment rates of married Ashkenazi and Mizrahi women are similar to those of their single counterparts, and non-Jewish married women tend to work less than those not married, holding constant all other factors. Similarly, past marriages correspond to 4–10 percentage points higher in employment for non-Mizrahi Jewish women, and about 7 percentage points lower for non-Jewish women.

In conclusion, holding all else constant, the employment probability of Israeli men and women who were married in the past is 2–3 percentage points higher than that of their colleagues who never married. As noted previously, this figure can simultaneously reflect both the effect of unobservable characteristics on employment and marriage and the long-term effect of the marriage itself (which persists after the marriage is terminated). However, currently married men are expected to work with an even higher probability, and there is a statistically significant difference between them and those who were married in the past (the employment advantage of married men over their never-married counterparts is about 10 percentage points, while for those previously married it is 3 percentage points). Non-Ashkenazi Jewish women show similar employment patterns, although the employment effect is smaller than for men and is greater for those previously married. Among Ashkenazi women and non-Jewish women, however, current or past marriages do not result in heightened employment rates, and among non-Jews they actually result in lower employment. This gender difference is possibly due

7 Individuals were divided into four groups: Ashkenazi Jews — Jews who were born or whose parents were born in Europe or America; Mizrahi Jews — Jews who were born or whose parents were born in Asia or Africa; all other Jews — those whose parents were born in Israel or on different continents (i.e., one parent was born in Europe/America and the other in Asia/Africa); and non-Jews, which include both Arabs and others.

to the division of labor within the household, which is expressed differently in different populations, and may also be due to the fact that non-Jewish married couples tend to prioritize the employment of men at the expense of women.

The Israeli marriage premium

The model's main findings, which are presented in Table 2, show that in the second decade of the 21st century there is a positive and significant marriage premium for workers in Israel. The hourly wages of married men tend to be about 30% higher than those of their unmarried colleagues (an advantage that is nonexistent for those previously married). Furthermore, on average, the hourly wage of married women is about 20% higher than that of single women (this advantage is 10% for those previously married). These estimates are similar to those found in other developed countries. However, these average estimates mask differences between workers from different populations, and, in particular, the gap between Jews and non-Jews.

Table 2. The marriage premium, the general working population

		Total	By subpopulation and sector				By occupation	
			Ashkenazi Jews	Jews, parents Israeli-born or from different continents	Mizrahi Jews	Non-Jews	Blue collar	White collar
Currently married vs never married	Men	**29.5%**	**27.3%**	**36.5%**	**25.5%**	-5.6%	**36.1%**	**16.6%**
	Women	**20.4%**	**17.0%**	**30.8%**	**22.1%**	**-10.3%**	**23.6%**	**14.5%**
Previously married vs never married	Men	4.3%	8.4%	**27.8%**	-8.8%	-15.9%	**7.9%**	-2.9%
	Women	**10.4%**	3.7%	**19.0%**	**15.1%**	**-16.1%**	**9.6%**	**11.9%**

Note: Each cell displays the point estimate for the group. Blue numbers show statistically significant values. The findings presented in the table are based on an estimate of the average marginal effect (AME) of dummy variables for current and past marriages given age, education, experience, geographic location, religiosity, gender, ethnicity, employment status, the value of the home owned by the household, and the number of children under the age of 10 in the household. The model's findings are presented in Appendix Table 1.
Source: Michael Debowy, Gil Epstein, and Avi Weiss, Taub Center | Data: CBS

Dividing the population by ethnicity, the premiums for men and women show radically different results. Third-generation or mixed origin Jewish men benefit from the highest premium of 36.5%, followed by Ashkenazi and Mizrahi men with premiums of about 25%–27%, while non-Jewish married men earn the

same as their unmarried counterparts (i.e., they have no marriage premium). This is true for those currently married only; for male employees who were previously married and are no longer married there are no wage advantages over unmarried individuals, with the exception of third-generation or mixed origin Jews for whom most of the premium carries over to the previously married group.

Among women, Ashkenazi women benefit from a marriage premium of about 20% (which is approximately 62% of the premium of Ashkenazi men), while non-Ashkenazi married Jewish women enjoy a premium that is roughly 13%–16% lower than that of men of the same ethnicity. Non-Ashkenazi Jewish women who are divorced, separated, or widowed generally have a premium similar to that of their married colleagues, except for Ashkenazi women who only enjoy the premium while married. Among non-Jewish women, current and past marriages correspond to wages that are about 10% and 16% lower than those of unmarried women, respectively.

Another division that demonstrates interesting differences is by occupation (the relationship between marriage and employment is not estimated in this division, since, by definition, only people who work are included). Married men and women receive a similar premium of about 14%–16% among *white-collar* workers (managers, academic occupations, practical engineers, and technicians).[8] The gender difference is more prominent, and the premium is slightly higher than its average level in the general population, among *blue-collar* workers. Previously married women have a similar wage advantage for both types of occupations, while previously married men who are *blue-collar* workers enjoy a premium of about 8%.

To complete the picture, we estimated the marriage premium in another model, where the probability of being married (in parallel with the probability of working) is explicitly estimated in the first stage, and the gross hourly wage is estimated in the second stage, so that the influence of unobservable factors affecting both marriage and wages is controlled for (Appendix Table 2). This analysis focused on currently married versus unmarried individuals. The results indicate lower marriage premiums in relation to the base model, although the relative gaps between the groups are maintained. Based on this estimation,

8 The statistical hypothesis that both male and female *white collar* workers receive a marriage premium of 16% cannot be rejected at the 95% confidence level.

the average premium for married men is about 21% and for married women about 12%. This is due to slightly smaller premiums than in the base model for Jews of all ethnicities, while the relationship between marriage and wages remains the same as for non-Jews without modeling the selection for marriage.

In summary, the findings converge into solid evidence of the existence of a marriage premium in Israel for Jewish men and women which is similar in scale to estimates from other developed countries. Marriage leads to higher hourly wages for men and women even after controlling for a range of factors related to wages and marriage. This premium is not uniform, varying with gender and occupation. *White collar* workers enjoy a smaller-than-average premium, which is similar among men and women. Meanwhile, *blue-collar* workers enjoy a slightly larger-than-average premium, where men have a distinct advantage over women. The marriage premium also varies by ethnicity — non-Jewish male workers do not benefit from it, and non-Jewish female workers are *penalized* by their marriage when it comes to their predicted wages. Nonetheless, for Jewish workers of all ethnicities, the marriage premium remains significantly positive. Interestingly, among male and female Ashkenazi Jews, the premium is not expected to be maintained should the marriage end (i.e., there is no advantage to *previously married* but only to the *currently married*). In contrast, among Mizrahi Jewish women, and among third-generation and mixed origin Jews, most of the premium is expected to be maintained among those previously married — a distinction similar to the results of the relationship between marriage and employment. Differences in background factors (observable and unobservable) and cultural differences may drive different mechanisms in the relationship between marriage and employment and wages that manifest as these differences by ethnicity.

Summary

In this paper, we have shown that a marriage premium exists in the Israeli labor market for both employment and wages. The employment probability of married men is about 10 percentage points higher than that of unmarried men. Furthermore, within the general population, married men's wages are about 30% higher than that of unmarried men, while married Jews of various ethnicities receive premiums ranging from 25% to 36%. While the probability of married women working is 2 percentage points lower than that of unmarried women in the general population, when separated by ethnicity

it was found that only non-Jewish married women are likely to work at lower rates than unmarried women, while married Jewish women are likely to work at similar or even higher rates than unmarried women. Non-Ashkenazi Jewish women who are divorced, separated women, or widows have a higher employment probability than single women who have never been married, while the relationship between past marriages and employment among non-Jewish women is negative. The wages of married women are about 20% higher than the wages of unmarried women. Among Jewish women — women whose parents were born either in Israel or on different continents benefit from the highest premium for marriage (31%). Ashkenazi women have the lowest premium (17%), while non-Jewish married women not only do not benefit from a premium, they suffer 10% lower wages.

In addition, we found that the marriage premium is significantly lower among *white-collar* workers. *Blue-collar* workers who were married in the past have a high positive premium, and among women who were married in the past, the premium is similar regardless of their occupation. An attempt to trace unobservable background factors that affect both the probability of getting married and wages and controlling for them in the statistical estimation suggests that most of the numbers cited are 30%–40% greater than the actual premium. However, their direction, significance, and ratios correctly reflect the relationship between the institution of marriage and the Israeli labor market.

The scarcity of past research on this subject in Israel, the changes that have been made over the years in the CBS household surveys, and the considerable changes that have taken place in the institution of marriage in Israel in recent years inhibit comparisons that will allow us to draw solid conclusions on how things have changed over time. As mentioned, the main research carried out on this subject was that of Shahrabani (2004). The current study differs from that paper in several significant aspects, such as the age range of individuals, the scope of their employment, the background variables that are controlled for, the focus on hourly wages versus monthly wages, and the choice of statistical model. In an attempt to uncover the extent to which the differences in the findings between the two studies result from actual changes that have occurred in the Israeli economy rather than from the differences mentioned above, we endeavored to duplicate Sharabani's model to the extent possible using current data.

We found a monthly wage premium of 13.9% for men and 12.5% for women using Shahrabani's methodology on the 2017 and 2018 data. The premium for men is not statistically different from the 11% estimated by Shahrabani, however for women the confidence interval for the premium does not include the 7% estimated in that paper, but it nearly does. All told, it seems that since the 1980s and 1990s the marriage premium of men has not changed, while that of women has increased. This trend is in line with findings from other countries, such as those of McConnell and Valladares-Esteban (2020).

Unfortunately, the analysis in this paper and the available data made it impossible to take into account all the changes that have occurred in the Israeli marriage institution, the most significant being the increased rate of couples who choose to cohabit without being married (Figure 2). It would be interesting to see whether a similar premium exists for these individuals as well or only for those in an official marriage. It is possible that one of the causes for the premium's existence may be the stability of the arrangement, as implied by Pilossoph and Wee (2019), and such stability may be just as prevalent for couples who are not officially married but not necessarily for every couple who choose to cohabit. Another interesting line of investigation is whether the increase in the age of marriage and share of single individuals in different age groups (Figure 3) has an impact on the size of the marriage's premium. In order to answer these and other questions, long-term panel data is required to distinguish between different relationship patterns and to account for demographic developments.

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Appendix

Appendix Table 1. The findings of the multivariate model: the probability of working and the gross hourly pay

	Overall		By origin and sector		By occupation
	Dependent variable: Probability of working[1]	Dependent variable: Log of gross hourly wage	Dependent variable: Probability of working[1]	Dependent variable: Log of gross hourly wage	Dependent variable: Log of gross hourly wage
Married — reference group: Never married					
Currently married x man	0.4399***	0.2947***			
	(0.0335)	(0.0181)			
Currently married x woman	-0.0755*	0.2041***			
	(0.0313)	(0.0173)			
Previously married x man	0.1302*	0.043			
	(0.0626)	(0.04)			
Previously married x woman	0.0702	0.1036***			
	(0.0429)	(0.0228)			
Currently married x man x Ashkenazi			0.3899***	0.2733***	
			(0.0558)	(0.0287)	
Currently married x man x Jewish, parents Israeli-born or from different continents			0.3898***	0.3652***	
			(0.0432)	(0.0252)	
Currently married x man x Mizrahi			0.4049***	0.2546***	
			(0.0673)	(0.0374)	
Currently married x man x non-Jew			0.5744***	-0.0560	
			(0.0504)	(0.0458)	
Currently married x woman x Ashkenazi			-0.056	0.1699***	
			(0.0521)	(0.027)	
Currently married x woman x Jewish, parents Israeli-born or from different continents			0.1273**	0.3076***	
			(0.0419)	(0.0217)	
Currently married x woman x Mizrahi			0.0934	0.2206***	
			(0.0649)	(0.0358)	
Currently married x woman x non-Jew			-0.4814***	-0.1034***	
			(0.0458)	(0.0294)	
Previously married x man x Ashkenazi			0.032	0.0844	
			(0.113)	(0.063)	
Previously married x man x Jewish, parents Israeli-born or from different continents			0.3377**	0.2783***	
			(0.1246)	(0.0498)	
Previously married x man x Mizrahi			0.1667	-0.0884	
			(0.1072)	(0.0959)	
Previously married x man x non-Jew			0.0927	-0.1595	
			(0.1486)	(0.0968)	
Previously married x woman x Ashkenazi			0.0531	0.0367	
			(0.0692)	(0.0329)	

Appendix Table 1 (continued). The findings of the multivariate model: the probability of working and the gross hourly pay

	Overall		By origin and sector		By occupation
	Dependent variable: Probability of working[1]	Dependent variable: Log of gross hourly wage	Dependent variable: Probability of working[1]	Dependent variable: Log of gross hourly wage	Dependent variable: Log of gross hourly wage
Previously married x woman x Jewish, parents Israeli-born or from different continents			0.3553***	0.1901***	
			(0.0978)	(0.0466)	
Previously married x woman x Mizrahi			0.1449	0.1506***	
			(0.0792)	(0.0414)	
Previously married x woman x non-Jew			-0.2122**	-0.1610***	
			(0.0793)	(0.0452)	
Currently married x man x *blue collar* employment					0.3609***
					(0.0190)
Currently married x man x *white collar* employment					0.1659***
					(0.0197)
Currently married x woman x *blue collar* employment					0.2364***
					(0.0199)
Currently married x woman x *white collar* employment					0.1449***
					(0.0216)
Previously married x man x *blue collar* employment					0.0798*
					(0.0513)
Previously married x man x *white collar* employment					-0.0292
					(0.0318)
Previously married x woman x *blue collar* employment					0.0956**
					(0.0436)
Previously married x woman x *white collar* employment					0.1193*
					(0.0691)
Origin and sector — reference group: Ashkenazi Jew					
Jewish, parents Israeli-born or from different continents	0.0409	0.0133	-0.033	0.0133	0.0124
	(0.0243)	(0.0125)	(0.0419)	(0.0125)	(0.0125)
Mizrahi	0.1634***	0.0603***	0.0845	0.0603***	0.0606***
	(0.0285)	(0.0152)	(0.0649)	(0.0152)	(0.0152)
Non-Jew	-0.5501***	0.0108	-0.4720***	0.0108	0.0078
	(0.032)	(0.0187)	(0.0494)	(0.0187)	(0.0189)
Intercept	-2.4994***	5.7143***	-2.4673***	5.7250***	5.7937***
	(0.1155)	(0.1091)	(0.1208)	(0.1115)	(0.1120)
Additional variables: age, education, gender, experience, occupation, industry branch, work hours, employment status, origin and sector, geographic locale, religious observance, survey year	Yes	Yes	Yes	Yes	Yes

Appendix Table 1 (continued). The findings of the multivariate model: the probability of working and the gross hourly pay

	Overall		By origin and sector		By occupation
	Dependent variable: Probability of working[1]	Dependent variable: Log of gross hourly wage	Dependent variable: Probability of working[1]	Dependent variable: Log of gross hourly wage	Dependent variable: Log of gross hourly wage
Additional variables: number of children in household under the age of 10, prevailing wage	Yes	No	Yes	No	No
Additional variables: probability of working	No	Yes	No	Yes	Yes
λ	0.0675***		0.0454***		0.0688***
	(0.0069)		(0.0082)		(0.0103)
χ^2	26,292.2		26,033.3		25,182.9
(p-value)	(0.0000)		(0.0000)		(0.0000)
Number of observations	34,401		34,401		34,401
Number of workers	24,867		24,867		24,867

Note: The table presents the findings of the multivariate model regarding the individual's probability of working and gross hourly pay. The two columns on the left show the estimates of the first and second stages in the model that estimates the overall premium. The two columns in the middle present the estimates of the first and second stages in the model in which the premium is estimated separately by ethnicity. The furthest right column displays the estimate by occupation.
Significance level: *p < 0.10; **p < 0.05; ***p < 0.01.
1 Any amount of work for any salary.
Source: Michael Debowy, Gil Epstein, and Avi Weiss, Taub Center | Data: CBS

Appendix Table 2. The findings of the dual processing model: gross hourly pay

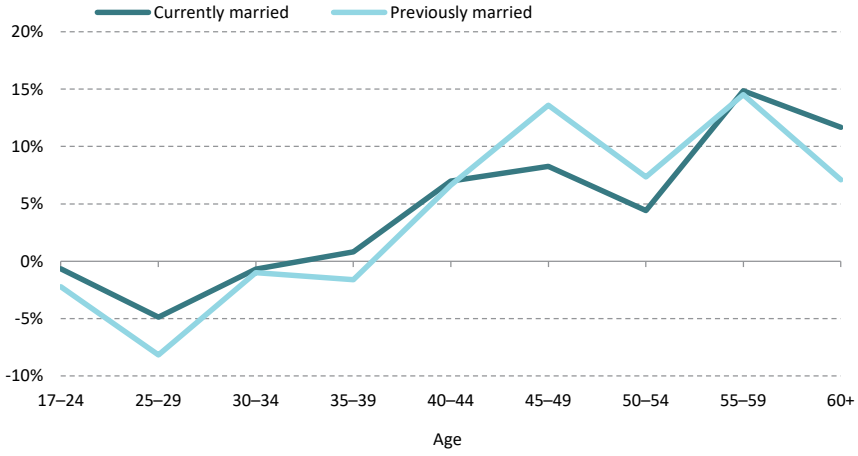
	Dependent variable: Log of gross hourly wage		
	Overall	By origin and sector	By occupation
Married — reference group: Never married			
Currently married x man	0.2063***		
	(0.0148)		
Currently married x woman	0.1155***		
	(0.0127)		
Currently married x man x Ashkenazi		0.2372***	
		(0.0232)	
Currently married x man x Jewish, parents Israeli-born or from different continents		0.3080***	
		(0.0238)	
Currently married x man x Mizrahi		0.2203***	
		(0.0325)	
Currently married x man x non-Jew		-0.0583*	
		(0.0247)	
Currently married x woman x Ashkenazi		0.1230***	
		(0.0199)	
Currently married x woman x Jewish, parents Israeli-born or from different continents		0.1896***	
		(0.0204)	
Currently married x woman x Mizrahi		0.1580***	
		(0.0266)	
Currently married x woman x non-Jew		-0.1160***	
		(0.0264)	
Currently married x man x *blue collar* employment			0.2663***
			(0.0193)
Currently married x man x *white collar* employment			0.1631***
			(0.0185)
Currently married x woman x *blue collar* employment			0.1816***
			(0.0169)
Currently married x woman x *white collar* employment			0.0461**
			(0.0166)
Origin and sector — reference group: Ashkenazi Jew			
Jewish, parents Israeli-born or from different continents	0.0055		
	(0.0124)		
Mizrahi	0.0201		
	(0.0162)		
Non-Jew	0.0212		
	(0.0190)		
Intercept	3.7767***		
	(0.2548)		

Appendix Table 2 (continued). The findings of the dual processing model: gross hourly pay

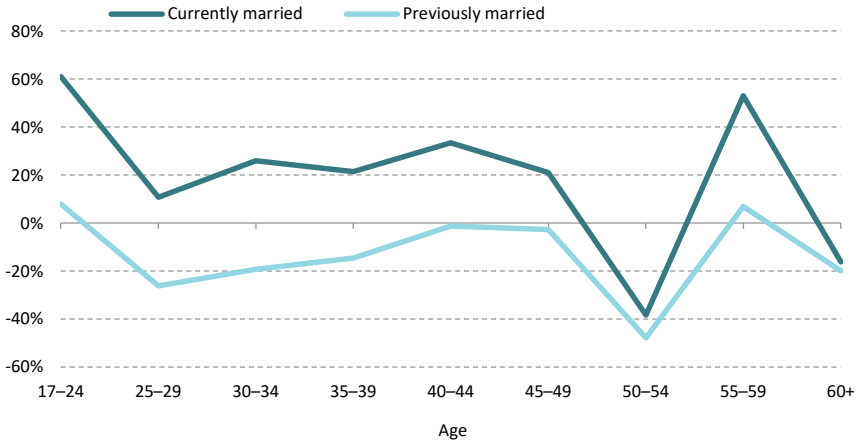
	Dependent variable: Log of gross hourly wage		
	Overall	By origin and sector	By occupation
Additional variables: age, education, gender, experience, occupation, industry branch, work hours, employment status, origin and sector, geographic locale, religious observance, survey year	Yes	Yes	Yes
Additional variables: probability of working, probability of being married	Yes	Yes	Yes
λ employment	-0.0422***	-0.0438***	-0.0338***
	(0.0076)	(0.0067)	(0.0070)
λ marriage	-0.0211***	-0.0219***	-0.0224***
	(0.0023)	(0.0023)	(0.0022)
χ^2	21,496.1	24,511.7	30,351.3
(p-value)	(0.0000)	(0.0000)	(0.0000)
Number of observations	34,401	34,401	34,401
Number of workers	24,867	24,867	24,867

Note: The table presents the findings of the second stage within the framework of a double selection model in line with Wetzels and Zorlu (2003). In the first stage, the probability of the individual working and the probability of the individual being married are estimated using a simultaneous Probit model. The instrumental variables used to predict the probability of being employed are the prevailing wage and the number of children under the age of 10 in the household. The instrumental variable for predicting the probability of being married is the marriage rate of other individuals from the same gender-ethnicity-religiosity group of the individual and in an age range of up to five years older or younger than the individual.
Significance level: *p < 0.10; **p < 0.05; ***p < 0.01.
Source: Michael Debowy, Gil Epstein, and Avi Weiss, Taub Center | Data: CBS

Appendix Figure 1a. Difference in employment rate between currently married and those who have never been married, by age group



Appendix Figure 1b. Gross hourly wage gaps between currently married couples and those who have never been married, by age group



Note: The figures show average differences between married or previously married couples and individuals who have never been married, in different age groups. Appendix Figure 1a shows the percentage difference in employment rates, and Appendix Figure 1b presents the percentage difference in gross hourly wages. It should be noted that among older individuals (age 50+), those who have never been married constitute a very small subsample, therefore the documented gap is based on a few observations regarding unmarried individuals. Apparently, this is the origin of the anomalous gaps observed in these ages.

Source: Michael Debowy, Gil Epstein, and Avi Weiss, Taub Center | Data: CBS

The Labor Market in Israel: An Overview

Michael Debowy, Gil S. Epstein, and Avi Weiss

Introduction

The COVID-19 pandemic and the economic crisis that accompanied it had a dramatic effect on the labor market in Israel and led to extreme and rapid changes in the levels of employment and unemployment and in wages. Following the major shocks in 2020 — the year of unpaid leave and lockdowns — the process of recovery gained momentum in the second half of 2021 and essentially was completed during 2022. During the first half of 2022, the level of employment returned to its 2019 level and the narrow rate of unemployment dropped to below its pre-pandemic level. Towards the end of the summer, there was somewhat of an increase in both the broad and narrow rates of unemployment, and since then the former has been within a range of less than one percentage point above its end-of-2019 level and the latter has been within a range of less than one-half of a percentage point.

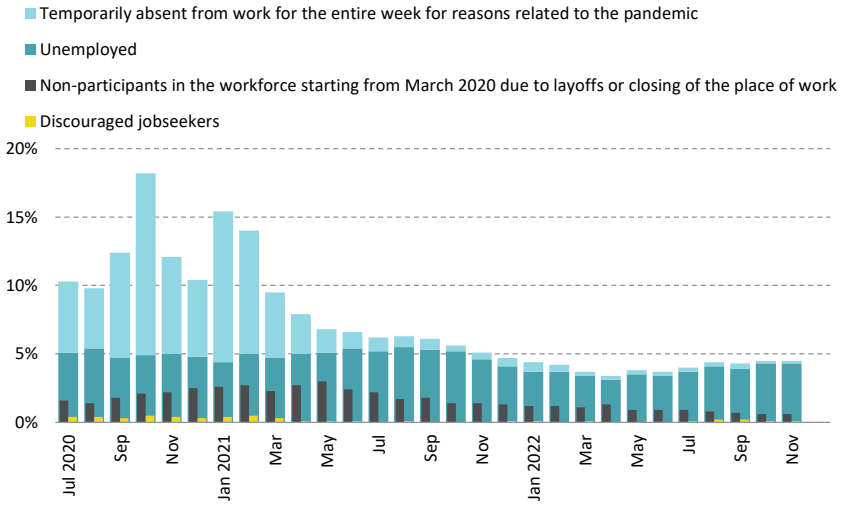
In this paper, we will survey the developments in the labor market and discuss them in the context of past and future forecasts. We will examine the level of employment and work hours in the various industries, as well as wages. We will describe the variation in employment according to gender, sector, age, and region and the changes that have occurred in higher education and vocational training in recent years. Finally, we will discuss the forecasts of the Israeli labor market's future.

* Michael Debowy, Researcher, Taub Center for Social Policy Studies in Israel; doctoral student, Department of Economics, Ben-Gurion University of the Negev. Prof. Gil S. Epstein, Principal Researcher, Taub Center; Professor of Economics and Dean of the Social Sciences Faculty, Bar-Ilan University. Prof. Avi Weiss, President, Taub Center; Department of Economics, Bar-Ilan University.

Unemployment, employment, and wages

Figure 1 presents unemployment and its composition during the past two years. The definition of unemployment was expanded during the pandemic so as to include workers on unpaid leave (or those who were absent from work for some other reason related to the pandemic) and individuals who left the workforce as a result of the pandemic. The unemployment that was incurred by these two groups in 2020 and the first half of 2021 was in addition to the already significant increase in the rate of unemployment according to its narrow definition (jobseekers out of all workers and jobseekers) during this period; however, during all of 2022 the contribution of these two groups was less than 2% (1.2% in July 2022).

Figure 1. Rate of unemployment



Source: Michael Debowy, Gil Epstein, and Avi Weiss | Data: CBS

The rate of unemployment according to its narrow definition also fell significantly between 2021 and 2022, reaching less than 3.5% in the spring of 2022 before rising again in the summer and autumn (4.3% in October 2022). Even if we include workers who were absent from work because of the pandemic, the rate of unemployment during the first half of 2022 was lower than its historically low point in 2019, and during the second half of the

year it did not exceed its end-of-2019 level by more than half a percentage point. According to this simple measure, Israeli employment reached one of its historically best levels in 2022, and it remained there at the end of the year.

Figure 2a. The average wage

NIS, current prices

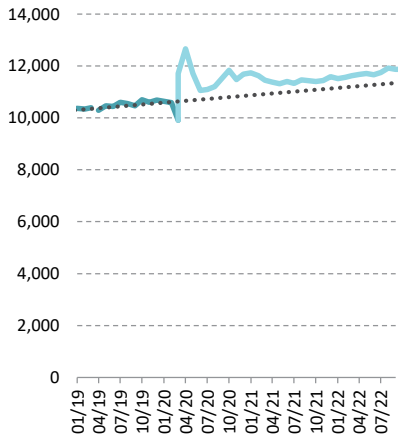
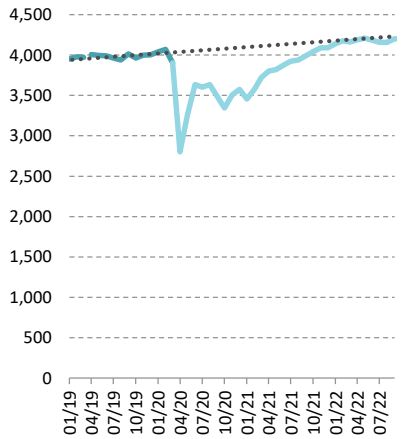


Figure 2b. Total jobs

Thousands



Notes: The dark blue line continues until March 2020 and is the basis for the calculation of the trend line presented for the entire period (based on monthly seasonally adjusted data starting from January 2017).
Source: Michael Debowy, Gil Epstein, and Avi Weiss | Data: CBS

The ups and downs in employment during the past two years were paralleled by movements in wages. Figures 2a and 2b present the average monthly wage and the number of jobs in the economy from the beginning of 2019 through September 2022. The dotted lines represent the long-term trend, which is based on pre-pandemic data. The drop in the rate of employment with the onset of the pandemic was accompanied by a rise in the average wage, since the jobs that remained paid higher wages, on average, than the jobs that were lost. During the second half of 2021, the number of jobs began to return to their pre-pandemic level and the average wage fell in parallel. Although the rate of increase in number of jobs returned to the pre-pandemic level by the beginning of 2022, the average wage remained higher (in real terms) than its expected value and remained higher by about 1% as of September 2022.

It can be assumed that this situation reflects the difficulty in hiring workers during the recovery period and the wage increase that employers had to pay in order to persuade workers to return to work, an issue that has been widely discussed in public discourse (Arlosoroff, 2022; Lavi, 2021; Tash, 2021).

Employment and wages by industry

As described in our previous survey, the effect of the pandemic varied across industries (Debowy et al., 2021a). In addition to the variation in the intensity of demand shocks by industry and in the restrictions on production activities in different industries, other background factors, such as technological innovation and volatility in international trade, continued to have an effect. Table 1 presents the change in the number of jobs by industry up to September 2022 relative to the annual average or the same quarter in 2019 (the data include workers on unpaid leave). In 2020–2021, the number of jobs was significantly less than in 2019 in almost all industries (although in 2021 there was an improvement in all industries relative to 2020) and in 2022 the number of jobs recovered to its previous level in most of them. However, employment in several industries remained at a lower level than in 2019.

The industries in which the number of jobs was at a lower level than prior to the pandemic include: agriculture (where the monthly number of jobs during the first nine months of 2022 was lower by 1,200 on average than during the same period in 2019); mining and quarrying (400 fewer jobs); transportation and warehousing (1,400); hospitality and food services (12,100); art and entertainment (4,600); and management and support services, which lost more than 33,000 jobs during the two-year period.

The number of jobs increased in the rest of the industries and some of them experienced a particularly large increase. Jobs in the health and welfare industry grew by about 26% and during the three first quarters of 2019 it accounted for 112,000 of the 190,000 new jobs in the economy. About 44,700 new jobs were added in the information and communication industry and 60,000 in the *high tech* industry (a substitute definition that partially overlaps with some of the other industries). Almost 19,000 new jobs were added in the education industry and a similar number in the professional, scientific and technical service industry. The construction industry also recovered from the severe effect the pandemic had on it, and it saw an addition of about 17,800 jobs. It is possible that this last figure is directly related to the recovery in employment among Arab men, as will be described.

Table 1. Rate of change in number of jobs (including workers on unpaid leave) in 2020–2022 relative to the same period in 2019, by industry

	Average 2020	Average 2021	Q1 2022	Q2 2022	Q3 2022
Overall economy	-10%	-3%	5%	5%	4%
Agriculture, forestry, fishing	-5%	-4%	-1%	-2%	-4%
Mining, quarrying	-10%	-11%	-8%	-7%	-9%
Manufacturing	-6%	-3%	1%	1%	1%
Electricity, water supply, waste management	1%	3%	3%	4%	4%
Construction	-9%	-4%	8%	8%	7%
Wholesale trade, vehicle repair	-13%	-6%	2%	2%	2%
Transportation, warehousing, postal, courier services	-15%	-8%	-1%	-1%	-2%
Accommodation, restaurant services	-40%	-23%	-2%	-6%	-8%
Information, communication services	-1%	9%	23%	23%	22%
Financial, insurance services	-6%	-5%	0%	1%	1%
Real estate activities	-10%	-3%	7%	8%	6%
Professional, science, technical services	-8%	-1%	8%	8%	7%
Management, support services	-22%	-17%	-11%	-10%	-11%
Local, public, security administration	-1%	1%	2%	1%	1%
Education	-4%	-1%	4%	4%	3%
Health, welfare, social services	6%	17%	26%	26%	25%
Arts, recreation, entertainment	-36%	-24%	-6%	-7%	-9%
Other services	-17%	-10%	2%	3%	4%
High tech	0.2%	8%	18%	19%	19%

Notes: High tech includes a number of subindustries that belong to several different industries: manufacturing, information and communication, and professional, scientific and technical services. Therefore, these jobs partially overlap those presented in the aforementioned industries.
Source: Michael Debowy, Gil Epstein, and Avi Weiss | Data: CBS

Due to the reduction in work hours among workers who remained employed, which was observed in almost every industry, the drop in employment during the pandemic was even larger than the drop in the number of jobs. Table 2 presents the change in the number of weekly work hours per worker during the past three years by industry relative to 2019. In 2022, the comparison is to the parallel quarter in 2019. It can be seen that the decline was across the board, affecting almost every industry. It moderated in 2021 but lingered in several industries, particularly in the transportation, warehousing, postal and courier

services industry. However, in 2022 the number of work hours grew in most industries, including in the aforementioned industry, such that average work hours per worker remained within a few percentage points of its level during the first half of 2019 and was even higher than in the third quarter of 2019.

Table 2. The rate of change in average weekly work hours per worker in 2020–2022 relative to the same period in 2019, by industry

	Average 2020	Average 2021	Q1 2022	Q2 2022	Q3 2022
Overall economy	3%	1%	-1%	3%	-1%
Agriculture, forestry, fishing	-2%	-1%	0%	3%	-1%
Mining, quarrying	-1%	5%	3%	-2%	1%
Manufacturing	0%	-1%	-7%	6%	-2%
Electricity, water supply, waste management	-6%	-1%	1%	1%	-2%
Construction	-10%	-3%	-1%	-1%	-2%
Wholesale trade, vehicle repair	-13%	-3%	-2%	-3%	-1%
Transportation, warehousing, postal, courier services	-30%	-13%	0%	-4%	-3%
Accommodation, restaurant services	1%	2%	1%	3%	2%
Information, communication services	0%	2%	1%	5%	4%
Financial, insurance services	-12%	-3%	2%	-5%	3%
Real estate activities	-6%	-1%	-1%	3%	1%
Professional, science, technical services	-14%	-6%	-6%	-3%	2%
Management, support services	0%	0%	0%	1%	1%
Local, public, security administration	-6%	0%	-1%	-1%	2%
Education	-5%	1%	-3%	3%	3%
Health, welfare, social services	-28%	-7%	2%	-1%	3%
Arts, recreation, entertainment	-19%	-7%	-3%	-6%	5%
Other services	4%	12%	14%	5%	9%

Source: Michael Debowy, Gil Epstein, and Avi Weiss | Data: CBS

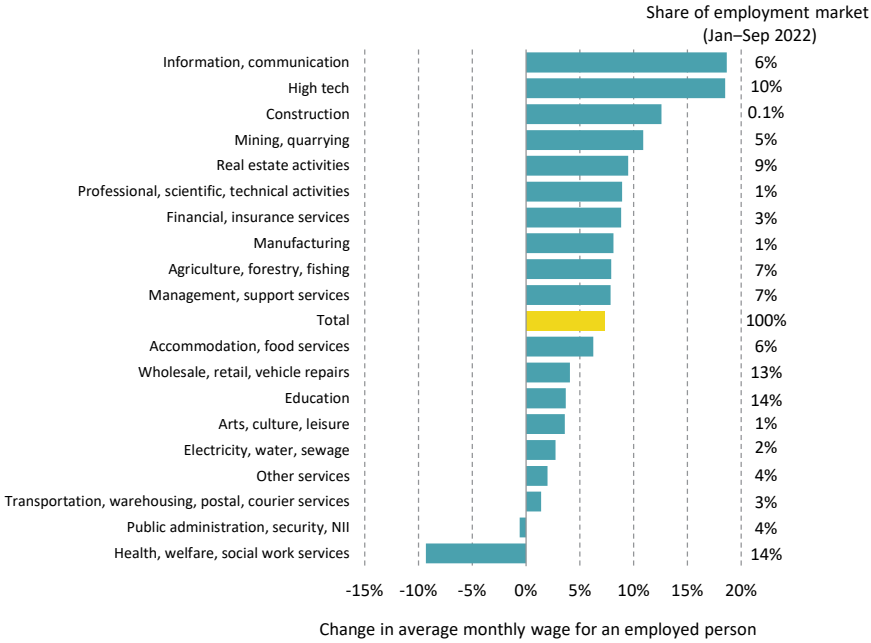
In parallel with the change in employment in the various industries, there were also far-reaching changes in wages during the pandemic and the recovery period. Figure 3 presents the change in the monthly average wage between the first three quarters of 2019 and the same quarters in 2022 by industry.[1] At the end of each bar, is the share of each industry out of total employment during the first three quarters of 2022. Particularly noticeable is the drop of about 9% in the average wage in the health and welfare industry. As mentioned above, there was a meteoric rise in the number of jobs in this industry during the pandemic and many of those workers were low-paid (such as workers administering the COVID-19 testing). It appears that the growth in the number of workers led to a drop in the industry's average wage. There was also a particularly large increase in the average wage (9%–11%) in the manufacturing and construction industries; in the information and communication industry and in the high tech industry (18%–19%); in agriculture (9%); in finance and insurance (9%); and in mining and quarrying (13%).

It is worth focusing on the high tech industry (i.e., the information and communication industry, which largely overlaps with high tech) in view of its large share of employment (about 10%), the large increase in the industry's average wage (which was already high before the pandemic), and the entry of workers from a variety of sectors of the population during the past decade (Cohen Kovatch, 2022). The aforementioned factors had a major impact on the trend of wages in the economy as a whole. According to the industry classification of the CBS, high tech is comprised of a number of subindustries that belong to several different industries and therefore it overlaps them to some extent.[2]

1 The CBS does not publish data on work hours in the high tech industry.

2 The high tech industry is composed of the following subindustries: pharmaceuticals production, production of computers and electronic and optical equipment and production of transportation and transport vehicles (which are part of manufacturing); communication services, information and software services and computer consulting (which are part of information and communication); and research and development (which is part of professional, scientific and technical activity).

Figure 3. The rate of change in the average monthly wage between 2019 and 2022, by industry



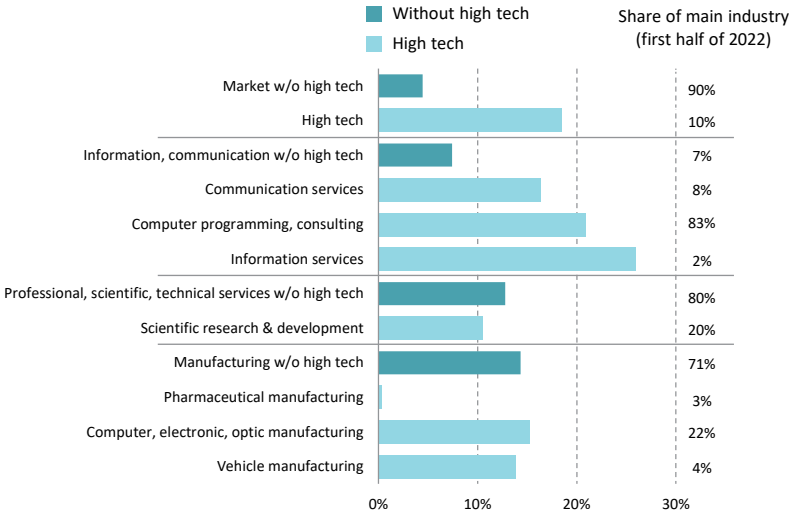
Notes: High tech includes a number of subindustries that belong to several different industries — manufacturing, information and communication and professional, scientific and technical services. Therefore, these jobs partially overlap those presented in the aforementioned industries. The length of the bar represents the change in wages (in percent) between the first three quarters of 2019 and the same quarters in 2022. The value presented at the end of the bar represents the share of the industry in total employment during the first three quarters of 2022.
Source: Michael Debowy, Gil Epstein, and Avi Weiss | Data: CBS

In a comparison of high tech and non-high tech subindustries within a particular industry, an interesting picture emerges. Figure 4 presents the rate of change in the average monthly wage per worker in selected industries between 2019 and 2022. For each industry, the graph presents the rate of change in the various high tech and non-high tech subindustries in that industry, alongside the relative weight of each group in that industry.

First, an overview of the economy as a whole shows that after subtracting out the increase in wages in high tech — which totaled about 18% during the period — the increase in the average wage in the economy was much more

moderate. The average wage outside of high tech grew by 4% (as opposed to about 7% in all of the industries including high tech). Second, in the information and communication industry, the majority of which is high tech (93%) and primarily software and computer consulting (83%), wages in the high tech subindustries grew by two- to three-fold more than in the non-high tech subindustries. Also, in professional and scientific activity, wages grew faster in the high tech subindustries than in the rest of the industry (13% vs 10%). The situation was different in manufacturing: the rise in wages in the three high tech subindustries was only about 13.6% on average in contrast to 14.3% in the rest of the industry. This industry is the only one in which the rate of increase in wages in some of its high tech subindustries was more moderate than in the non-high tech subindustries.

Figure 4. The rate of change in wages in the high tech subindustries in contrast to the non-high tech subindustries, 2019–2022, selected industries



Notes: The length of the bars represents the change in wages (in percent) between the first three quarters of 2019 and the same quarters in 2022. The percentage appearing at the end of the bar represents the share of the industry within total employment during the first three quarters of 2022.
Source: Michael Debowy, Gil Epstein, and Avi Weiss | Data: CBS

SPOTLIGHT

The Relationship Between Wages in High Tech and Wages in Other Industries

Since the high tech industries are directly responsible for a significant part of the increase in aggregate wages and since in some cases the increase in high tech wages was greater than in the rest of the industries, the question arises as to whether an increase in high tech wages contributes indirectly to increasing wages in other industries since it leads to increased competition among employers for workers outside their industry. Indeed, the claim is sometimes made in public discourse that non-high tech employers are forced to raise wages in order to prevent the *flight to high tech* (Fisher, 2022; Greenzweig, 2021). Economic theory predicts that in the short term the initiative will be that of the industry with the highest marginal productivity of labor, although in the long term the competition over workers will be mutual between businesses or industries (on the assumption that the workers have skills that are suited to the different industries or that there is sufficient time to acquire them). This claim is therefore expected to have validity only in the short term (and perhaps not even in the short term) while in the longer term both the high tech industry and its competitors will react to each other's wage increases.

Although the wage data we possess does not make it possible to confirm or refute the claim, they do make it possible to gather *circumstantial evidence* regarding the connection between wages in high tech and wages in other industries. Our empirical investigation made use of the Granger test (Granger, 1969)

to examine the hypothesis that the behavior of high tech wages in the past does not improve the accuracy of wage forecasts in other industries after taking into account the past behavior of wages in those industries. In other words, we checked whether wages in high tech or its trend contain information on future wages in other industries. This test, which we carried out on the basis of monthly wage data from January 2017 to July 2022, used a multivariate model to estimate the mutual relations between time series data for wages and additional factors such as long-term trend, seasonality and lockdowns.[3] The statistical significance of the results, along with other statistics for the model, are presented in Appendix Table 1a.

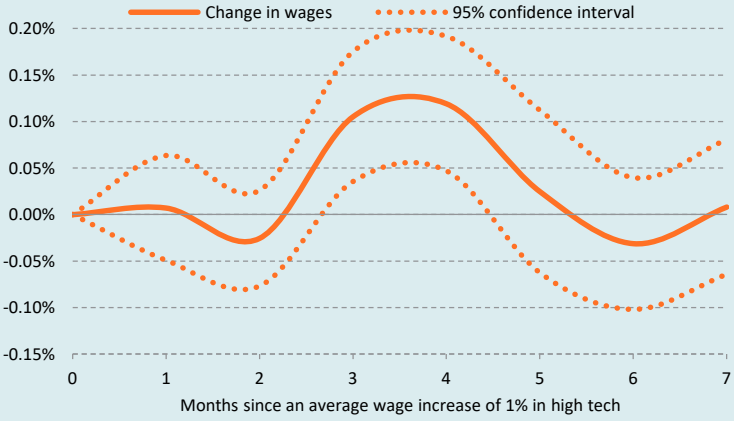
We found that in the short term (up to three months), the wage level in high tech or its monthly rate of change predicts the level of wages and their monthly rates of change in the rest of the economy, while wages in the rest of the economy do not predict wages in high tech. In the intermediate term (six months), the effect is for the most part mutual, although the effect of high tech on the rest of the economy is more statistically significant, while in the long term (nine months), the effect is totally mutual. These findings are consistent with the claim that wage increases in high tech lead to increases in other industries and also with the theoretical prediction that in the long term it is also expected that other industries will have an effect on high tech.

With respect to the duration of the effect and its intensity, most of the estimations predicted that an increase of 1% in the average wage in high tech will lead to an increase of 0.11%–0.12% in the average wage in other industries after three to four months. Figure 5 presents the impulse response function. The vertical axis represents the response of the

3 The results of the Augmented Dicky-Fuller tests for stationarity of the wage time series are presented in Appendix Table 1b.

average wage in the rest of the economy to an increase of 1% in the average wage in high tech while the horizontal axis represents the number of months since that increase. The graph shows that the confidence interval includes zero at every point except for the third and fourth months. In other words, the possibility that there is no response before 3–4 months have passed and that subsequently the response dies out completely cannot be ruled out. In contrast, in the range of 3–4 months the response is estimated to be at least 0.05% and no more than 0.19% (0.11%–0.12%, on average, as mentioned above).

Figure 5. The response of the average wage in non-high tech subindustries to an increase of 1% in the average wage in the high tech subindustries



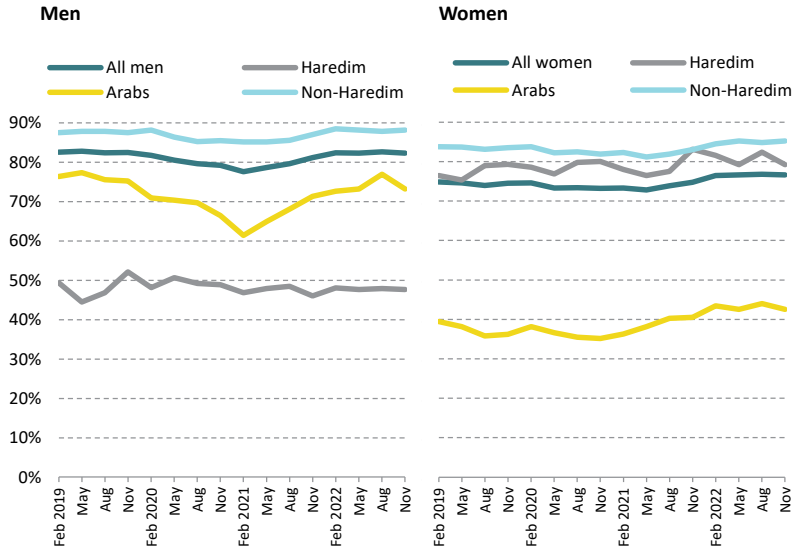
Note: The graph presents the impulse response of the average wage in the rest of the economy to the average wage in high tech, based on the model that explains the connection between the two with nine lags (presented in Appendix Table 1a).
Source: Michael Debowy, Gil Epstein, and Avi Weiss | Data: CBS

This oversimplified analysis has several drawbacks. First, the average wage data conceal a much more complex picture of the variation in wage levels among workers with differing skill levels and different positions in the hierarchy. Second, the omission of the self-employed is liable to bias the actual average wage estimator. And third, it may be that the official definition of the *high tech industry* is overly narrow, such that it does not include firms that everyone would agree should be classified as *high tech*, or overly wide, including firms that many would not classify as *high tech*. Nonetheless, our investigation uncovered an interesting pattern that is in line with the conventional wisdom expressed in public discourse and with economic theory. Furthermore, the results seem to imply that the growing high tech industry — the Israeli economy's *growth engine* — is indeed pushing wages up in other industries as well.

Employment and wages by sector

Figure 6 presents recent rates of employment for men and women aged 25–64 in various sectors of the population. The rate of employment among Jewish non-Haredi (non-ultra-Orthodox) men, which fell by about 3–4 percentage points during the pandemic, returned to pre-pandemic levels already at the beginning of 2022. The fall in the rate of employment among Arab men, which began already in 2019 and intensified during the pandemic, was halted in the summer of 2021 and has shown a consistent recovery since then. The employment of Haredi men remained somewhat lower than prior to the crisis (by about 4 percentage points).

Figure 6. Rates of employment among the 25–64 age group, by sector



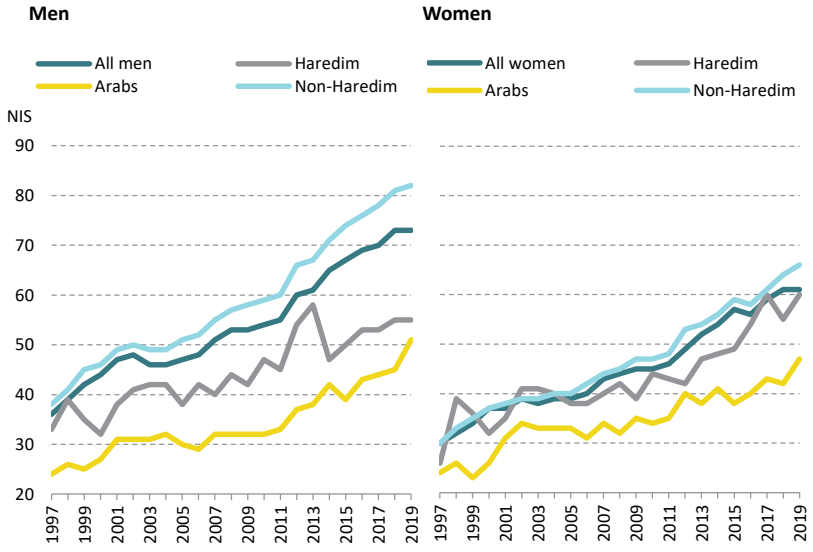
Source: Michael Debowy, Gil Epstein, and Avi Weiss | Data: CBS

The rate of employment among Jewish non-Haredi women, whose decline in employment during the pandemic was similar to that among men in the same sector, also returned to its pre-pandemic level by the beginning of 2022 and even surpassed it during the year. At the same time, the rate of employment

among Haredi women continued to rise and temporarily caught up to that of Jewish non-Haredi women in the third quarter of 2021. Among Arab women also, the employment situation returned to its previous level by the beginning of 2022 and since then has even surpassed it by several percentage points.

In general, while the rate of employment among men during the summer of 2022 was equal to its level in the summer of 2019 (82%), among women there was an increase of about 2 percentage points (77% vs 75%). Moreover, among women in all sectors of the population, the rate of employment returned to its previous level and even surpassed it relative to the end of the previous decade, and among Arab men the rate of employment returned to its previous level. In contrast, among Haredi men the rate of employment has still not returned to its previous level.

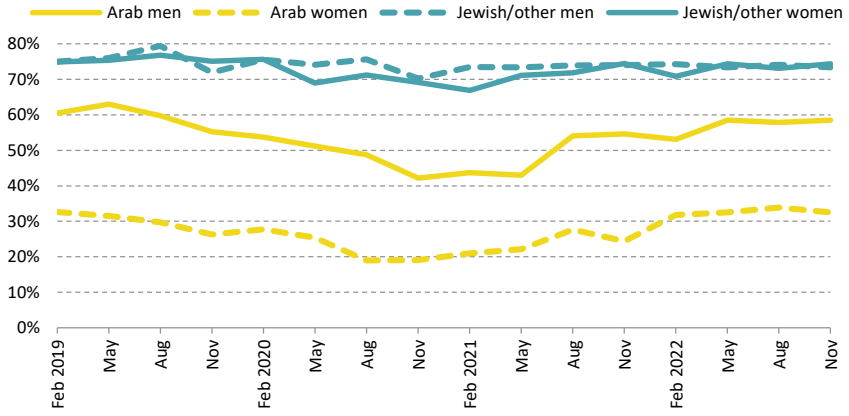
Figure 7. The hourly wage in the 25–64 age group, by sector



Source: Michael Debowy, Gil Epstein, and Avi Weiss | Data: CBS

The growth in the employment of women appears to be a natural continuation of the trend in recent decades. It was also accompanied by a significant increase in women's wages, with the increase being close to or equal to that of men (in relative terms) in every sector of the population. For example, between 1999 and 2019 the average hourly wage of Arab men rose by 103% while that of Arab women rose by 100%, in contrast to 83% among non-Haredi men and 90% among non-Haredi women and 65% among Haredi women and 57% among Haredi men (Figure 7). It is worth mentioning that this impressive increase in wages was accompanied by somewhat of a narrowing in the hourly wage gap between Jewish and Arab women (the hourly wage gap between Jewish non-Haredi women and Haredi women was never large or consistent); however, the monthly wage gap in fact widened (Appendix Figure 1). The wage gaps grew between non-Haredi Jewish men on the one hand and Arab and Haredi men on the other.

Figure 8. Rates of employment among the 20–24 age group, by gender and sector

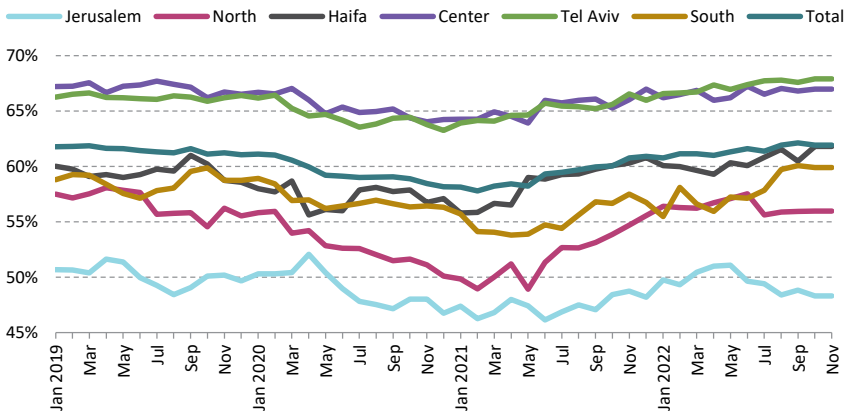


Source: Michael Debowy, Gil Epstein, and Avi Weiss | Data: CBS

The effect of the pandemic and the recovery was even more evident in employment among the young. Figure 8 presents the rate of employment among men and women in the 20–24 age group by sector and gender. It can be seen that employment in this age group, which tends to be several percentage points lower than among older adults, suffered most from the

pandemic. This is a reasonable finding given the demographic profile of workers in the industries most disrupted by the pandemic. Among young Arab men and women, for example, the rate of employment dropped by 24% and 27%, respectively, between the first quarter of 2019 and the last quarter of 2020, in contrast to declines of 12% and 3% among Arab men and Arab women, respectively, in the 25–64 age group. Nonetheless, even among this population there was a significant recovery during 2021–2022. Since the spring of 2022 the employment of young Jewish men and women has been at its pre-pandemic level and among young Arab men and women it even surpassed its pre-pandemic level. Young Arab women have even returned to their rate of employment at the beginning of 2019, prior to the trend of non-employment among the young in this sector of the population, while young Arab men have approached this level but have not yet fully returned to it.

Figure 9. The rate of employment among the 15+ age group, by region



Source: Michael Debowy, Gil Epstein, and Avi Weiss | Data: CBS

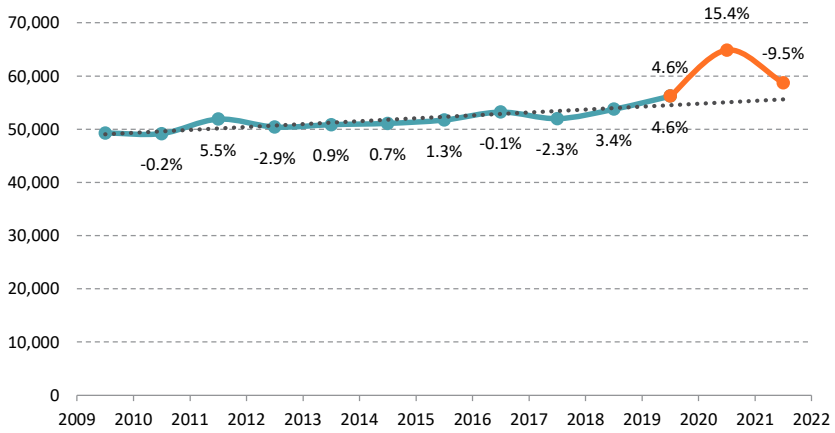
The recovery of employment since mid-2021 has been consistent also by region. Figure 9 presents the rate of employment among the 15 and over age group by region. In all regions, there was a return to the average rate of employment in 2019 by the beginning of 2022. In the regions of Jerusalem, the South and the North, in which there were declines of 10% or more in rates of employment during the pandemic, employment has recovered to the

greatest extent. However, employment in those regions remains lower than in the Center and Tel Aviv regions, as it was prior to the crisis.

Higher education

The pandemic and the lockdowns led to a sharp increase in new students during the 2020/2021 academic year, primarily among the age groups whose employment and leisure possibilities were particularly limited by the pandemic, such as younger individuals were unable to travel abroad or work in various service sectors. An important question in this context is what percentage of those new students had intended to study in any case and simply started earlier and what percentage would not have acquired an academic education if not for the pandemic and the unique circumstances it created. The larger the former group, the greater will be the expected decline in the number of new students in the years following the pandemic, since individuals who intended to study in any case will have already entered the system. In the 2021/2022 academic year, the number of new undergraduate students dropped by 9.5% compared to 2020/2021. Though a significant decline, it is modest relative to the increase in 2020/2021 (Figure 10), so the number of new students in this year was still above the expectations given the long-term trends. It seems likely, therefore, that many of the new students in 2020/2021 would not have acquired a higher education had it not been for the pandemic and they entered the system only because of the restrictions imposed in response to the pandemic. It would be interesting to more closely examine this one-time shock and its implications for the individuals involved and for the economy as a whole in coming years.

Figure 10. Number of new undergraduate students and the rate of change



Notes: The height of the line represents the number of undergraduate students in Israel and the number above or under it is the rate of increase (in percent) relative to the previous academic year. The straight dotted line represents the long-term trend and is based on the period from the 2009/2010 academic year to the 2019/2020 academic year alone.
Source: Michael Debowy, Gil Epstein, and Avi Weiss | Data: CBS

The number of degrees awarded continued to grow, particularly bachelor's and master's degrees. Table 3 presents the number of degree recipients in Israel during the past three decades. During the 1990s and the 2000s, there was a significant increase, thanks to, among other things, the *college revolution*. During the past decade, the rate of growth has slowed, though there remains an upward trend in the number of degree recipients for each type of degree. From 1999/2000 until 2020/2021, the number of bachelor's degree recipients grew by about 21%, the number of master's degree recipients grew by about 68%, and the number of doctoral degree recipients grew by 7%. However, it should be recalled that the population also grew by approximately 50% during this period.

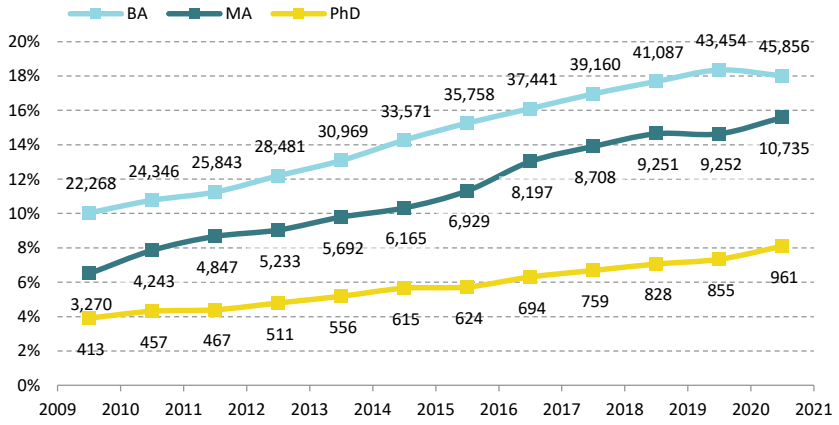
Table 3. Number of degree recipients

Academic year	BA	MA	PhD
1989/1990	11,528	2,790	450
1999/2000	29,322	7,528	800
2009/2010	42,934	15,649	1,534
2019/2020	50,395	24,022	1,811
2020/2021	52,157	26,289	1,640

Source: Michael Debowy, Gil Epstein, and Avi Weiss | Data: CBS, 2022

The expansion of higher education was even more evident in the growing proportions of Arab students. Figure 11 presents the proportion of Arab students studying for the various degrees (and their absolute number) during the past decade. From 2009/2010 until 2020/2021, the number of Arab undergraduate students more than doubled and their proportion from all undergraduate students grew from 10% to 18%, a few percentage points less the share of the Arab sector within the total population. The share of students studying toward advanced degrees grew even more (relatively): the proportion of Arab graduate students among all graduate students rose during the decade from less than 7% to about 16% and the share of Arab doctoral students doubled from 4% to 8%.

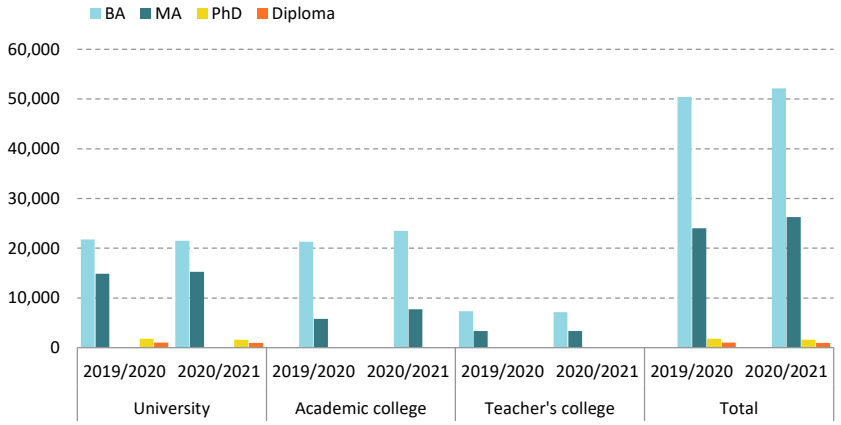
Figure 11. The proportion of Arab students in higher education, by type of degree



Source: Michael Debowy, Gil Epstein, and Avi Weiss | Data: The Council for Higher Education

An interesting picture is revealed if we focus on the institutions granting these degrees, especially recently. Figure 12 presents the number of degrees awarded during the 2019/2020 and 2020/2021 academic years. The largest increase occurred among the academic colleges, which, for the first time, awarded more bachelor's degrees than the universities in 2020/2021. In that year, the academic colleges awarded almost 2,000 more master's degrees than in 2019/2020, an increase of more than 33%. While in 2019, the academic colleges awarded less than 40% of the number of master's degrees awarded by the universities, in 2020 they awarded more than 50%.

Figure 12. Number of degree recipients in the 2019/2020 and 2020/2021 academic years, by degree



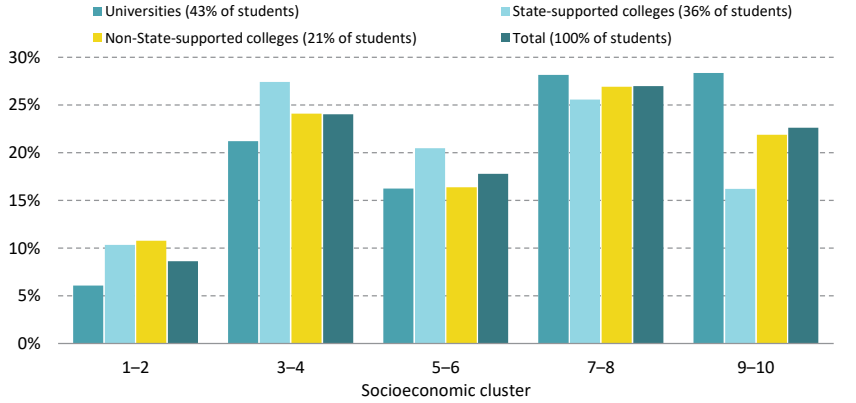
Note: PhD's and academic certificates (such as a certificate in teaching, translation, musicology, or editing, which are contingent on completion of undergraduate studies) were awarded only by the universities, not including the Open University.
Source: Michael Debowy, Gil Epstein, and Avi Weiss | Data: CBS, 2022

The spectacular growth in the number of master's degree recipients is also in line with the long-term growth mentioned above (68% in 21 years). Figure 12 shows that this trend is maintained also in the short term and that only master's degrees were awarded in larger numbers by universities in 2020/2021 than in 2019/2020. It is worth mentioning that a master's degree involves the shortest period of studies, usually two years and sometimes even one, and therefore it may be that among those who earned a master's degree in 2020/2021 were

those who started their studies in that year as part of the surge in registration as a result of the pandemic and lockdowns.

The lead taken by colleges in awarding degrees is particularly encouraging when one considers the population of students that they serve. In the past five years of growth in the activity of the colleges the number of students from cities with a low socioeconomic ranking (1–4) grew by about 14,000. This represents a majority of the increase in undergraduate students, which stood at about 21,000 (Council for Higher Education, 2022). Figure 13 presents the breakdown of undergraduate students during the 2020/2021 academic year by socioeconomic status and type of institution. The colleges, and in particular the budgeted colleges, recorded a higher proportion of students from the lower half of the distribution. Furthermore, the proportion of students from cities with a socioeconomic ranking of 1–4 in the budgeted colleges stood at 35%, which is similar to the proportion of the total population living in those cities. On the other hand, the proportion of students with a high socioeconomic status (ranking of 7–10) in the universities is larger than in the colleges. However, it is worth mentioning that the differences between the colleges and the universities in the proportion of students from the various socioeconomic strata are usually not more than a few percentage points.

Figure 13. The distribution of undergraduate students in the institutions of higher education by socioeconomic status, 2020/2021 academic year



Note: The data do not include the Open University and the teachers' colleges, which are not budgeted by the Planning and Budgeting Committee. The percentage of students in each institution (appearing in the legend) includes students without a socioeconomic ranking (the percentages represented by the columns are in relation to total students with a socioeconomic ranking who account for about 90% of the students in all the types of institutions).
Source: Michael Debowy, Gil Epstein, and Avi Weiss | Data: The Council for Higher Education

Vocational training

Despite the surge in demand for assistance by the unemployed in placement and vocational training during the pandemic and the lockdowns, the Employment Service found it difficult to provide the assistance and tools in real time due to the social distancing restrictions. The number of participants in vocational training and skill-building programs run by the Employment Service in 2020 was 35% less than in 2019.

On the other hand, during the recovery from the pandemic in 2021, the number of participants grew in almost all of the Employment Service programs relative to 2019 (Table 4). There was a sharp increase of 91% (about 50,000 additional participants) in guidance, workshops and infrastructure programs relative to 2019. The largest increases were in the IAM diagnostic programs and in employment counseling (69% and 50%, respectively) and they were described by the Employment Service as a *paradigmatic change* (Israeli Employment Service, 2022). There was also a significant increase (32% or about 6,200 additional participants) in vocational training programs and skill-building programs (whose activity contracted in 2020) relative to 2019. Within this group of programs, there was a particularly large increase in use of vouchers for vocational training with employers (86%) and in the number of participants in vocational Hebrew courses (68%) and *The Right Training* program (61%), alongside a high level of interest in new programs, such as vocational English.

It appears, therefore, that during 2021 the placement and vocational training programs returned to their previous level of activity and new programs that are suited to the challenges of the current labor market were opened. The impressive growth in the number of participants in the various programs is evidence that Israelis are taking advantage of the options to improve their human capital also when the labor market is in a period of recovery. It is possible that these programs contributed to the increase in employment and in wages during 2021 and 2022.

Table 4. Rate of change in number of participants in Employment Service vocational training programs between 2019 and 2021

Program/year	2019	2020	2021	Change 2019/2021
Employment Plus (rehabilitation)	712	0	450	-58%
Employment training in the department			437	
Career Incubator 40+	7,158	3,591	7,147	-0.2%
Employment Circles	15,881	32,312	27,427	42%
Employment consultation	25,400	53	50,453	50%
IAM - Diagnotic tool	5,933	4,914	19,368	69%
Total: aid, consultation, workshops, programs	55,084	40,870	105,282	48%
Joint programs with outside agencies			2,163	
Personalized training	55	9	142	61%
Hebrew for on-the-job	516	197	1,600	68%
UP- joint initiative		2,000	2,394	
English for on-the-job			2,397	
Vouchers to employers	419	0	2,981	86%
Professional training vouchers	2,540	2,597	3,055	17%
Courses in professional training division	3,680	2,418	4,443	17%
Other programs	5,737	1,249		
Total: professional training and programs for skills strengthening	12,947	8,470	19,175	32%
Grand total	68,031	49,340	124,457	45%

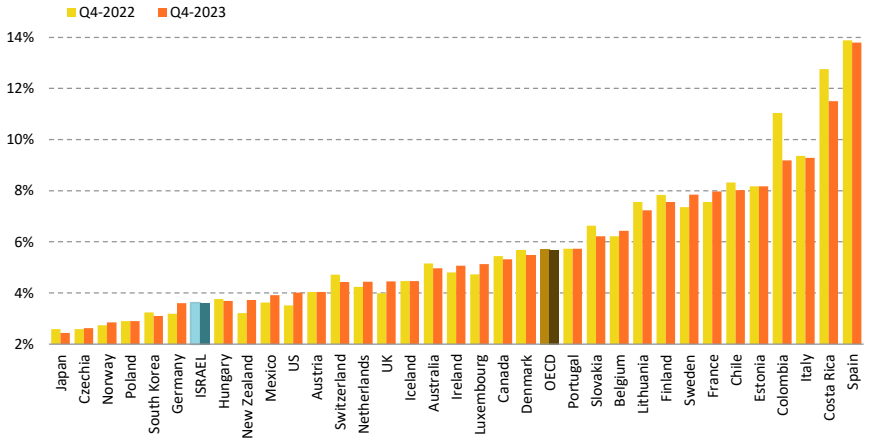
Source: Michael Debowy, Gil Epstein, and Avi Weiss | Data: Employment Service

Forecasts

In 2019, the rate of unemployment in Israel stood at about 3.8%. In April 2020, it reached a peak of 36% according to its broad definition, and in August 2021 it reached a peak of 5.5% according to its traditional definition. By July 2022, a decline had begun in unemployment according to both definitions: the broad rate of unemployment dropped to 4.6% while according to its traditional definition it dropped to 3.4%. In view of these figures, two important questions arise: the first is whether the economy has recovered from the pandemic and has reached full employment and the second and more important question is whether the labor market will tighten even further in the future or will the rate of unemployment perhaps rise again.

Various organizations in Israel and worldwide have issued forecasts for the economy as a whole and for the labor market in particular. According to the Bank of Israel forecast released in October 2022, the rate of unemployment in the 25–64 age group is expected to be about 3.1% on average in 2022 and about 3.5% in 2023 (Bank of Israel, 2022). A similar though somewhat less optimistic forecast was made by the OECD (Figure 12): 3.6% at the end of 2022 and also at the end of 2023. This is in contrast to the OECD's forecast one year earlier, which expected the rate of unemployment at the end of 2022 to be higher than in 2019 by about 1 percentage point and that the Israeli economy would not return to full employment before 2025.

Figure 14. The forecasted rate of unemployment in the OECD countries during the fourth quarters of 2022 and 2023



Source: Michael Debowy, Gil Epstein and Avi Weiss | Data: OECD

Although the OECD forecast is somewhat less optimistic than those of the Bank of Israel, they are both positive about the Israeli economy relative to other countries. Figure 14 compares the OECD forecasts for various countries. The forecasted rate of unemployment in Israel is about two-thirds of the average forecast for the OECD countries, and only in a few countries is there expected to be a lower rate of unemployment. The previous OECD forecasts, which, as mentioned, were less optimistic, rested on, among other things, the assumption that it would be very difficult to again achieve the historical

low of 3.8% recorded in 2019. However, the data show that Israel has indeed achieved that low and even dipped below it at the beginning of the summer of 2022 (with the reservation that since then the rate has risen somewhat and we need to wait and see at which level it will stabilize).

Conclusion

The pace of recovery in Israel's labor market in 2022 exceeded most forecasts and the rate of jobseekers fell to below its historic low achieved in 2019. The return to the 2019 level of employment was recorded in all regions already at the beginning of 2022 and the increase in the rates of employment is visible among all sectors of the population. Among Jewish non-Haredi men of all ages there was a full recovery in employment and a return to pre-pandemic levels. There was an impressive recovery also among Arab men of all ages. Among Haredi men, the rate of employment remained low. Among women in all sectors of the population not only did employment return to its pre-pandemic level but there were new records for employment achieved in all of them: 85% among non-Haredi Jewish women, 83% among Haredi women and 43% among Arab women. The impressive recovery in rates of employment and the supply of jobs was accompanied by an aggregate increase in average wages, which is about 7% above that in 2019 in real terms.

The recovery was not uniform in all parts of the economy, and in particular it varied by industry. The majority of jobs added in the economy since 2019 were in the health, welfare, and nursing care industries (about 59% of the added jobs in the economy), and in high tech (32%), alongside not insignificant additions in education (10%) and construction (9%). The largest increases in jobs relative to the past were also in the high tech and health industries (26% and 19%, respectively). A more modest increase, though important in its own right, was recorded in construction (9%) and real estate (8%). Wage changes were not uniform across industries, and in particular not in industries where employment has expanded significantly. Thus, for example, the average monthly wage in high tech rose by about 18% and in construction by about 11%, while in education it rose by only 4%,[4] and in the health and

4 The wages of workers in education are, for the most part, determined by collective bargaining agreements with the teachers, and therefore wages remained fixed until the signing of a new wage agreement between the State and the Teachers Union in the autumn of 2022. The new framework, which includes significant wage increases (primarily for new teachers), will go into effect in January 2023 and will include retroactive compensation for September–December 2022.

welfare industry it dropped by about 9%. Wages rose by a surprising extent in traditional manufacturing and in agriculture (9%) and in the knowledge-intensive industries, such as finance and insurance (9%), real estate (8%), and professional, scientific and technical services (13% without high tech). It can be assumed that these recent wage increases are related indirectly to the high tech industry, which competes with other industries for workers and forces them to increase the wages they pay. This effect goes beyond high tech's direct contribution to the growth in wages in the relevant years — about one-third of the total growth (as mentioned, outside of the high tech industries wages rose by only 4%, as opposed to 7% in all industries including high tech).

If the continuing wage increases in high tech indeed represent an increase in the labor productivity of high tech workers, then this is a welcome phenomenon, since competition over workers with other industries will force businesses in those industries to improve efficiency and the productivity of their workers. In contrast, if the wage increase in high tech is partly the result of distortions in the capital market and investments in start-up companies, or if they represent a high tech bubble, then the transition to a sustainable equilibrium will be accompanied by wage decreases and even a contraction in employment in all of the industries affected by high tech, to the detriment of workers.[5] The consistency of the wage increases in high tech over the years makes it possible to adopt some degree of optimism and to cautiously assume that they are to a large extent the result of increases in labor productivity.

In parallel with the expansion of employment and the increase in wages, there was an increase in the number of academic degrees awarded last year, particularly master's degrees, and in the number of degrees awarded by academic colleges. The sharp increase in the number of master's degrees awarded is particularly interesting given the return on advanced degrees in recent years (Debowy et al., 2021b). It appears that many in the labor market have internalized the fact that this is a highly accessible way to improve earning power. On the other hand, since this is an academic degree that requires a relatively short period of studies, it may be that we are observing the first

5 When wages reach a non-sustainable level and employers must lower wages in order to survive, they sometimes choose instead to reduce their scope of activity and lay off workers in order to maintain the level of wages among the remaining workers. The rationale is that morale will be damaged by a cut in wages and will lead to a decline in the output of the workers, such that it would be preferable to fire them. This theory, which is well-known in economics, is known as *downward nominal wage rigidity* (Tobin, 1972).

graduates of the *class of corona*. In other words, it is a direct result of the surge in the number of students enrolled for a bachelor's or master's degree program with the onset of the pandemic. One way or another, the large increase in the number of workers with a master's degree is a good sign, and the fact that the academic colleges are primarily responsible for the increase is evidence that they are fulfilling their function, namely to provide an academic education to anyone who wants one.

In conclusion, the labor market has recovered surprisingly well from the pandemic. This was manifested in the expansion of employment and a rise in wages to beyond their pre-pandemic level. This aggregate recovery involved a high degree of variation in employment and wage trends across the various industries. However, the expansion of employment cuts across regions and sectors of the population, and the accumulation of human capital in the workforce through the acquisition of an academic education is grounds for an optimistic view of the future, as seen in the forecasts of the Bank of Israel and the OECD. In the short term, it can be assumed that the labor market will continue to move forward. However, in order to ensure long-term growth, investment must continue in higher education and vocational training, in infrastructure, in macroeconomic total factor productivity, and in high-quality employment opportunities for Israeli workers.

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Appendix

Appendix Table 1. Results of Granger test (1969)

Dependent variable		Average industry wage in month t			Change in average industry wage between month t-1 and month t		
Number in arrears		3	6	9	3	6	9
Statistical test for the *influence* of wages in the high tech sector on wages in the overall economy without high tech		0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
Statistical test for the *influence* without high tech on wages in the high tech sector		0.330	0.002***	0.000***	0.307	0.020**	0.000***
Information criterion of the model	AIC	2.51	2.20	**1.66**	2.64	2.17	**1.83**
	SBIC	3.05	3.03	**2.78**	3.19	3.01	**2.96**
Number of observations		124	121	118	123	120	117

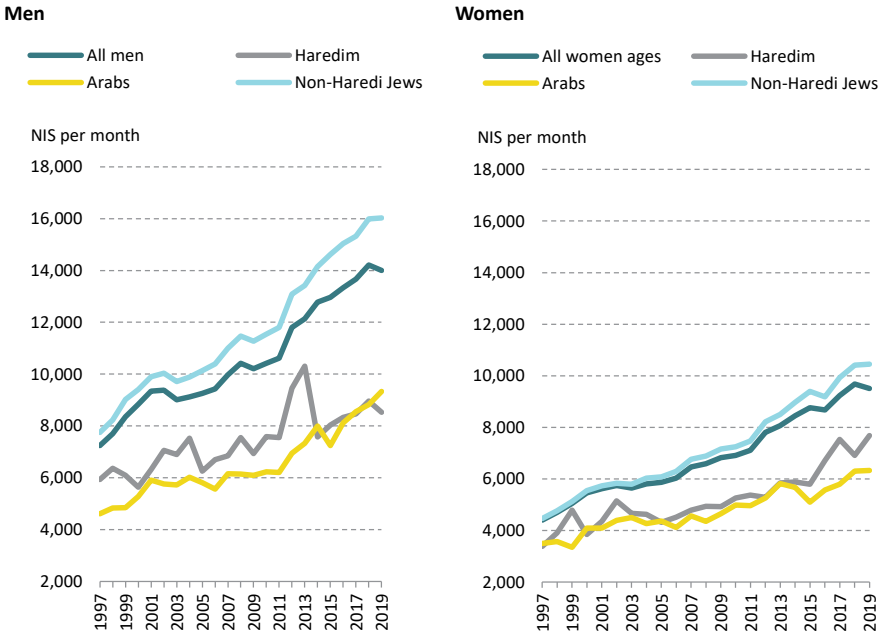
Note: The table presents p-values for a Granger test to examine the *impact* of wages of the average employee in a given sector on wages in another sector, based on monthly data from January 2012 until September 2022. The tests are based on the VAR model with a series of average wages in high tech and a series of average wages in the overall economy, with trends, seasonality, and dummy variables for lockdowns in 2021–2020. Information criterion of Akaike and Schwarz are also presented for each model, alongside the p-value of the Granger test for each direction of *influence*.
Source: Michael Debowy, Gil Epstein, and Avi Weiss, Taub Center |Data: CBS

Appendix Table 2. Results of Augmented Dicky-Fuller test for stationarity

Industry branch	Augmented Dicky-Fuller	p-value
Economy without high tech	-8.068	0.0000***
High tech	-6.539	0.0000***

Note: The table presents the results of an Augmented Dicky-Fuller test to examine stationarity in the wages series used in Appendix Table 1a. All of the tests were included in the trend.
Source: Michael Debowy, Gil Epstein, and Avi Weiss, Taub Center | Data: CBS

Appendix Figure 1. Average monthly salary for workers ages 25–64, by sector



Source: Michael Debowy, Gil Epstein, and Avi Weiss, Taub Center | Data: CBS

Executive Summary

Working From Home in Israel

Noam Zontag, Shavit Madhala, and Benjamin Bental

The option of working from home made it possible for workers in many countries to maintain economic activity during the COVID-19 pandemic, and it has become an integral part of our employment landscape. In this study, Taub Center researchers examine this form of employment among salaried workers and try to understand who worked from home during the pandemic and their characteristics. The study is based on the Central Bureau of Statistics (CBS) *Labor Force Survey*, which since September 2020 has included data on hours worked from home. The main conclusion of the study is that this type of employment is common primarily among stronger segments of the population, that is, primarily, workers with an academic education and those in high-earning economic sectors of the labor market.

The study focused on the period from September 2020 until November 2021, which includes the second and third lockdowns and the military operation *Guardian of the Walls*. The descriptive part of the study focused on salaried workers who work a significant number of hours (20 hours or more during the sampled week). The data show that, in general, the rates of working from home were significantly higher during the lockdowns (about 25% during the second lockdown and 23% during the third) than during the period between the lockdowns (13%–15%) or during the period following the third lockdown (6%–7%). From the perspective of gender, it was found that the rate of working from home during the second lockdown was higher on average

* Noam Zontag is a researcher in the Research Department of the Bank of Israel. At the time of writing, he was a researcher at the Taub Center for Social Policy Studies in Israel. Shavit Madhala, researcher, Taub Center. Prof. Benjamin Bental, Principal Researcher and Chair, Taub Center Economic Policy Program. The full study was published in September 2022 and can be found on the Taub Center website.

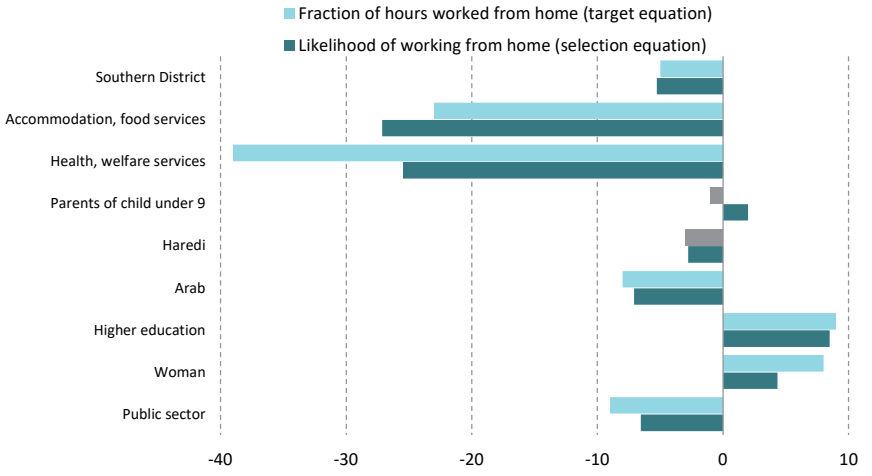
among women than among men (31% vs 20%); however, during the periods without a lockdown, the rates were similar. Furthermore, parents of young children (up to the age of 9) worked from home at higher rates than other men or women, and mothers of young children worked from home more than fathers of young children. Lower rates of working from home were observed in the Haredi (ultra-Orthodox Jewish) and Arab sectors relative to the general population. Furthermore, the rates of working from home were usually higher among Arab and Haredi women than among their male counterparts, as was the case in the general population.

The study also found that workers with higher education worked from home at higher rates than those with less education. Thus, at the peak of the second lockdown, about 39% of the working hours of workers with an academic education were from home as compared to about 17% of those with only a Bagrut (matriculation) certificate and about 5% of those without even a Bagrut certificate. Furthermore, variation was observed across economic sectors, for example, workers in information and communication had a higher rate of working from home than workers in other economic sectors, during both the lockdowns and the periods without a lockdown.

The research looked at the characteristics that determine the likelihood of a worker working from home as well as the fraction of work hours worked from home, while controlling for various sociodemographic variables. Most of the findings are in line with those of studies carried out in other countries. It was found that the likelihood of working from home was higher among workers with higher education, and in particular, it was 8 percentage points higher among workers with an academic education than among workers with lower education levels. Among workers who worked from home, it was found that the fraction of work hours worked from home was 9 percentage points higher among workers with an academic education than among workers without a Bagrut certificate and 6 percentage points higher than among workers with a Bagrut certificate. In a breakdown by population group, it was found that the likelihood of Haredim and Arabs working from home was significantly lower than for non-Haredi Jews by 3 and 7 percentage points respectively. Among workers working from home, the share of work hours worked from home among Arab workers was 8 percentage points lower than among non-Haredi Jews, while the gap between the Haredi sector and the non-Haredi sector was not statistically significant. Another interesting finding is related to gender and parents of young children. The research found that the likelihood

of working from home among women is 4 percentage points higher than among men, and that the fraction of work hours worked from home among women working from home is also greater than among men; however, the effect of gender diminishes in the case of workers with a Bagrut certificate or an academic education. Furthermore, among parents with children up to the age of 9, the likelihood of working from home is 2 percentage points higher and the likelihood increases by an additional percentage point for a mother of young children under 9. Nonetheless, among workers working from home it was found that the share of work hours worked from home is not related to parenthood. With respect to economic sector, it was found that the likelihood of working from home among workers in the information and communication sector is higher than among workers in other sectors, and this was also the case with respect to the share of work hours worked from home among workers who are indeed working from home.

Marginal effects in percentage points of selected variables on the likelihood of working from home and the fraction of hours worked from home



Note: The results present the marginal effect relative to the excluded base group, as described in Appendix Table 1. The grey bars indicate marginal effects that are not statistically significant ($p > 0.05$).
Source: Noam Zontag, Shavit Madhala and Benjamin Bental, Taub Center l Data: CBS

It appears that further research is needed in order for the labor market and workers to fully take advantage of the option of working from home — to understand which workers and which employers are best suited to this type of employment, and what is the correct balance between working from home and working in the work place. Therefore, an organized effort is needed to gather relevant information on labor productivity and satisfaction among workers and employers. This can be done by means of, for example, periodic surveys of workers and employers, controlled experiments, or the use of already existing hybrid models. Monitoring the effectiveness of the transition to working from home in various economic sectors and occupations and the frequent publishing of the results will provide useful information to employers and decision makers.

Executive Summary

Top Decile Wage Earners in Israel

Michael Debowy, Gil S. Epstein, and Avi Weiss

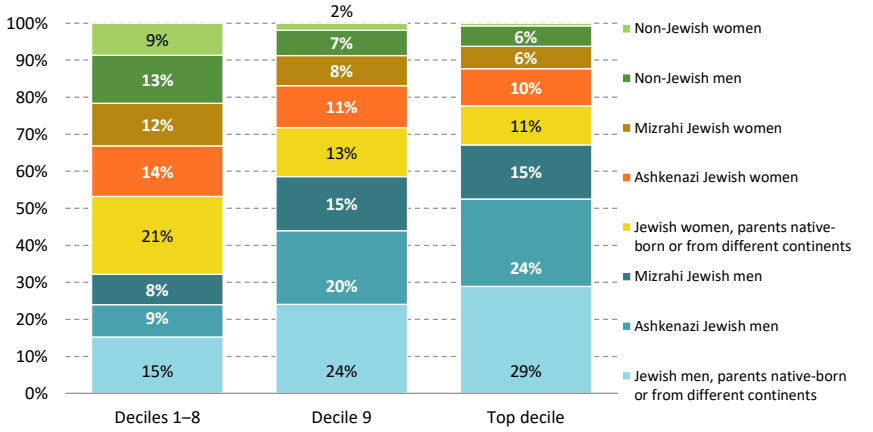
A considerable amount of professional literature has dealt with the issue of income inequality from the perspective of low-wage earners, and it has tended to disregard the other end of the spectrum — the group of workers at the top of the income ladder. A new Taub Center study examines the characteristics of workers in the top wage decile in Israel and what influences their position within this group. This research enabled us to draw several main conclusions. First, the demographic composition of those in this top decile is unlike the population composition in the other deciles. It has a large percentage of men, an even higher percentage of Jews, and a particularly high percentage of Ashkenazim. Second, education reduces gaps between workers of different backgrounds, and the more educated the worker, the greater are their chances of selecting into this top decile. With regard to the wage distribution within the top decile, it was found that as workers rise on the wage scale, education, ethnic background, sector, experience, and additional individual characteristics begin to lose their predictive strength for determining wages, and factors that seem to carry more weight are those of talent and traits that are difficult to quantify.

In order to conduct this research, data from the Central Bureau of Statistics *Household Expenditure Surveys* from 2017 to 2018 were used, including data from some 24,000 workers in the Israel labor force. The representative sample was divided into wage deciles. Workers in the top decile were those who in 2017 earned more than NIS 20,380 gross per month, and in 2018, more than NIS 21,430. Data included information on age, gender, sector, and a variety of additional demographic variables.

* Michael Debowy, Research Assistant, Taub Center for Social Policy Studies in Israel. Prof. Gil S. Epstein, Principal Researcher, Taub Center; Professor of Economics and Dean of the Social Sciences Faculty, Bar-Ilan University. Prof. Avi Weiss, President, Taub Center; Department of Economics, Bar-Ilan University. The full study was published in August 2022 and can be found on the Taub Center website.

The research found that 73% of workers in the top decile are men, although women are about half of the working population. In addition, the gap in numbers between men and women exists in every population group in this decile, and is especially prominent among the non-Jewish population. Regarding wage levels, the average monthly wage of women in the top decile is NIS 32,500 (gross) per month; the average wage for men is NIS 36,300 (gross) per month. This difference is mostly explained by gender differences in the number of monthly hours worked. With regard to demographic composition, the uppermost decile is comprised mainly of Ashkenazi Jews and Jews whose parents were born on different continents, 34% and 40%, respectively, although their shares in the overall sample was smaller (25% and 36% respectively). The share of Mizrahi Jews in the top decile group was 21%, the same as their share in the overall sample, and the share of non-Jews was only about 6% (18% of the overall sample). About 42% of the workers in the top decile are between the ages of 40 and 60 — a factor that indicates that it takes time to reach this level of income. The self-employed — two-thirds of whom are men — are about 15% of the top decile (12% of the labor force in Israel), and their average wage is much higher than that of employees. Furthermore, a greater share of non-Jews are self-employed in the top two deciles than in the rest of the population — 27% in the top decile and 19% in the 9th decile.

Breakdown of income groups by ethnic group, origin, and gender



Source: Michael Debowy, Gil Epstein, and Avi Weiss, Taub Center | Data: CBS

What are the factors that influence the likelihood of selecting into the top wage decile and what impacts the position within this group? First, education, and higher education in particular, correlates with a high probability of locating in the top decile, and each further academic degree increases the likelihood of selecting into this group. Experience is also a determining factor, although its influence is not uniform across education groups. For example, the probability of someone with a bachelor's degree selecting into the top deciles increases by 1% upon completion of the degree and reaches a peak of 13% after 28 years of experience, while high school graduates with a Bagrut (matriculation) certificate reach a peak of only 2% after 32 years. In addition, the over-representation of Ashkenazi Jews in the top decile is explained by their average higher level of educational attainment. Nevertheless, controlling for the impact of education, the likelihood of selecting into the top decile is no greater than for other Jews. With regard to a worker's position *within* the top decile, it was found that education, ethnic background, sector, and even experience have little influence on wage levels.

MACROECONOMIC TRENDS

6

Macroeconomic Trends: An Overview

Benjamin Bental and Labib Shami

The following survey provides a broad picture of Israel's economy and its trends during the past year, with a focus on seven main topics: processes of growth since the onset of the pandemic; the connection between these processes and the situation in the labor market; government activity and its effect on Israel's national debt; Israel's low labor productivity relative to countries with similar economic profiles; the low level of private and public capital, again relative to countries with similar economic profiles; the exceptional achievements of the high tech industry which highlight the problem of labor productivity in other industries; and finally the changes that have occurred in prices and their impact on households and the cost of living.

The national accounts

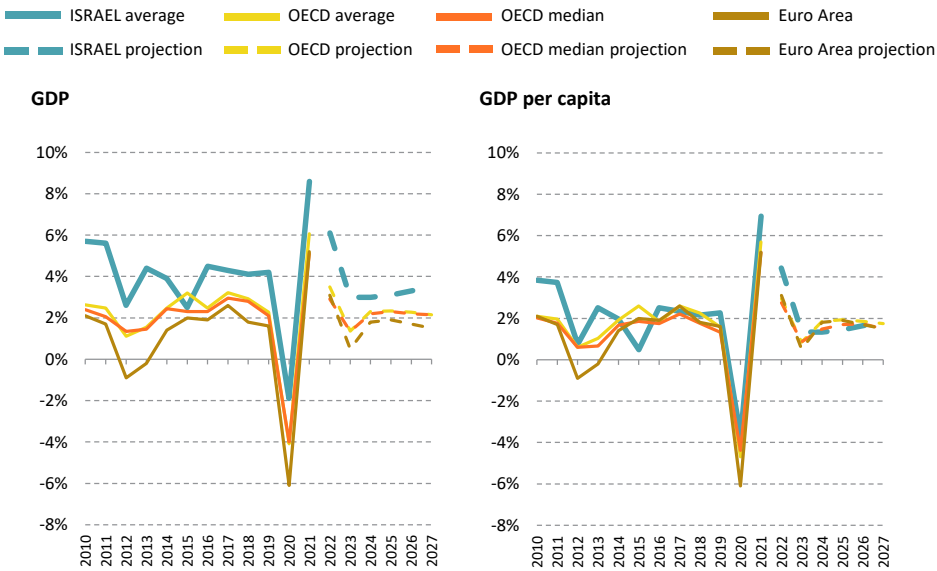
Since the onset of the pandemic, the course of events in the Israeli economy, as in other economies, has resembled a roller coaster ride. What is surprising is that like a roller coaster ride, at the end it appears that the economic systems have to a large extent returned to their original point of departure, though with some adjustments. The figures that follow illustrate this.

Figure 1 presents the annual GDP growth rate (left panel) and the annual GDP per capita growth rate (right panel) in Israel, the OECD countries, and the Euro Area. The left panel shows that there was less of an impact on Israel in 2020 and that Israel grew faster in 2021 than the OECD countries and the Euro Area countries. Furthermore, it appears that the war in Ukraine is having less of an impact on Israel than on other countries, particularly members of the Euro Area. However, according to the IMF forecasts for coming years, the rate of growth will return approximately to the pre-crisis level.

* Prof. Benjamin Bental, Principal Researcher and Chair, Economics Policy Program, Taub Center for Social Policy Studies in Israel; Professor Emeritus, Haifa University. Dr. Labib Shami, Senior Researcher, Taub Center; Department of Economics, Western Galilee Academic College; Department of Economics, Haifa University.

The right panel, which adjusts for the rate of population growth, shows even more clearly the similarity between Israel's rate of growth and those of the reference countries prior to the pandemic and according to expectations for the coming years. Following the growth in 2021, in both Israel and the reference countries, GDP per capita returned to roughly its 2019 level.

Figure 1. Annual growth in GDP and GDP per capita in Israel,the OECD, and the Euro Area



Source: Benjamin Bental and Labib Shami, Taub Center | Data: IMF

Figure 2 depicts the trends of the GDP components from the first quarter of 2020 until the third quarter of 2022 relative to the parallel quarter in 2019. Specifically, the graph presents the annualized seasonally adjusted growth rates of the variables (in constant prices) for each quarter relative to the same quarter in 2019, as implied by the levels of the respective variables in a given quarter relative to their level in the same quarter in 2019.[1] The calculation of the annualized growth rates makes it possible to determine the extent

1 The annualized growth rate is obtained as the solution for g in the equation $(1+g)^t X_0 = X_t$, where X_0 is the value of the variable in the base year (2019) while X_t is its value after t years.

to which the economy returned to its long-run growth path by 2022 — as if the pandemic had never occurred. For example, the actual GDP level of the third quarter of 2022 would have been achieved had the third-quarter GDP been growing at an annual rate of 4.3% in both 2020 and 2021 relative to the previous year. In reality, GDP declined by 0.9% in the third quarter of 2020 relative to the same period in 2019; in the third quarter of 2021, it grew by 8.2% relative to the same period in 2020; and in the third quarter of 2022, it grew by 5.8% relative to the same period in 2021.[2]

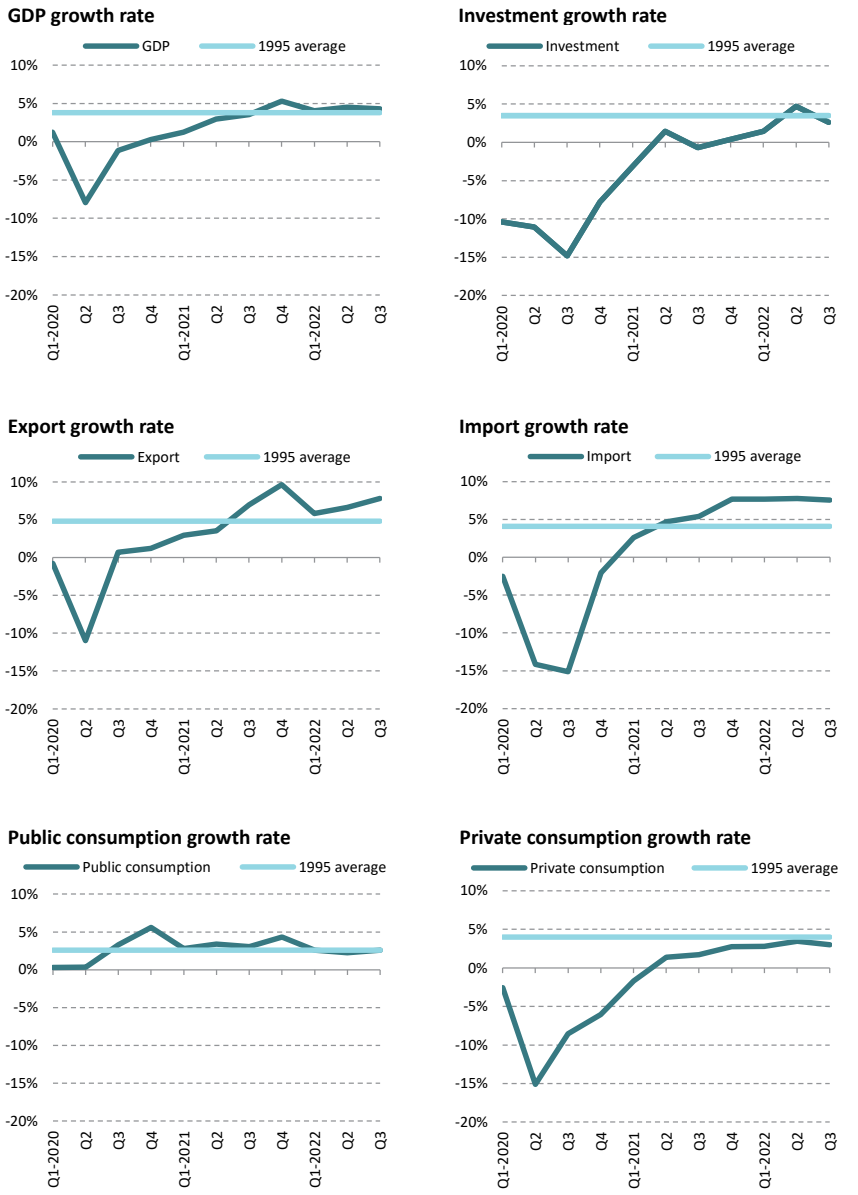
Figure 2 also presents the annualized growth rate of the variables between 1995 and 2019. It appears that, at least in the first half of 2022, the GDP growth rate (and correspondingly also GDP per capita) stabilized at an annual rate that is about 0.5 percentage points higher than the average long-run rate. This finding is in line with the forecast of the IMF for 2022 which is presented in Figure 1.[3] The growth rates of imports and exports also stabilized at values higher than the long-run average and it appears that the investment growth rate is close to its long-run average, where the outlier in the second quarter of 2022 was the result of an unusually large investment in vehicles. It seems that the public consumption growth rate has stabilized at a long-term rate of 2.6%, somewhat lower than the long-run average.[4] Finally, and despite the significant increase in 2021, the private consumption growth rate — on an annualized basis — is about 1 percentage point lower than its long-run rate, which is 4.0% per year. Accordingly, private consumption so far in 2022 accounts for about 51% of GDP, in contrast to 53.2% in 2019.

2 The war in Ukraine had only a minor direct effect on the Israeli economy. In 2021, exports to Ukraine and to Russia constituted 0.4% and 1.5% respectively of Israel's total exports (without diamonds). With respect to imports, the figures are 0.2% and 0.3%, respectively.

3 As of the beginning of 2020, GDP has cumulatively been about 2% lower than the level it would have achieved if the rate of growth had remained at its original level. Discounting at a rate of 3% reduces the loss to only about 1.5%.

4 This rate is consistent with the long-run decline in the share of public consumption within GDP from 29.4% in 1995 to 21.9% in 2019.

Figure 2. Annual growth rates of the GDP components since 2019



Source: Benjamin Bental and Labib Shami, Taub Center | Data: CBS

Changes in National Accounting

The Central Bureau of Statistic (CBS) has recently modified Israel's National Accounts system in line with globally accepted standards. The main change is in relation to goods that can be used by the defense sector for more than one year. These are now recorded as *investment in fixed assets* rather than *public consumption*. Clearly, this change increases the investment in the economy and reduces public consumption by the same amount. However, the depreciation of investments in the defense sector are now considered to be *public consumption* and that accordingly increases this item in the National Accounts. Furthermore, there was a change in the valuation of the contribution of the construction renovations sector and it too has led to an increase in the *investment in fixed assets* item. On the other hand, there was also a change in the imputation of housing services consumed by homeowners, which reduced this item and in turn private consumption.

Overall, these modifications tend to raise the measured values of GDP by an average of about half a percent on an annual basis and they also tend to somewhat raise the GDP growth rates (CBS, 2022a).

Economics of the Environment and the National Economy

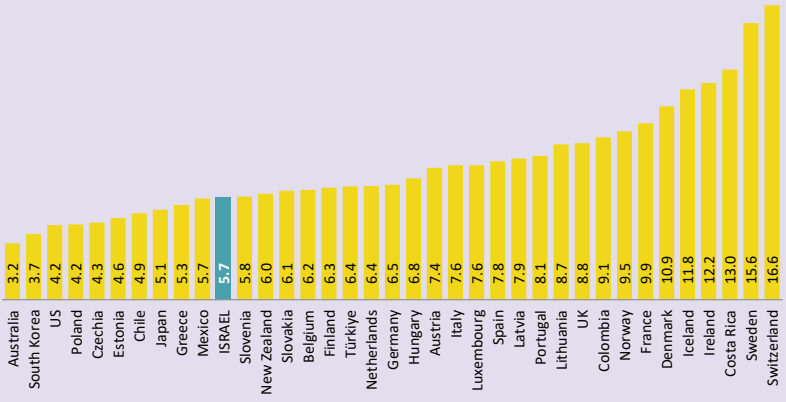
The OECD provides indicators for monitoring the progress toward green growth with the goal of encouraging policies to preserve the environment.[5] These indicators include indices for environmental productivity and resources, which can be used to determine whether economic growth has become greener, including more efficient usage of natural capital, and thus it relates to factors of production which are not usually included in economic models and accounting systems. Figure 3 presents one of the main indices which calculates *energetic productivity* as real GDP created per unit of carbon dioxide emitted during its production (dollars per kilogram). The calculation includes emissions from the burning of coal, oil, natural gas, and other fossil fuels. As shown in the graphs, Israel is among the lower third of OECD countries according to this index.

Air pollution involves an externality that reflects the monetary value of its negative effects on human health and the environment. According to estimates of the Ministry of the Environment, in 2021 this amounted to a cost of NIS 12.5 billion (for further details, see Ministry of the Environment, 2022).

5 See the OECD site: OECD Environment Statistics (database), Green growth indicators.

Figure 3. Productivity in carbon-based production in the OECD measured as GDP per unit of energy-related CO_2 emissions, 2019

2015 prices



Source: Benjamin Bental and Labib Shami, Taub Center | Data: OECD

In response to the climate crisis, international targets were set for lowering emissions, to which Israel is committed. The transition to a zero-emissions economy is liable to erode economic activity in certain industries, due to, for example, regulation and the imposition of taxes on the emission of greenhouse gases. As a result, credit risk in the financial system may increase due to the reduced ability of polluting companies to service debt.

The Bank of Israel has analyzed the extent to which the banking system is exposed to large borrowers with high levels of greenhouse gas emissions (CO_2-equivalent emissions).[6] The analysis indicates that at the end of 2020, the total gross quantity of credit to these borrowers was about NIS 19.1 billion. This represents an increase of about 57% relative to the end of 2019 and about 6% of the total credit to large borrowers in the banking system. This is a high proportion relative to the average for 2018–2019 (3.8%). According to the government decision to impose a tax on emissions in the future,[7] the large polluting borrowers will bear a tax burden of about NIS 7 billion. This tax, which is about 37% of the total credit of the polluting borrowers as of the end of 2020, will create a heavy burden on them and will increase risk in the financial system.

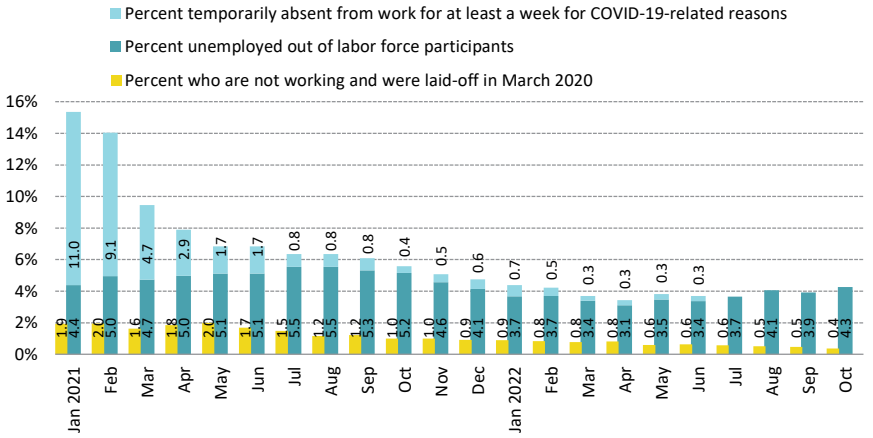
6 The IMF publishes a carbon footprint-adjusted loans to total loans (CFALTL) index which represents the relative amount of loans that involve carbon activity within total loans in each country. While the index is published for almost every country in the world, Israel is absent from the list. See the IMF site, Financial and Risk Indicators.

7 See Government Decision 286 dated August 1, 2021.

The labor market and GDP

The trend in GDP reflects developments in the labor market. Figure 4 shows a steep decline in the proportion of workers absent from work due to circumstances related to COVID-19, beginning in the first half of 2021. At the same time, the *classic* rate of unemployment rose somewhat even into the summer months of 2021. However, since then, it has also been declining and essentially has returned to its rate prior to the pandemic. Only a small number of workers have not returned to the labor market (about 0.6% of the population aged 15 and over in Israel, or about 43,000 individuals).

Figure 4. Main characteristics of the labor market



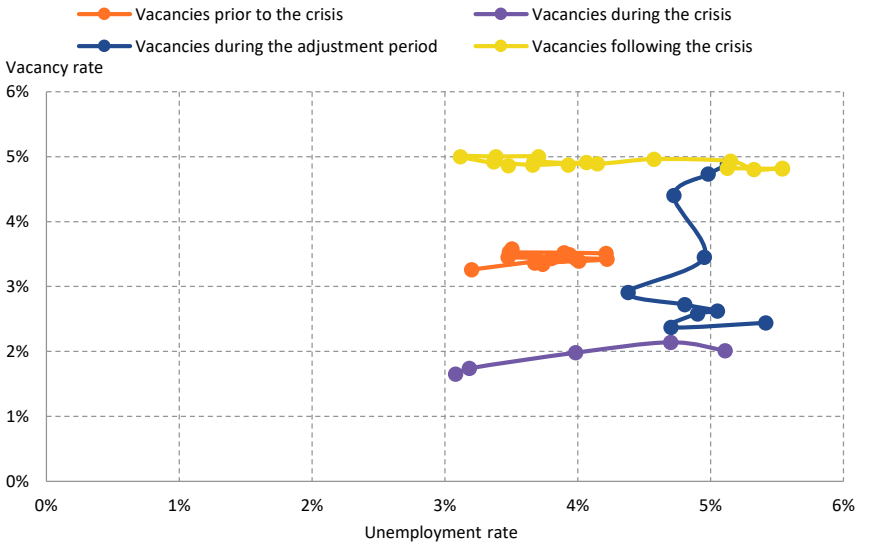
Note: In July 2022, the CBS stopped publishing data on the temporary absence of workers from their jobs for reasons related to the pandemic.
Source: Benjamin Bental and Labib Shami, Taub Center | Data: CBS

The intensity of the recovery in the labor market can also be seen in Figure 5 which presents the Beveridge Curve.[8] The curve represents the relationship between the job vacancy rate within total jobs in the economy and the unemployment rate. Intuitively, it can be hypothesized that when the unemployment rate is low employers have greater difficulty finding workers and filling job vacancies than when the unemployment rate is high. Accordingly, the Beveridge Curve is expected to decline from left to right. However, the situation in Israel paints

8 For the source of the curve's name and a review of the initial studies based on it, see Yashiv (2006).

a different picture. Prior to the pandemic, in 2019, the curve was *flat* — in other words, while the unemployment rate changed from month to month, the job vacancy rate remained fixed (the orange curve, January 2019 to February 2020). The pandemic caused the curve to shift downward — in other words there was a sharp decline in the rate of job vacancies. However, a negative slope did not appear in the initial months of 2020 either (the purple curve, March 2020 to July 2020).[9] As the pandemic progressed, the economy entered a period of adjustment during which there was no major change in the unemployment rate and employers began to search for workers (the blue curve, August 2020 to May 2021). In mid-2021, the situation changed: the unemployment rate began to decline, but the job vacancy rate did not, as could have been expected (the yellow curve, June 2020 to September 2022). In other words, with the drop in unemployment more and more job vacancies were added, so that the job vacancy rate remained much higher relative to its value prior to the pandemic.

Figure 5. The Beveridge Curve

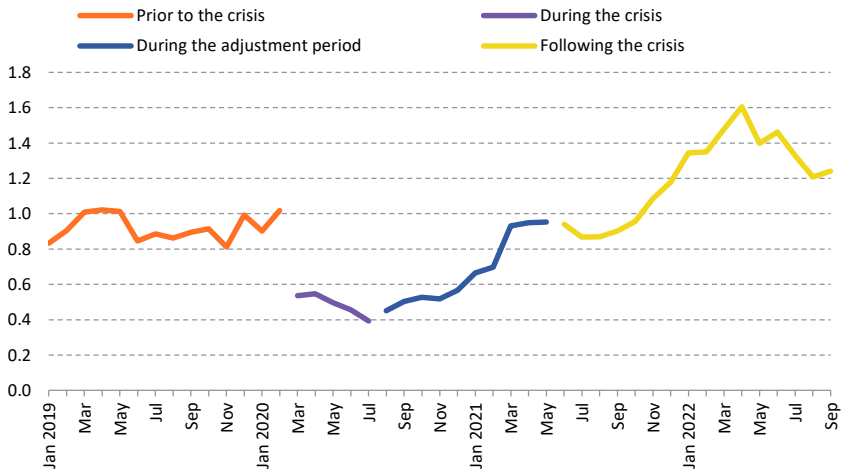


Source: Benjamin Bental and Labib Shami, Taub Center | Data: CBS

9 The unemployment rate on the horizontal axis is the *classic* unemployment rate, based on the assumption that most of the workers on unpaid leave were not looking for work and hoped to return to their former jobs. Their employers did not relate to their jobs as vacant.

The ratio between the vacancy rate and the unemployment rate clearly shows the intensity of the change. As presented in Figure 6, the ratio was close to one prior to the pandemic while in July 2020 it sank to 0.4. Subsequently, the ratio shot up and in the spring of 2022 it reached 1.6. This development is consistent with a very tight labor market but also with a growing mismatch between the types of job vacancies and the skills of the unemployed.[10] In the third quarter of 2022, there was somewhat of a weakening in the labor market, but the ratio between the job vacancy rate and the unemployment rate remained higher than prior to the crisis.

Figure 6. Ratio between the job vacancy rate and the unemployment rate

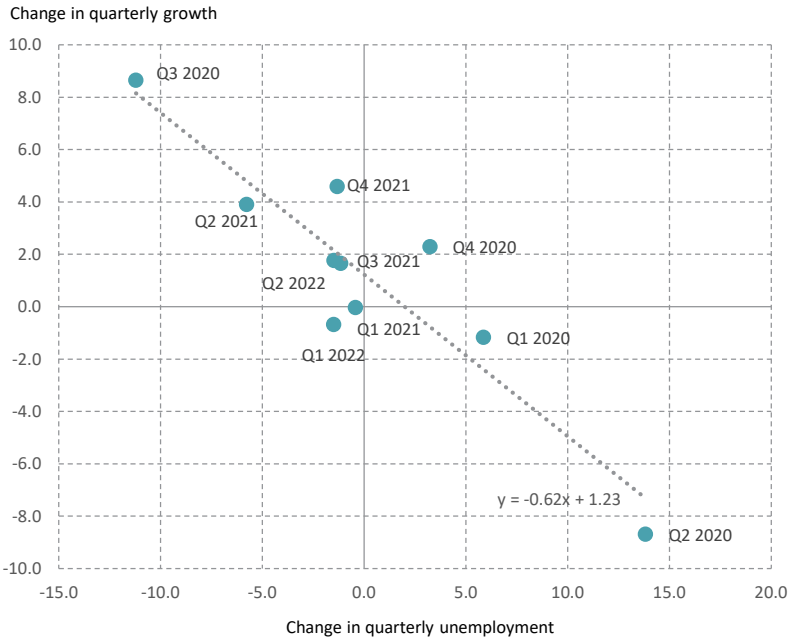


Source: Benjamin Bental and Labib Shami, Taub Center | Data: CBS

10 See Blanchard et al. (2022). In the US, the behavior of the ratio between the job vacancy rate and the unemployment rate is very similar to that in Israel. In the US, the ratio was 1.2 prior to the pandemic and it rose to 2.0. The authors do attribute some of the increase to a worsening in the match between job vacancies and jobseekers. In their opinion, the natural rate of unemployment in the US rose by 1.3 percentage points from its level prior to the pandemic. Accordingly, they believe that the Fed's war on inflation will necessitate increasing the rate of unemployment and reduce the rate of job vacancies.

Finally, the connection between the changes in the unemployment rate and the economy's growth rate, which is known as Okun's Law and which we referred to last year (Bental & Shami, 2021), still holds. According to Figure 7, a decline of 1 percentage point in the unemployment rate from one quarter to its predecessor leads, on average, to a 0.6 percentage point increase in the growth of that quarter relative to the previous one. If seems, therefore, that as the unemployment rate has returned to its pre-pandemic level, it is likely that the GDP growth rate will also stabilize.[11]

Figure 7. Changes in unemployment and quarterly growth



Source: Benjamin and Labib Shami, Taub Center | Data: CBS

11 In the US, it has been observed that a decrease of 1 percentage point in the quarterly unemployment rate raises quarterly growth by an annual rate of about 1.8 percentage points, as compared to about 2.4 according to the aforementioned results. In general, this connection is used to construct short-term forecasts, particularly in periods of economic recovery. For an international discussion of the connection between the unemployment rate and growth, see Lee et al. (2020).

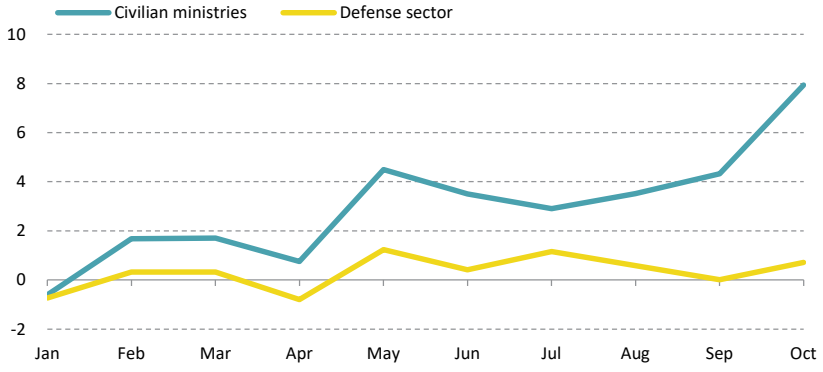
Government activity

At the beginning of November 2021, the Knesset passed the State Budget Laws for 2021 and 2022 and the Arrangements Law. At that time, the Ministry of Finance predicted a budget deficit of 6.7% of GDP in 2021 and 3.9% in 2022 (Ministry of Finance, 2021). In actuality, the deficit was 4.6% of GDP in 2021 while during the first three quarters of 2022 there was a *budget surplus* of 2.6% of GDP.

Figure 8 presents the government expenditures in billions of shekels for the civilian ministries and the defense sector for the months of 2022 in comparison to the parallel months in 2019. According to the graph, during the initial months of 2022 government activity in defense was very similar (in nominal terms) to what it was in 2019 and higher by about NIS 1 billion in civilian activity. During the second quarter, there was an increase of about NIS 4 billion in civilian activity and about NIS 1 billion in defense activity. This constitutes an increase of 15%–20% relative to 2019, which is similar to the increase in GDP in nominal terms during the first half of 2022 relative to 2019. In the third quarter, defense activity returned to its level in 2019 while in October NIS 8 billion was added to civilian activity in nominal terms, an increase of about 40% relative to October 2019 and double the increase in nominal GDP in the third quarter relative to the same quarter in 2019. It appears, therefore, that the government ministries began to realize the 2022 budget only after an adjustment period that lasted several months.

Figure 8. Government activity in 2022 relative to 2019

NIS billion

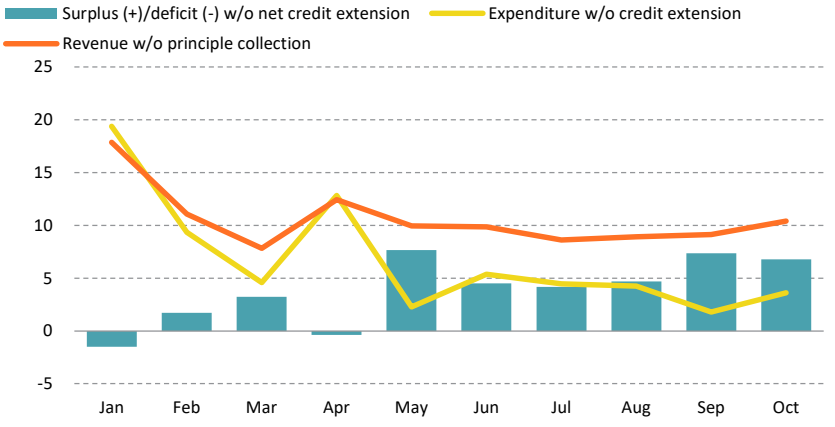


Source: Benjamin Bental and Labib Shami, Taub Center | Data: Accountant General Department, Ministry of Finance

Figure 9 presents the nominal gaps in government revenue and expenditure and in the monthly deficit in 2022 relative to the corresponding months in 2019. In January, government revenues were higher than in January 2019 by NIS 19 billion while expenditure was lower by about NIS 1.5 billion. Thus, the deficit of about NIS 800 million in January 2019 became a surplus of NIS 18.5 billion, a difference of more than NIS 19 billion. The balance was restored to a large degree during the course of the year but nonetheless in June, August, September, and October — months in which the government was in deficit in both 2022 and 2019 — the deficit was lower in 2022 than in 2019.

Figure 9. Government revenue and expenditure and the budget surplus, 2022 compared to 2019

NIS billion

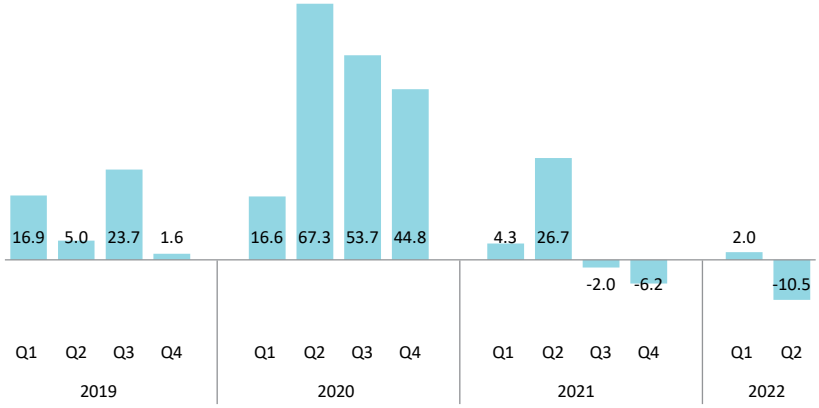


Source: Benjamin Bental and Labib Shami, Taub Center | Data: Accountant General Department, Ministry of Finance

The accumulated surpluses made it possible for the government to reduce the amount of capital it raised. Figure 10 shows a massive raising of capital during the pandemic required to cover the exceptional level of expenditure. Even so, the rapid growth of the economy, which began in the second half of 2021, and the associated increase in government revenue made it possible for the government to reduce its debt.

Figure 10. Net capital raised by the government

NIS billion



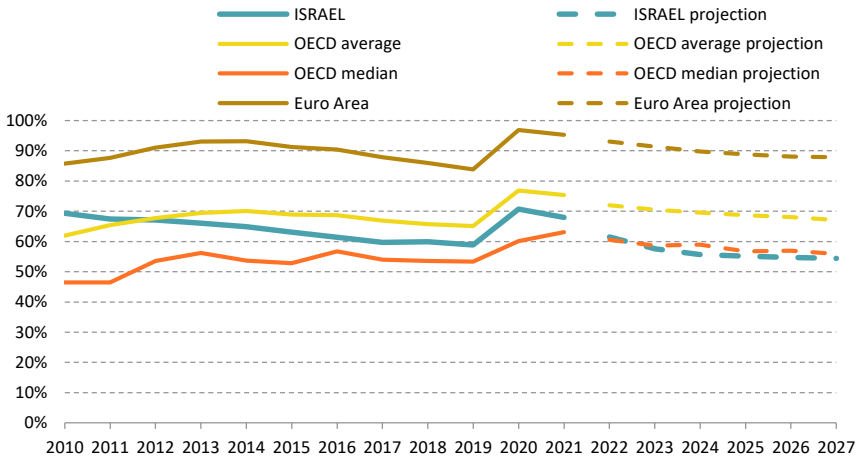
Source: Benjamin Bental and Labib Shami, Taub Center | Data: Accountant General Department, Ministry of Finance

The results of the government's fiscal activity are reflected in the debt-to-GDP ratio which appears in Figure 11. Prior to the pandemic, Israel reached a ratio of 60%. Recall that this is the target agreed upon by the countries in the Euro Area as part of the Maastricht Treaty in 1992.[12] During most of the previous decade, the debt-to-GDP ratio in Israel was located between the median and the average of the OECD countries and was significantly lower than the average for the Euro Area. In 2020, all governments took measures to mitigate the economic effect of the pandemic and significantly increased their deficit and total debt. As a result, the debt-to-GDP ratio in Israel rose to a level similar to the average of the OECD countries, i.e., by about 12 percentage points. In the Euro Area the increase was even larger — about 14 percentage points. The rapid growth in 2021 made it possible for Israel to reduce its debt-to-GDP ratio by close to 3 percentage points, as compared to a bit less than 2 percentage points on average among the OECD countries and somewhat more than 1

12 This level was set on the assumption that it can be sustained over time alongside a primary surplus of 3% of GDP. This assumption is validated as long as the economy's growth rate is greater than the interest rate by a half a percentage point. For a discussion of the parameters of the Maastricht Treaty, see Priewe (2020).

percentage point in the Euro Area. The IMF predicts that the downward trend will continue worldwide. According to its latest forecasts, the IMF expects that by the end of 2022 the debt-to-GDP ratio in Israel will be 61.5% and will even continue to drop to a level of about 55% toward the end of the decade. Thus, Israel's debt-to-GDP ratio will be similar to the median of the OECD countries.

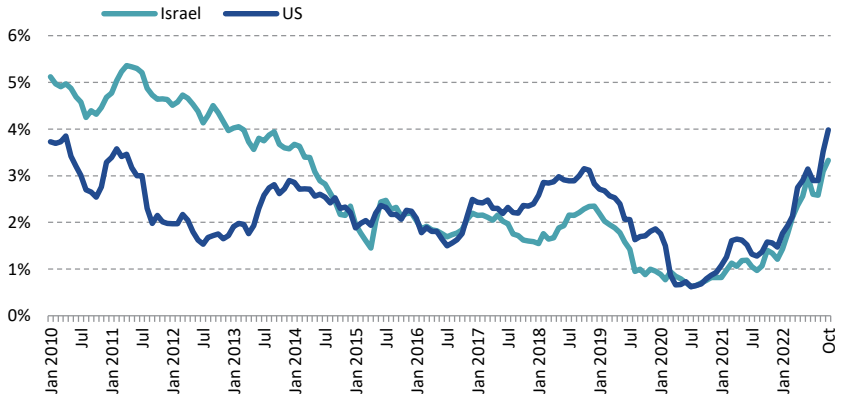
Figure 11. The debt-to-GDP ratio in Israel, the OECD, and the Euro Area



Source: Benjamin Bental and Labib Shami, Taub Center | Data: IMF

The global market relates to the Israeli government's debt as a secure asset. Evidence of this can be found in Figure 12, which presents the long-term yields of 10-year Israeli government bonds and those of similar US Treasury bonds. These yields have been climbing consistently since the low of about 0.7% in mid-2020. The rise in yields accelerated at the beginning of 2022 and the gap in favor of Israel was closed, even though the rate of inflation in Israel was lower. Nonetheless, it should be remembered that the rate of inflation has only a minor impact in the case of a long-term asset, which primarily reflects expectations of the future. However, the very fact that the yields on Israeli government bonds are similar to those of the US government illustrates the level of confidence in global markets with regard to the Israeli economy.

Figure 12. Monthly yields on 10-year government bonds, Israel and the US



Source: Benjamin Bental and Labib Shami, Taub Center | Data: Federal Reserve Economic Data

Israel's credit rating has essentially remained stable, at least since the middle of the previous decade. Moody's ranks Israel as A1 (the fifth from the top) while Fitch rates it as A+ (again fifth from the top). S&P raised its rating from A+ to AA in 2018 (from the fifth ranking to the fourth).[13] The costs of a Credit Default Swap (CDS) on Israel's five-year debt in recent months has ranged from 40 to 50 basis points. Based on the conventional assumption that insurance covers 40% of the loss caused by a debt default, this cost is equivalent to a market assessment that the probability of Israel not meeting its obligations in the next five years is 0.6%–0.8%.[14] Thus, this indicator also provides evidence of international confidence in Israel's debt.

13 See Trading Economics.

14 For purposes of comparison, the insurance contracts on US five-year debt are traded at 18 basis points, which is equivalent to a 0.32% probability of default; the debt of Spain and Portugal is traded at about 52 basis points (probability of default of 0.87%); the debt of Greece is traded at about 170 basis points (probability of default of 2.86%); and the debt of Russia is traded at 13,775 basis points (probability of default of 100%). See World Government Bonds.

SPOTLIGHT

Bankruptcy

There were numerous changes in the area of bankruptcy in 2020, as a result of both the new Bankruptcy and Economic Rehabilitation Law, which went into effect in September 2019 (and replaced the Bankruptcy Ordinance), and the economic stress resulting from the pandemic which forced many citizens and businesses into bankruptcy.

According to the new law, bankruptcy is an economic situation in which the debtor is unable to service his debts or that the debtor's obligations exceed the value of his assets. The bankruptcy process starts with the submission of a request to issue an order to initiate the process. The request is usually submitted by the debtor himself, although the creditor can also do so. If the debts exceed NIS 150,455, the request is transferred to the district court by the Commissioner of Insolvency Proceedings. After a hearing, it is decided whether to issue an order to begin bankruptcy proceedings (which replaces the receivership order in the previous bankruptcy proceedings). Following that, a period of investigation begins with the goal of ascertaining the facts about the debtor's financial situation and the behavior that led to bankruptcy. In the next stage, a Financial Rehabilitation Order is issued, under which (according to the instructions in the Financial Rehabilitation Order) the individual's assets are sold or managed to repay his debt to the creditor. At the same time, the debtor is required to make periodic payments from their income towards the repayment of the debt.

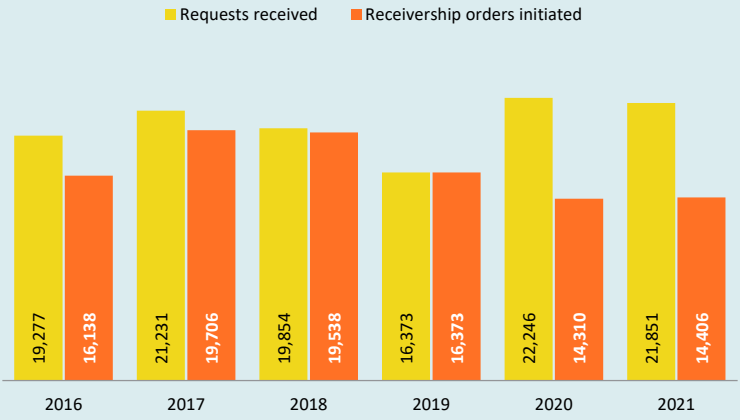
According to the language of the law, the bankruptcy proceedings allow the debtor to turn over a new leaf economically, to arrive at an arrangement with his creditors and to obtain a discharge (a directive that exempts him from his debt) at the conclusion of the process. Thus, the new law focuses on rehabilitating a debtor who is insolvent rather than punishing him. And indeed, as can be seen in Figure 13, the number of requests to initiate bankruptcy proceedings by individuals rose sharply in 2020 and 2021 relative to 2019 (36% and 33% respectively).[15]

We do not have the necessary data to isolate the effect of the pandemic and to differentiate it from that of the new law on the number of requests to initiate bankruptcy proceedings. Nonetheless, the data for the first quarter of 2020, i.e., prior to the pandemic, provide evidence of the new law's impact. During this quarter, 6,286 requests for bankruptcy were submitted as compared to only 4,401 in the same quarter of 2019, an increase of 42% after the new law went into effect prior to the pandemic. The continuing increase in the number of requests during 2020 and 2021 provides almost certain proof of the combined effect of the new law and the pandemic.

It is important to mention that in comparison to 2019, there was a sharp drop in 2020 and 2021 in the number of orders to open proceedings that were *actually* issued (-12% and -13%, respectively), despite the increase in the number of requests. This decline may be the result of the limited format in which the courts operated during the lockdowns in those years.

15 Relative to 2018, the number of requests by individuals to initiate proceedings fell in 2019 by about 18%. This decline may be the result of debtors waiting for the new law which seeks, to the extent possible, to rehabilitate the debtor economically (rather than punish him), to go into effect. It appears that the sharp increase in number of requests in 2020 supports that hypothesis.

Figure 13. Requests and orders for receivership and the initiation of proceedings for individuals



Source: Benjamin Bental and Labib Shami, Taub Center | Data: General Legal Guardian Office, Ministry of Justice

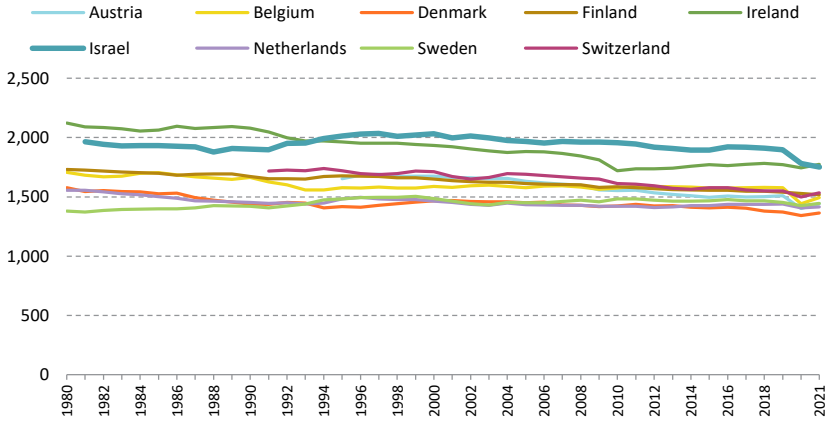
With respect to the liquidation and suspension of proceedings in the case of companies, there were 1,179 requests for the liquidation of corporations in 2019; 1,200 in 2020 (an increase of 2%); and 1,328 in 2021 (an increase of 13% relative to 2019). In actuality, 872 were approved in 2019, 900 in 2020, and 873 in 2021. Thus, despite the pandemic, there was only a negligible increase of 3% in orders to initiate proceedings in 2020 relative to 2019, and in 2021 there was essentially no change.

Labor productivity

Labor productivity is low in Israel. From among the many reasons for this phenomenon, we will focus in this section on private physical capital available to workers on the one hand and the public capital in the economy on the other.[16] The comparison below is between Israel and a group of eight European countries whose population is similar to that of Israel: Austria, Ireland, Belgium, Denmark, Finland, the Netherlands, Sweden, and Switzerland.

Workers in Israel spend a lot of time at work, as can be seen in Figure 14. The average number of work hours of an employee in Israel is significantly higher than in the reference countries, apart from Ireland. In 2019, an Israeli worker worked 1,898 hours per year on average while in most of the other countries the average was about one quarter less. It can also be seen that the effect of the unpaid leave policy reduced the average by about 150 hours per year, which is much larger than the effect of the pandemic in most of the reference countries.

Figure 14. Average annual work hours in selected countries



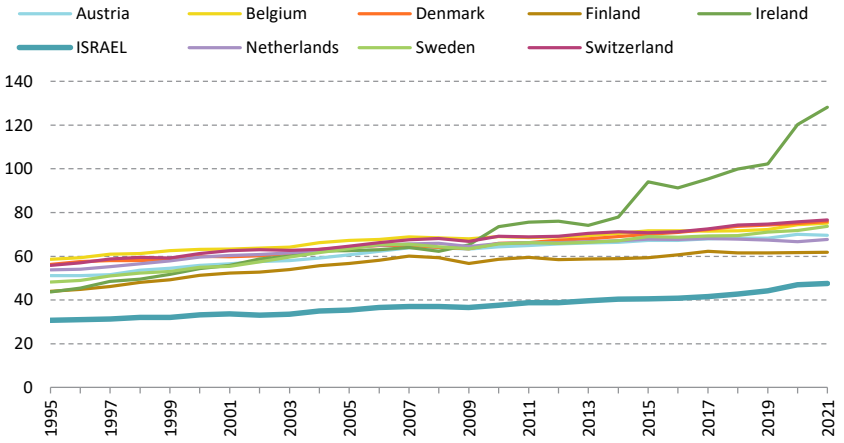
Source: Benjamin Bental and Labib Shami, Taub Center | Data: OECD

16 The gaps in the workforce quality and their contribution to gaps in productivity have been studied extensively. See, for example, Brand (2017) and also Bank of Israel (2019).

However, the high number of work hours does not lead to correspondingly high output. Figure 15 shows that the output per work hour in Israel is significantly lower than in the reference countries. Moreover, the graph shows that the gap between Israel and the reference countries is widening. In 2021, the output of an Israeli worker was about $48 per hour (in 2017 prices), while that of their counterparts in most of the reference countries was higher by about one quarter. This was particularly the case in Ireland — which is similar to Israel in average number of work hours — where there has been an impressive rise in labor productivity since 2009.[17]

Figure 15. GDP per work hour in selected countries

Dollars, 2017 prices



Source: Benjamin Bental and Labib Shami, Taub Center | Data: OECD

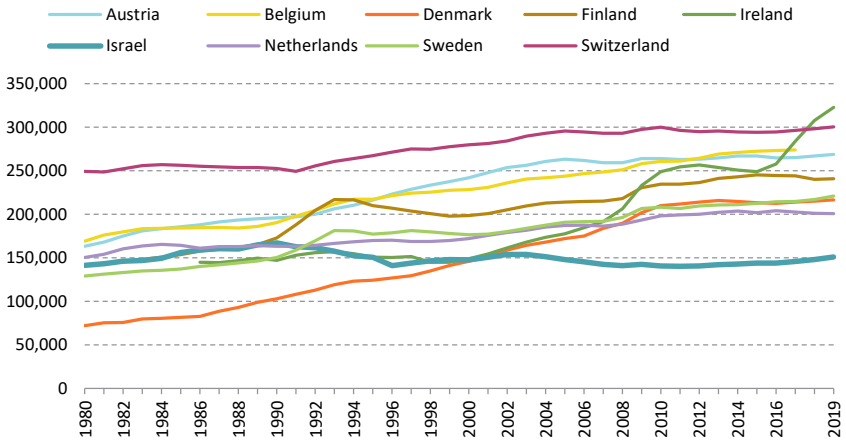
17 In Finland, GDP per work hour stopped increasing simultaneously with the prolonged crisis at Nokia. The National Accounts of Ireland are affected by the large presence of multinational companies which are located there for tax reasons and the ability to gain access to both the American and EU markets.

Private and public capital

Figure 16 presents the level of private capital (i.e., capital generated by private sector investments) per employee in Israel and in the reference countries in 2017 dollars.[18] The graph shows Israel's increasing lag according to this parameter. Since 1980 *the amount of capital per employee in Israel has not risen* (and has even fallen somewhat), while in most of the reference countries, it rose by more than 50%. Denmark, in which capital per employee was lower than in Israel in 1990, raised it three-fold during this period. In Ireland, capital per employee grew by more than two-fold and in a shorter time. It appears, therefore, that businesses in Israel face distorted investment incentives, whether due to bureaucratic obstacles that reduce return or due to low wages which reduce the profitability of replacing labor with capital.[19] According to accepted estimates, the elasticity of GDP with respect to private capital is about 0.3 (see also the Appendix). Accordingly, if capital per employee in Israel would rise to the level in Sweden, Denmark, or the Netherlands, GDP per worker would increase by about 13%. This would close about one-half of the gap in GDP per work hour between Israel and most of the reference countries.

Figure 16. Private capital per employee in Israel and selected countries

Dollars, in PPP terms, 2017 prices



Source: Benjamin Bental and Labib Shami, Taub Center | Data: OECD; IMF

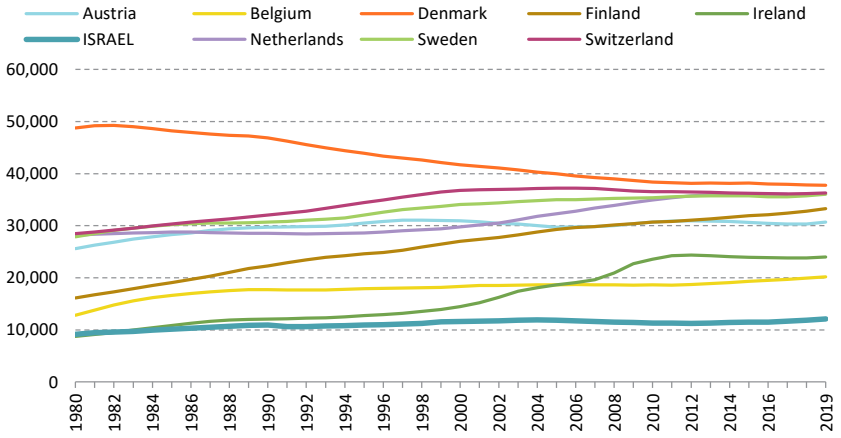
18 For an explanation of the calculation method, see Xiao et al. (2021).

19 The construction industry is a good example of both of these distortions.

Private capital is a factor of production that employees work with, and, therefore, it is directly related to labor productivity. Public capital, which includes various types of infrastructure such as roads, public transportation, communication, seaports and airports, and electricity, has an indirect effect. According to IMF data, the level of public capital per capita in Israel is drastically lower than that in the reference countries. Figure 14 shows that over a period of about 40 years, the level of public capital per capita in Israel remained unchanged. Since it was lower than in the reference countries (except for Ireland) to begin with, the gap has only widened. At the end of the period, public capital per capita in Israel stood at about one-third of that in the reference countries. According to the accepted elasticities of GDP relative to public capital in the literature, if public capital per capita in Israel were to increase three-fold thereby catching up to the reference countries, between 5 and 20 percentage points of the gap in output per employee would be closed.[20]

Figure 17. Public capital per capita in Israel and selected countries

Dollars, 2017 prices



Source: Benjamin Bental and Labib Shami, Taub Center | Data: OECD; IMF

20 In the US, which has a high level of public capital per capita, the elasticity is 0.05 (Ramey, 2021). The World Bank uses values between 0.1 for *general public capital* and 0.18 for transportation infrastructure (Devadas & Pennings, 2018). See also Eckstein et al. (2022). The estimate reported in the Appendix is even higher.

The high tech sector

Employment, productivity, and wages

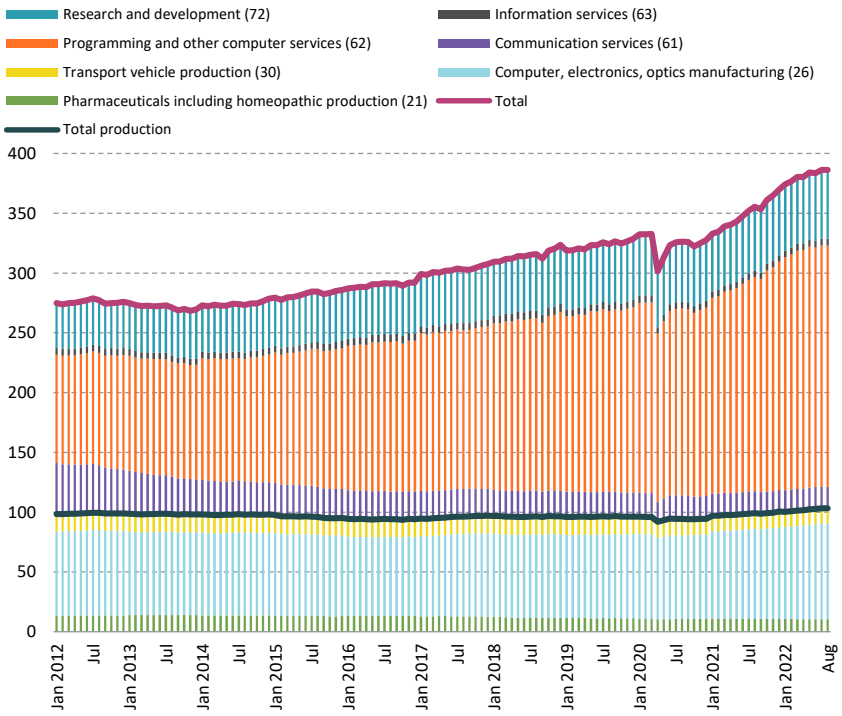
In 2021, the high tech sector in Israel employed about 10% of the workers in the economy and accounted for about 15% of GDP.[21] The sector includes both manufacturing industries and service industries.[22] Figure 18 presents the trend in jobs in the various high tech sectors and illustrates the rapid growth in services as compared to the stability in manufacturing. Thus, in 2021, a little more than two-thirds of high tech jobs were in services while the rest were in manufacturing. In the service industries, there was a particularly rapid increase in the number of jobs in programming and a decline in information services. The pandemic also had a relatively large effect on jobs in these two industries as compared to the relative resilience in other areas of high tech.

21 See the website of the Innovation Authority. The CBS does not publish data that can be used to calculate the contribution to GDP on an ongoing basis. The latest CBS Manufacturing, Mining, and Quarrying Survey conducted in 2018 showed that the high tech sector was responsible for about 20% of added value (14% in services and 6% in manufacturing). The survey did not represent the entire economy; it included about 75% of the jobs and 61% of the gross added value. See CBS (2021).

22 The high tech sector in Israel is composed of three manufacturing industries and four service industries. The former include manufacturers of pharmaceuticals (industry 21), computers, electronic instrumentation, and optics (26), and planes (303), while services include communication services (61), programming (62), data processing (631), and R&D (72). See also the CBS website, High Tech.

Figure 18. Monthly number of jobs in the high tech sector

Thousands

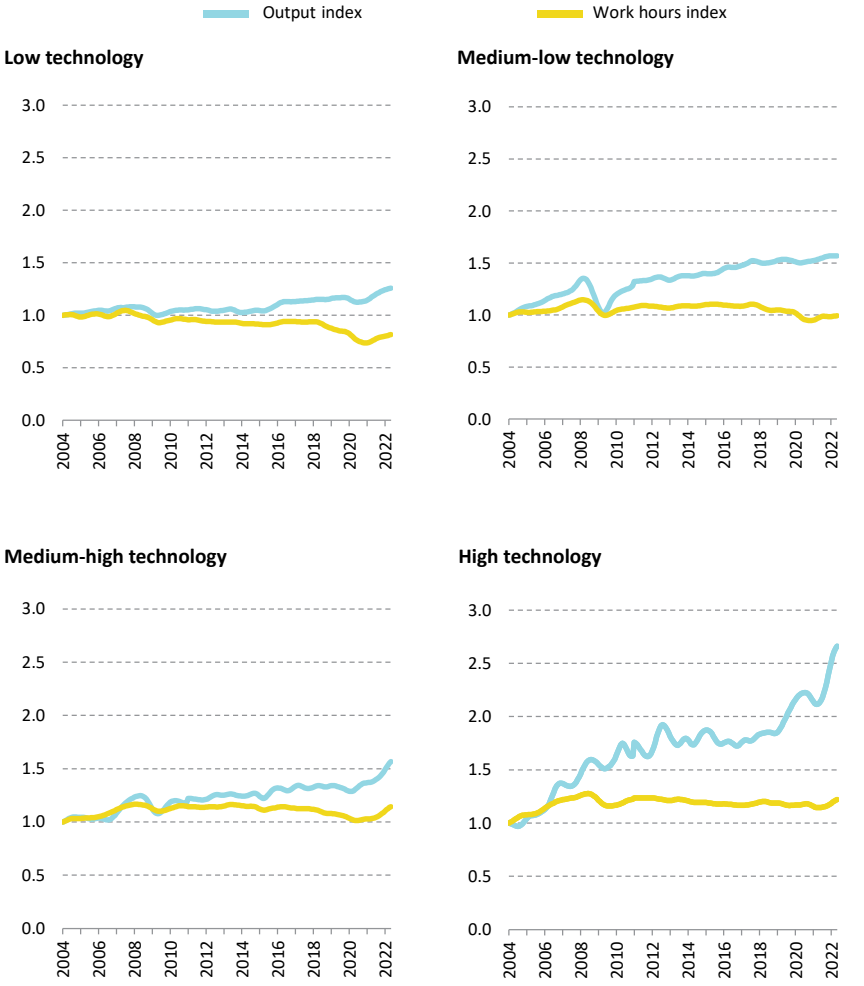


Source: Benjamin Bental and Labib Shami, Taub Center | Data: CBS

As noted, the contribution of high tech workers to GDP is 50% higher than their proportion of the workforce in Israel. Figure 19 illustrates the large gap in productivity in the manufacturing industries. In traditional-technology manufacturing industries, output in mid-2022 was about one-quarter higher than in January 2004, but the number of work hours in these industries had declined by about 20%. The productivity in mixed-traditional and mixed-high tech manufacturing industries showed a similar increase. Thus, although output grew in these industries by about 50%, the number of work hours remained almost unchanged. In the high tech sector the picture is completely different: the number of work hours rose by about 20% (primarily during the

first decade of the century and since then it has stabilized in accordance with the number of employees, as described in Figure 18); however, output rose by about 170%.

Figure 19. Work hours and output by technology intensity

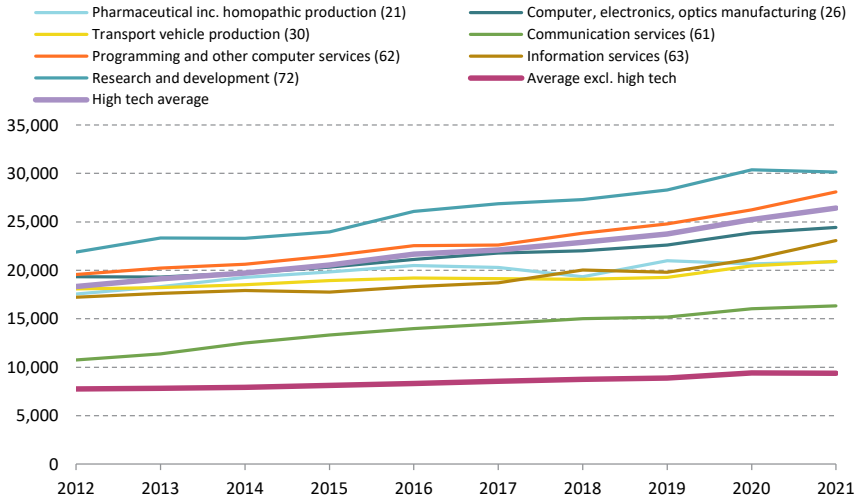


Source: Benjamin Bental and Labib Shami, Taub Center | Data: CBS

As expected, the gaps in productivity are also reflected in large wage gaps, as shown in Figure 20. In 2012, the average monthly wage in the high tech sector was higher than for other employees in the economy by 2.3-fold. In 2021, the gap grew to a ratio of 2.8. This increase occurred as a result of the moderate increase in the real wage among other workers in the economy of 21% during that period, as compared to the increase of 44% in the high tech sector. Among the workers in the high tech sector, the wages of those engaged in scientific research and development are particularly high. The increase in their wages is similar to the average for the entire sector. They in general have advanced degrees in science and their number has grown relatively moderately, from about 38,000 in 2012 to about 51,000 in 2021. The number of programmers, whose monthly wage is NIS 4,000–5,000 lower (although the rate of growth in their wages is similar), has almost doubled — from 93,000 in 2012 to about 176,000 in 2021. The communication services industry is characterized by low wages within the group of high tech industries; however the rate of growth in their wages is higher than the sector average (about 50% during that period). On the other hand, the industry has shed more than 50% of its jobs — from 40,000 in 2012 to 18,000 in 2021.

Figure 20. Average monthly wage

NIS, 2021 prices

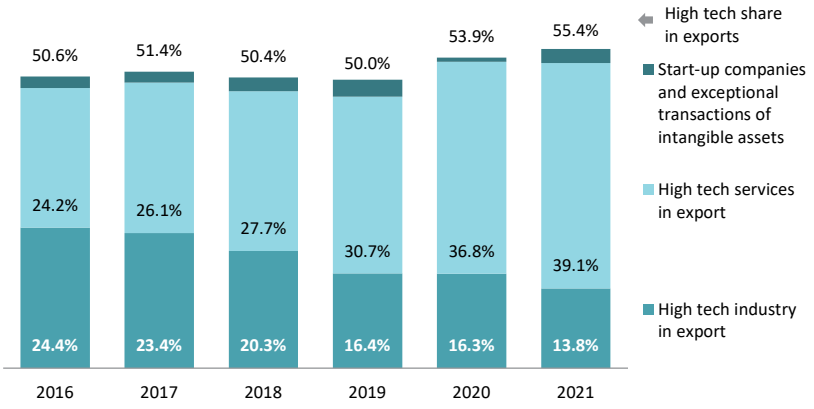


Source: Benjamin Bental and Labib Shami, Taub Center | Data: CBS

The high tech sector and foreign trade

The high tech sector has a decisive influence on Israel's balance of payments, including both the current account and the capital account. Figure 21 describes its contribution to the export, which stood at about 50% prior to the pandemic and rose to 54% and 55% during the two pandemic years, respectively. Especially noticeable is the rapid drop in the share of high tech manufacturing by about 10 percentage points in contrast to the parallel increase in the share of services by about 15 percentage points. The various *exits* contributed another 2% approximately.

Figure 21. The contribution of the high tech sector to Israeli exports



Source: Benjamin Bental and Labib Shami, Taub Center | Data: CBS

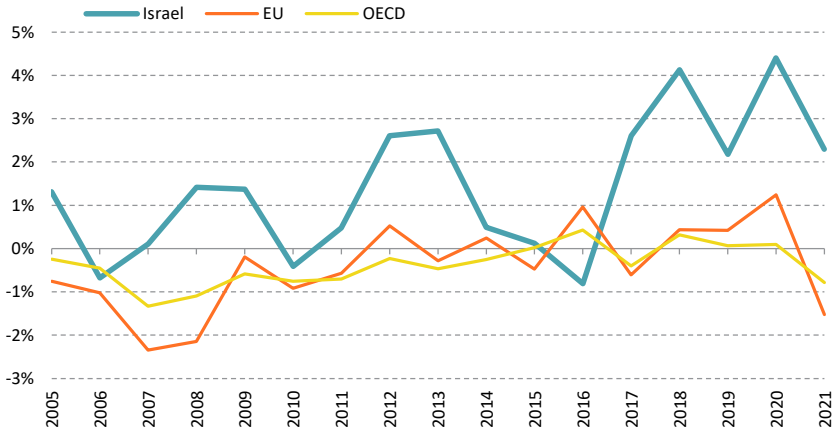
Finally, the high tech sector attracts foreign investment on a large scale. Figure 22 shows the size of net foreign direct investment relative to GDP in Israel as compared to the EU and the OECD.[23] The OECD estimate for 2021 as shown in the graph is 4.5% of GDP (i.e., about $18 billion).[24] Particularly noticeable is the upward trend during the past decade, which began simultaneously with the trend of appreciation in the shekel (see Figure 29).[25]

23 The word *net* relates to the deduction of capital returning to the country of origin and repayment of loans.

24 This estimate is significantly lower than that of the Start-up Nation Central organization, which is $25.4 billion for 2021 or about 6.2%. See the site Start-Up Nation Central.

25 The outlier in 2006 was a result of the Iscar deal.

Figure 22. Direct investment as a percentage of GDP in Israel, the OECD, and the EU



Source: Benjamin Bental and Labib Shami, Taub Center | Data: OECD

Prices

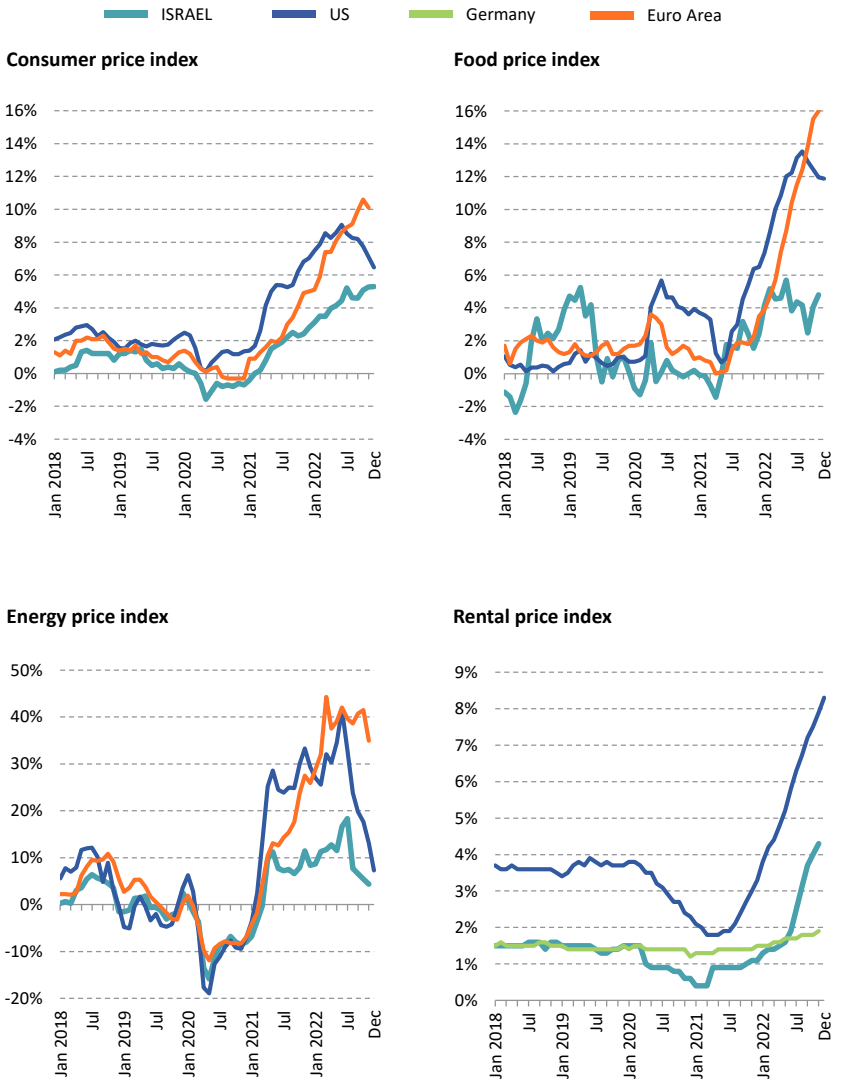
Inflation

The rate of increase in the prices of the consumption basket accelerated during the final months of 2022 in all the developed countries. The reasons are well-known. On the supply side, the world has still not fully restored the supply chain, which was adversely affected by the restrictions on international mobility during the pandemic. A large part of the difficulty in restoring the supply chain is the stringent COVID-19 policy adopted by the Chinese government. Russia's invasion of Ukraine in February 2022 led to additional disruptions, primarily in the supply of energy to Europe and the supply of grain to numerous countries (particularly in the Third World). The heat wave in Europe is drying up rivers and raising the price of transporting coal and commodities by land. On the demand side, equilibrium has not yet been restored. There is still a large surplus of liquidity, particularly in the US, which is the result of a highly expansionary monetary policy during the pandemic.

Figure 23 shows the rise in prices in Israel, the US, and the Euro Area, which began in early 2021. The upper left-hand panel describes the rate of increase in the CPI. As can be seen, this rate was significantly lower in Israel than in the US and the Euro Area. The gaps are even larger in the case of food and energy. In the US and the Euro Area, the increase in food prices was even faster than that of the index as a whole while in Israel they rose at almost the same rate as the index. In the US and the Euro Area, energy prices rose by about 40% while in Israel the rate of increase was about half of that (notice the scale of the vertical axis in this graph). Finally, although rent actually paid (without imputation for homeowners) in Israel recently rose somewhat more than in Germany (after a decline that continued for about 18 months), rents in the US have shot up by an annual rate of about 8%.[26]

26 The OECD does not publish data on rent actually paid in the Euro Area. Germany was chosen as the representative country.

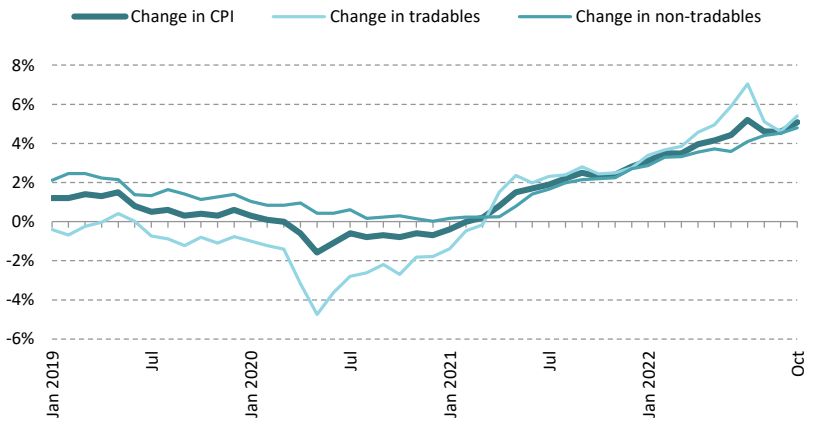
Figure 23. The increase in the CPI in Israel, the US, and the Euro Area



Source: Benjamin Bental and Labib Shami, Taub Center | Data: OECD

The rapid increase in prices in other countries on its own has an impact on the CPI in Israel. This can be seen in Figure 24, which presents Bank of Israel data distinguishing between tradable and non-tradable goods.[27] The graph shows that while in the past tradable goods moderated the rate of increase in the CPI, the rate of increase in their prices (whose weight in the CPI is about 37%) has been significantly higher than that of non-tradable goods (whose weight is about 63%) in recent months. In other words, Israel imports part of its inflation from abroad, despite the strengthening of the shekel. Nonetheless, it appears that the gaps between imported inflation and domestic inflation have recently narrowed to a large extent.

Figure 24. The rate of increase in the CPI, tradable and non-tradable goods



Source: Benjamin Bental and Labib Shami, Taub Center | Data: Bank of Israel

The impact of inflation on the various income quintiles

The data presented above related to the average for the economy as a whole. It is possible to differentiate the effect of price increases on the various income strata by computing the CPI based on the respective consumption of households as measured by the *Household Expenditure Survey* conducted in 2018–2019. During that period, the consumption profiles of households

27 For a list of tradable and non-tradable goods, see the Bank of Israel website.

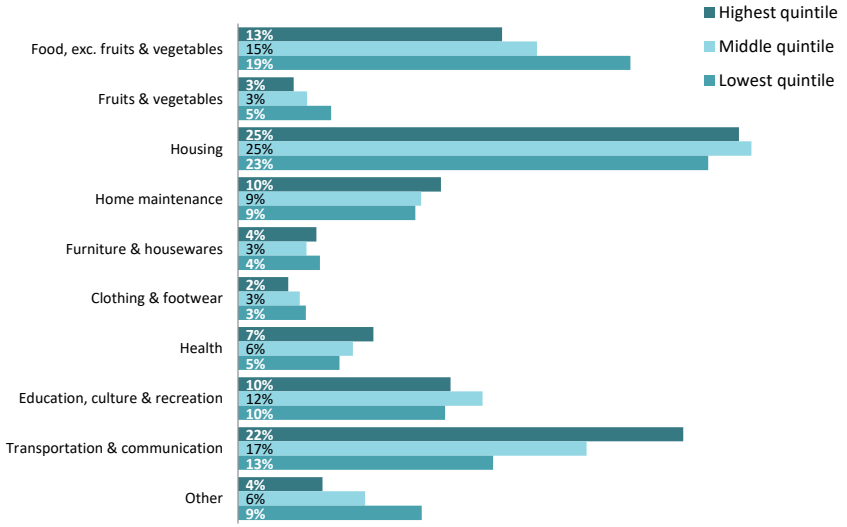
were aggregated according to quintiles of disposable income per standardized individual.[28] This enables a calculation of the CPI for the consumption baskets of households according to income quintiles and their rate of increase. The data below relate to consumption expenditure of the bottom, middle, and top income quintiles, each of which represent 20% of all households: those with the lowest income per capita (0 to 20th percentile), those in the center of the income distribution (40th to 60th percentile), and those with the highest income (80th to 100th percentile), respectively.

The weights of the goods and services that make up the CPI basket are determined for each income group according to the proportion of expenditure on those components relative to the total expenditure on consumption in that group and are differentiated across the average household in each income quintile. Indeed, there are significant differences in consumption patterns across the various income groups, as can be seen in Figure 25. Thus, for example, the proportion of expenditure on home maintenance, healthcare, and transportation and communication within the total consumption of a household in the top quintile is higher than in the lower income quintile. In contrast, in the case of expenditure on food (not including fruit and vegetables), fruit and vegetables and miscellaneous, the highest proportion is to be found in the lowest quintile. There are differences among households by income quintile also in the weights of secondary groups that make up the basket of goods and services in the CPI (not presented in the graph). Particularly noticeable is the large gap in the proportion of expenditure on cigarettes and tobacco within total expenditure of a household belonging to the bottom income quintile (almost five times the proportion in the top quintile). In contrast, the proportion of expenditure in a household in the top quintile on other housing expenditure, such as a real estate agent, the drawing up of contracts and insurance, is almost seven-times what it is for a household in the bottom quintile. This is also the case for the proportion of expenditure on household help, for which a household in the top quintile spends close to 8-times more than a household in the bottom quintile.[29]

28 For details, see CBS, Monthly composition of consumption expenditure, by sub-groups, in selected years, Table 1.2. The CBS does not publish data for the second and fourth quintiles.

29 For further details, see CBS, Weighted first and second main consumption expenditure groups in the CPI, Table 1.5.

Figure 25. Proportion of expenditure within total expenditure by main groups included in the CPI, selected income quintiles



Source: Benjamin Bental and Labib Shami, Taub Center | Data: CBS

Figure 26 presents the cumulative rate of change in the CPI for the main consumption groups that make up the CPI basket for each of the income quintiles. The graph relates to 2020 as the base year and differentiates between an increase in prices in 2021 and the cumulative increase up to July 2022.[30] Particularly noticeable is the high rate of increase in the expenditure on transportation and communication in all three income quintiles (close to 16%). In the housing component (mainly *consumption of housing services* which is closely related to rent), there was a higher rate of increase for the top quintile than for the bottom one. The opposite is the case for the furniture and home appliances component where households in the bottom quintile spend 3.6 times more than those in the top quintile on fixing kitchen appliances and 30% more on disposable plates, cups, and cutlery, which became significantly more expensive following the imposition of a tax on these items. In contrast, the clothing and footwear component fell steeply, by more than 14%

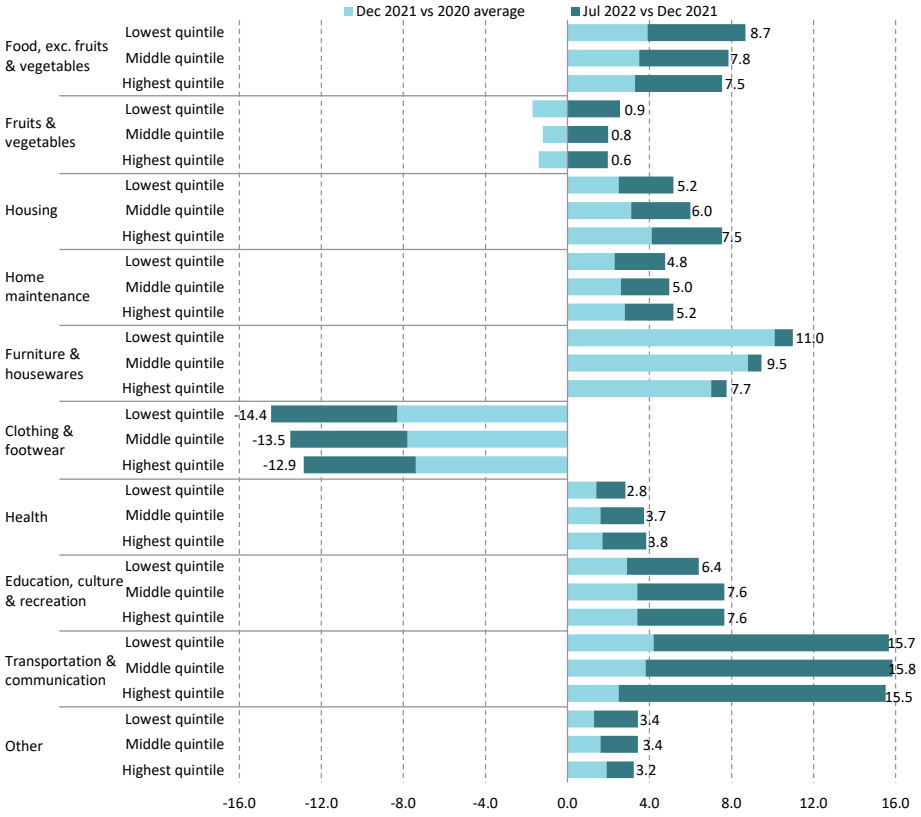
30 For further details, see CBS (2022c), Table 4.7.

among households in the bottom income quintile and by about 13% among households in the top quintile. The differences in the rate of increase in the CPI between the various quintiles are usually not very large; however, because of the differences in income there are large differences in their impact on expenditure relative to income. Overall, the total change in expenditure in July 2022 relative to the average for 2020 for households in the top quintile was NIS 1,856, for the middle quintile it was NIS 1,118 and for the bottom quintile it was NIS 705. These amounts reflect an increase of about 8% in total expenditure for the top quintile, about 7% for the middle quintile, and about 6.4% for the bottom quintile. In terms of 2019 income, the ranking is reversed: up to July 2022, these additions to expenditure reflect an additional cost amounting to 10.2% of gross income for the households in the bottom quintile; about 6.5% for the households in the middle quintile, and about 4.6% for the households in the top quintile.[31]

Figure 27 shows that the impact relative to income was larger in the bottom quintile in all components of expenditure, except for clothing and footwear. For example, the representative household in the bottom quintile was forced to give up 2.7% of its income due to the increase in food prices while the figure for the top quintile was less than 1%, a fact that is reflected in the larger weight this component has for households in the bottom quintile. Transportation and communication, on the hand, has a higher weight in the top quintile and the increase in the price of that component is translated into an increase in expenditure of about 3.2% of gross income for a household in the bottom quintile, as compared to 2.5% for a household in the middle quintile, and about 2% for a household in the top quintile.

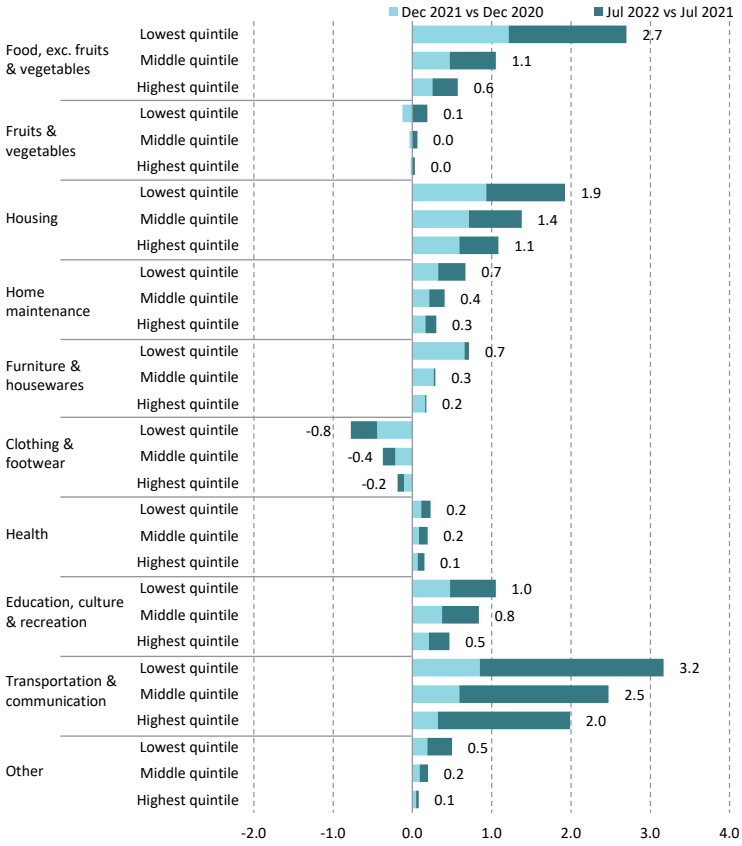
31 The most recent figures for household income in Israel are for 2019. In that year, gross monetary monthly income in the bottom quintile was NIS 6,883; in the middle quintile it was NIS 17,275; and in the top quintile it was NIS 39,988. For further details, see CBS (2022b).

Figure 26. Rate of change in the CPI, July 2022 relative to the average for 2020 and the contribution of each year to the rate of change



Source: Benjamin Bental and Labib Shami, Taub Center | Data: CBS

Figure 27. Total rate of change in expenditure as a percentage of income, July 2022 relative to the average for 2020 and the contribution of each year to the rate of change



Source: Benjamin Bental and Labib Shami, Taub Center | Data: CBS

The level of prices

Figure 20 illustrates Israel's relatively favorable position with respect to inflation. Nonetheless, the absolute level of prices in Israel is perceived as being very high relative to other countries.

The comparison between price levels in various countries is based on the *Law of One Price*, which was developed in France during the second half of the 18th century. The gold standard prevailed during that period, and it was possible to compare the prices of goods between countries on that basis. Accordingly, if the price of a good in terms of gold in Country A was lower than in Country B, than it was worthwhile for merchants in Country B to transfer gold to Country A and buy the goods there. According to the theory, these transfers would increase the amount of gold in Country A and reduce it in Country B, a process that would raise the prices of goods in Country A in terms of gold and reduce their prices in Country B. At the end of the day, prices were meant to equalize. The modern-day equivalent of this process is based on the demand and supply of foreign currency. If at a given exchange rate it is cheaper to buy goods in Country A than in Country B, merchants in Country B will prefer to exchange the currency of their country for that of Country A and buy the goods there. This pressure in the foreign currency market causes a depreciation in the exchange rate of country B relative to country A or, in other words, its currency weakens. As a result, the goods in Country A for merchants in Country B become more expensive and the goods of Country B become cheaper for merchants in Country A and a *one-price* equilibrium is achieved.

These hypothetical mechanisms are subject to failures in reality. The most important of them are transaction costs and the involvement of governments in the foreign currency market. This is particularly true in the case of non-tradable goods, where the transaction costs are essentially infinite. For example, it is not possible to transfer an apartment from Tel Aviv to Berlin nor is it possible to buy housing services in Berlin for use in Tel Aviv. In other cases, it is possible to buy similar services in both Tel Aviv and Berlin, such as a haircut or catering services; however, this involves an expensive trip from one city to the other. Nonetheless, it is conventional practice to compare the prices of a basket of uniform goods in different countries in terms of the local currency and to calculate the exchange rate at which the costs of the baskets equalize. This exchange rate is known as Purchasing Power Parity (PPP). International organizations calculate this exchange rate and compare it to the exchange rate prevailing in the market. This makes it possible to estimate the extent to which

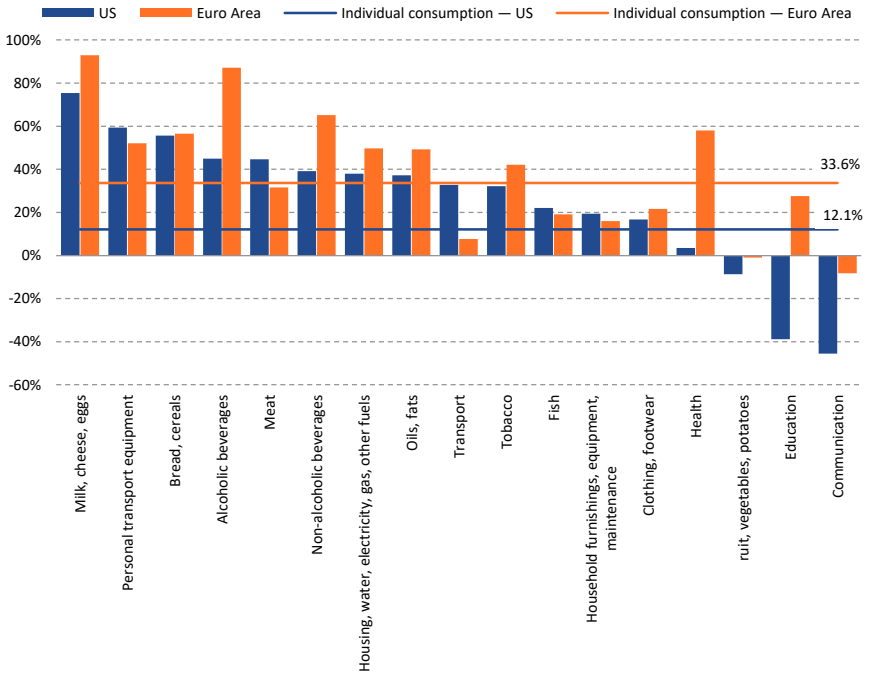
the local currency is overvalued relative to other currencies (which *raises* the prices in that country relative to the reference countries) or undervalued (in which case the country's prices are *low* relative to other countries).

The OECD constructs a uniform consumption basket every few years and gathers data from the member countries in order to carry out a comparison of price levels.[32] Unfortunately, the most recent one was carried out in 2017. Figure 18 reflects the cost of living in Israel relative to the US and the Euro Area. The gap is measured according to the rate at which the PPP of a selected group of goods is differentiated from the average exchange rate prevailing in the market in 2017, with respect to both the dollar and the euro. The graph also shows the gap relative to these currencies for the actual individual consumption basket. On average, the shekel was overvalued by 33.6% relative to the euro and by 12.1% relative to the dollar. In other words, according to the exchange rate that prevailed in 2017, Israel was more than one-third more expensive than the Euro Area countries, and about 10% more than the US. An examination of the consumption basket shows particularly large outliers. Milk and egg products were almost double in price relative to the Euro Area and 75% more relative to the US. These goods are characterized by high levels of concentration and intervention by production councils and they enjoy almost complete protection against competing imports. Another outlier is non-alcoholic beverages, a market which is particularly concentrated in Israel (their price in Israel was almost two-thirds higher than in Europe and almost 40% higher than in the US). Goods that were cheaper than in the reference countries were fresh produce, education (particularly in comparison to the US), and communication (prices in Israel were about one-half of those in the US). Recall that the communication market underwent a far-reaching reform (the Kahlon Reform) which led to particularly intense competition in this market.

32 The most recent comparison carried out by the OECD was in 2017. The basket that it constructed for the comparison is not identical to the basket of goods used to calculate the CPI in the different countries. For further details, see the OECD site, EUROSTAT-OECD Methodological manual on purchasing power parities (PPPs).

Figure 28. The cost of living in Israel relative to the US and the Euro Area

Selected groups of goods, 2017



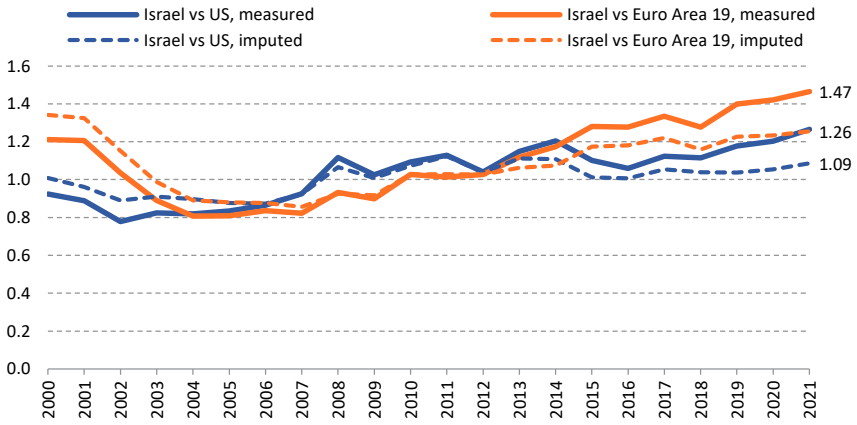
Source: Benjamin Bental and Labib Shami, Taub Center | Data: CBS

Figure 29 tracks the increase in prices in Israel over time according to the calculated gaps between the hypothetical exchange rate of the shekel that maintains the PPP of actual individual consumption and the average market exchange rate in that year. The graph also presents the gaps that emerge from a calculation based on the CPI in Israel, the Euro Area, and the US.[33] The large increase in the cost of living implied by the graph relative to the euro is the result of the trend in the shekel's exchange rate relative to the euro

33 The calculation is based on the fact that in 2012, the exchange rate in the market closely reflected PPP. It subtracts the rate of change in the exchange rate that was *justified* according to the difference between the change in the CPI in Israel and that in the comparison country from the change in the market exchange rate.

(see Figure 30) and the trend in the exchange rate of the dollar relative to the euro. In particular, the weakening of the dollar (until recently) is the reason that the price increases relative to the euro are much larger. The graph also shows the significant gap between inflation calculated from the comparison of the actual individual consumption basket according to the OECD calculations and the calculation that compares the cost of the (different) consumption baskets upon which the CPI is calculated in the various countries. In this calculation, Israel was only about 10% more expensive than the US in 2021, as compared to 26% more expensive according to the OECD calculation, and 26% more expensive than the Euro Area countries, rather than 47%. In other words, the international comparisons are very sensitive to the baskets of goods being compared and they represent, in the best case, very broad averages.[34]

Figure 29. Cost of living in Israel relative to the US and the Euro Area

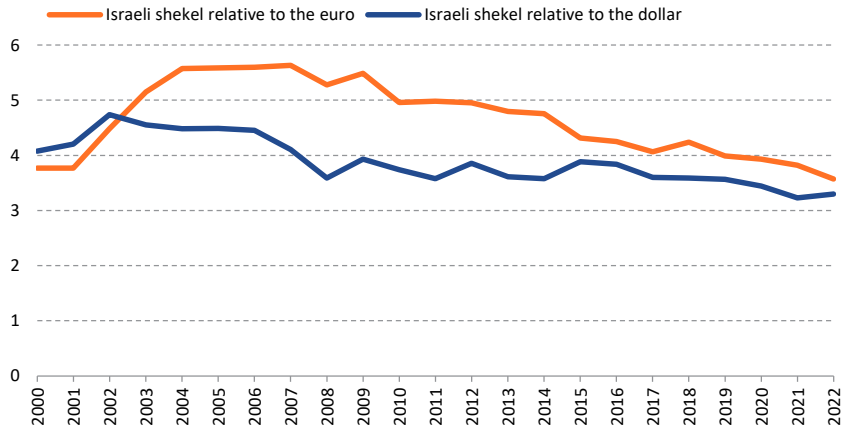


Source: Benjamin Bental and Labib Shami, Taub Center | Data: OECD

34 *The Economist* developed a PPP exchange rate for an especially standard good: McDonald's Big Mac. According to this index, the shekel was overvalued in January 2021 by 9.4% and in July of that same year by 4.7%. In July 2022, the shekel was undervalued. The exchange rate that would equalize the price of a Big Mac in Israel and the US was NIS 3.30 to the dollar when the exchange rate in the market was 3.44. In other words, the price of a Big Mac in Israel was lower by 4% that its price in the US. See The Economist website, The Big Mac Index.

As noted, Figure 30 shows the strengthening of the shekel to be the main factor determining the relative price levels in Israel and the reference countries. The strengthening of the shekel began in the mid-2000s and it is reflected in the growing gaps between the cost of the basket of consumption goods in Israel and those in the reference countries in Figure 29.

Figure 30. The shekel annual average exchange rate relative to the euro and the dollar



Source: Benjamin Bental and Labib Shami, Taub Center | Data: Bank of Israel

The massive global capital flows undermine the basis for the *one price* assumption. The exchange rate does not reflect only the relative prices of goods traded between countries, as assumed by economic theory; rather, in reality, and as we see on a day-to-day basis, exchange rates are affected primarily by the short-term considerations of investors in the capital market who are highly sensitive to even small gaps in interest rates. In Israel, the shekel is strengthening as a result of the surplus in its current account and the large inflow of capital, primarily due to foreign investment in the high tech industry, which we described in Figure 21 and 22. The foreigners who invest primarily in the high tech sector do so on the basis of long-term considerations and the expectation of very high returns. Their considerations are not affected by fluctuations in the exchange rate and in particular not by gaps in the cost of living. If anything, they benefit from the strengthening of the shekel which makes it possible for them to repurchase foreign currency at a low price.

Accordingly, it can be assumed that the shekel will remain a strong currency over time. This fact will continue to overshadow the cost-of-living calculations in Israel relative to other countries and the implied gap between the exchange rate in the market and that which maintains PPP.

Conclusion

As in other countries, the Israeli economy also experienced an upheaval as a result of the pandemic. However, the recovery was rapid both in Israel and in most of the developed countries and it roughly made up for the loss in GDP resulting from the pandemic. On the other hand, Russia's attack on Ukraine has offset this positive outcome to some extent, particularly in Europe. The attack has led to a sharp rise in energy prices, which is in addition to factors related to the pandemic that led to a surge in inflation throughout the industrialized world. The pressure on prices is felt also in Israel, although to a lesser degree. The inflation is forcing central banks to raise their interest rates sharply, which is increasing the fear of a slower rate of growth and negative developments in the real system, particularly during the coming year.

Alongside the problems in the short term, the fundamental failures that have characterized the Israeli economy for so long should not be ignored. Despite the success of the high tech industries, there remains a large gap between labor productivity in Israel and in other developed countries. It is the result of, among other things, the low levels of private and public capital in Israel. Correcting this situation will require the elimination of distortions in the range of incentives that face the private sector and a significant increase in public capital. At the same time, the cost of living in Israel remains high relative to the developed countries, even though the rate of inflation in Israel is lower. In part, the cost of living is partially explained by the strength of the shekel, a phenomenon that results to a large extent from the success of high tech. Nonetheless, the price system in Israel is characterized by serious distortions resulting from regulation, import barriers, and a lack of competition. The Arrangements Law of 2021 began the work of solving these problems. It can only be hoped that this process will continue in the future.

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Appendix

Labor, private capital, public capital, and GDP

Appendix Table 1 presents the results of panel regressions for the reference countries. The dependent variable is logged GDP in constant prices while the independent variables include logged employment and logged private capital, with or without logged public capital. Accordingly, the regression coefficients can be interpreted as the elasticity of GDP with respect to the aforementioned factors of production. All the regressions were run with country fixed effects and year dummies. All the coefficients are significant at a level of $p < 0.001$.

Appendix Table 1. Panel regressions

	Coefficient	95% confidence interval	Coefficient	95% confidence interval
ln (employment)	.472	.377–.567	.602	.505–.710
	(.048)		(.068)	
ln (private capital)	.355	.261–.449	.454	.350–.559
	(.048)		(.053)	
ln (public capital)	.303	.235–.371		
	(.034)			

Source: Benjamin Bental and Labib Shami, Taub Center | Data: OECD; IMF

In the panel that does not include public capital, the coefficients of logged employment and logged private capital sum to approximately 1 (a Cobb-Douglas function with constant returns to scale). On the assumption that there is perfect competition in the market for factors of production, the share of labor in GDP according to the coefficients is 60% and the share of capital is 40%. However, the confidence intervals of the coefficients include many combinations of the two coefficients that add up to 1. When public capital is included, the coefficients of the other two inputs are reduced. The estimated elasticity of public capital is 0.3, which is significantly higher than what is reported in the literature. Nonetheless, the result hints at the role of public capital as a factor that raises the productivity of the two private factors of production, i.e., capital and labor. According to the results of this panel, the external effects of public capital on the two private factors of production are very similar and lead to an increase of about 30% in the elasticity of GDP with respect to each of them.

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