



The Eli Hurvitz Conference
on Economy and Society

DALIA AND ELI HURVITZ
FOUNDATION LTD

Two Economies – One Society

December 17th-18th, 2019

Conference Background Materials

Research Abstracts and Working Group Summaries

Chair: Prof. Eugene Kandel | Director: Ms. Daphna Aviram-Nitzan

Opening Remarks – Yohanan Plesner, President, Israel Democracy Institute

Greetings,

This is the 26th year in which the Israel Democracy Institute is holding the Eli Hurvitz Conference for Economy and Society. This year finds us at the height of a multi-year initiative, launched three years ago in partnership with senior governmental leadership, representatives of the business sector, scholars from the academic world and research institutes, and leaders of civil society organizations. At the heart of this initiative is the commitment to working hand in hand towards forging a robust link between research and strategic planning, aimed at leading the way to generating real change in the areas we have chosen to focus on.

The interim products of the work teams which are the driving force in moving this initiative forward and which will be presented at this conference, relate to several key strategic issues. These include: the importance of long-term thinking and planning in government and adopting a strategic view when dealing with major economic challenges, including the formulation of a concrete strategic plan for achieving a thriving economy in a sustainable and low-carbon environment by the year 2050; preparing for future employment challenges, with an emphasis on Israel's school system, higher education, and technical training; the necessary legislative changes deriving from changing realities in the labor market; and improving regulation and reducing the bureaucratic burden facing the business sector, which all too often serves as an obstacle in attracting investors to Israeli markets.

The conference's opening session explores the overarching question of how the government can develop and implement an economic and social vision for Israel, based on a long-term strategic approach. The discussion will focus on the changes needed in both structure and process, especially in the current political reality, in order to integrate strategic thinking and planning as inherent components of government functioning.

We believe that the conference is an excellent opportunity for firsthand and unmediated, professional, and productive interaction between leading figures from all sectors of Israel's economy. The conference facilitates an open dialogue among its participants and challenges their accepted practices and perceptions.

This year is the seventh year in which the conference is named for the late Eli Hurvitz, the founder of Teva Pharmaceutical Industries and one of Israel's leading industrialists. Eli was the chair of the Israel Democracy Institute's board of directors and for many years headed the Caesarea Economic Policy Planning Forum (as the conference was previously known). We deeply value what for us is a natural connection with Eli's lifework and with the Hurvitz family. We would like to thank Dalia and the rest of the family for enabling the continued existence of this important event.

I would also like to express my thanks to all our partners: -- the researchers and their research assistants and the chairs and members of the working teams for their active involvement in writing their research reports. I also want to express my appreciation to the director of the conference, Daphna Aviram-Nitzan, and to the entire staff at the Israel Democracy Institute.

Special thanks go to Professor Eugene Kandel, the conference chair, for his professionalism, depth, and uncompromising commitment to the conference's success.

A handwritten signature in black ink, appearing to read 'Y. Plesner', with a stylized, cursive script.

Yohanan Plesner
President, Israel Democracy Institute

Eli Hurvitz, Z"L – A Life of Achievement

Eli was born in Jerusalem and grew up in Tel Aviv, where he completed his studies at *Hacarmel* elementary school and *Ironi Alef* municipal high school. With the outbreak of the War of Independence in 1948, he joined the *Nahal* ("Pioneering Fighting Youth") Brigade together with a group of friends from the Hebrew Scouts youth movement. Following a short agricultural training program, the group founded Kibbutz Tel Katzir in the Jordan Valley, adjacent to the border with Syria. At Tel Katzir, Eli married Dalia, also a member of the group. In October 1953, the couple left the kibbutz and moved to Tel Aviv.

In the same year, Eli Hurvitz began his career in industry as a bottle washer at the *Assia* pharmaceuticals company, and after completing his studies, rose to the company's management team. Taking a long-term view of the importance of establishing a leading role in the Israeli market and of laying the foundations for future international expansion, he initiated the acquisition of the Israeli pharmaceutical companies *Zori* and *Teva*, and their merger into a single company, Teva Pharmaceutical Industries Ltd., of which he became CEO in 1976. Over the course of his long tenure as CEO and chairman of the board at Teva, Eli displayed outstandingly innovative strategic leadership qualities, as evidenced in the acquisition and merger of pharmaceutical plants throughout the world, and the adoption of a culture of excellence throughout the company's operations. Consequently, Teva became Israel's largest pharmaceuticals producer, and eventually the largest generic drug company in the world.

Eli's sense of social responsibility and his strong commitment to humanist and Zionist values propelled him to volunteer for a wide variety of public organizations. He served as a combat soldier in all of Israel's wars, rising from the rank of private during the War of Independence to the rank of lieutenant-colonel and deputy commander of an artillery support brigade as an IDF reservist during the first Lebanon War,

Recognition of Eli's rare talent as a leader and strategist led to his appointment to numerous public positions, alongside his work at Teva. As president of the Manufacturers Association of Israel, he played a key role in the establishment of the historic program for stabilizing Israel's economy in 1985–86. Among other positions, he served as chair of the board of trustees of the Weizmann Institute of Science; as a member of the international council of the Belfer Center for Science and International Affairs at Harvard University's Kennedy School of Government (2002–2005); and as chair of the "Israel 2028" Commission, whose conclusions were published and presented to the prime minister in a report titled *Israel 2028: An Economic and Social Vision and Strategy in a Global World*.

Eli's extensive work in the public and industrial spheres was recognized with a series of awards from academic and public institutions. He held six honorary doctorates, and in April 2002, was awarded the Israel Prize for Special Contribution to Society and the State in recognition of his life's work.

Eli had a special relationship with the Israel Democracy Institute, which he considered a vital institution for strengthening Israeli democracy. He attributed particular significance to the Institute's efforts to help the country's leadership make informed decisions and to implement policies based on research and planning, for the benefit of all Israel's citizens.

For six years, Eli was the chair of the Institute's board of directors, and was a constant member of the Caesarea Forum up to the very last year of his life.

Eli Hurvitz, born in 1932, died on November 21, 2011, at the age of 79.

Opening Remarks – Prof. Eugene Kandel, Conference Chair

How can we be strategic? How can we afford not to be?

In a world of perpetual uncertainty, driven by rapidly changing technology, and by constantly approaching elections, many say that strategy is wishful thinking. The claim is that rather than focusing on the long run, we as a society, should direct our government to navigate the upcoming crises, and hope for the best. Who has the time, the understanding, and the patience for the long-term? Definitely not the electorate, and therefore -- neither do most politicians.

If the Israeli government indeed becomes driven entirely by a short-term perspective, we will almost surely find ourselves in dire conditions within a decade or two. The demographics of Israel are not sustainable, and without a smart long-term policy, this boat will capsize. The antiquated education system will produce people with antiquated skills unable to compete. Consequently, the high-tech sector that drives the Israeli economy may not be here a decade from now. The Social Security system will go bankrupt; many tens of thousands of new geriatric patients will not find suitable care, and the medical system itself may collapse. The continuing movement of Israelis to the center of the country will continue, completely clogging transportation arteries, and depleting the periphery. The resulting slowdown in economic growth can lead to our inability to defend ourselves or to continue to be seen as an attractive place to live for many of our most productive citizens.

These events will not happen tomorrow, but they will happen, and correcting the results of our short-term perspectives will be either very difficult or impossible. Thus, given all the uncertainty and change, Israel simply cannot afford not to be strategic. While our government is not myopic, but nor is it strategic enough. There is much work to be done.

The conference focuses on several strategic issues, and brings together the government, industry, academia, and the third sector. Only if we generate good ideas, and exert sufficient pressure to implement them, will we produce the much-needed strategic collaboration for developing solutions for future problems well in advance. This is the main focus of this conference.

A handwritten signature in black ink, appearing to read 'E. Kandel', with a stylized, flowing script.

Prof. Eugene Kandel
Conference Chair

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The Israeli Economy: A Public Opinion Survey

Prof. Karnit Flug, Daphna Aviram-Nitzan, Yarden Keidar

Social and Economic Issues: The Public's Priorities and the Vacuum in the Election Campaign

The public debate surrounding the last election campaign barely touched on social and economic issues-- and for the most part--, nor did the parties' election platforms. Even when these issues merited a mention, it was only in the most general terms. A close reading of the parties' platforms reveals a lack of clarity in their messages on these issues. In addition, most of the platforms that do promise to expand and upgrade social services, fail to explain where the funding for this will come from.

By contrast, public opinion surveys have repeatedly revealed that the decisive factors in the choices of almost half of the voters are social and economic issues. In a survey conducted by the Israel Democracy Institute in February 2019 (prior to the first elections of 2019), around 45% of voters cited socioeconomic issues as their main concern, compared with 28% who cited security and foreign policy issues, and 11% --religion and state.

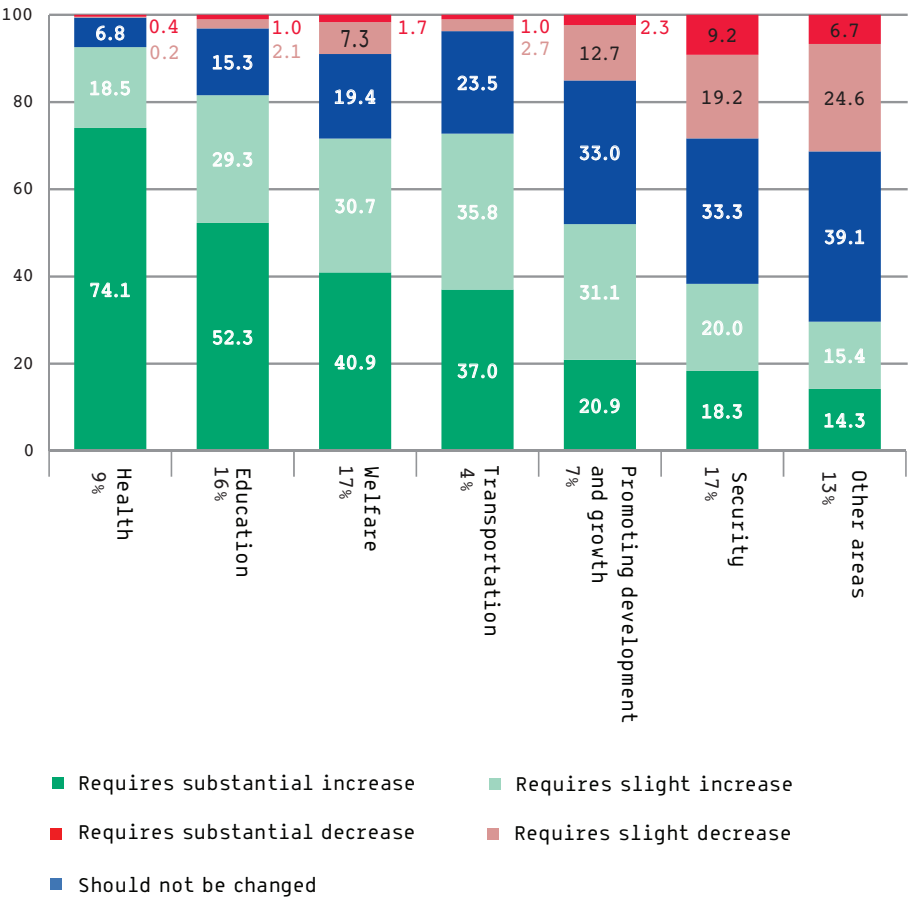
This new survey, conducted in July 2019 by the Smith Institute for the Israel Democracy Institute, examines Israeli public opinion on various socioeconomic issues ranging from the size of health, education, welfare, and transportation budgets, through Israel's budget deficit, and the anticipated National Insurance crisis, to the public's socio-economic priorities. The survey is based on a representative sample of the entire Israel population, adjusted for distribution by gender, age, area of residence, nationality, education, and, among Jews-- levels of religiosity.

The main findings regarding budget allocations for different purposes were as follows:

- An overwhelming majority (93%) support increasing the relative size of the health budget within the national budget, with 74% in favor of a substantial increase.

- 82% support increasing the education budget; 72% support increasing the welfare budget; and 71% support increasing the transportation budget.
- By contrast, only 38% support increasing the relative size of the defense budget within the national budget, with 33% in favor of maintaining it at its current level and 28% in favor of its reduction.

Figure 1. Public Opinion on Reallocation of Resources – What Change is needed in These Budgets’ Relative Size in the National Budget?
(% of survey respondents)



Expanding Services versus Raising Taxes: Lack of Clarity and Lack of Trust

Despite the great significance it attributes to socioeconomic issues, the public does not seem to believe that these will decide the elections. In other words, although it is important to the Israeli public that the party chosen to represent it for the next four years will invest efforts and resources to address socioeconomic problems, at the same time it believes that in fact--the elections will be decided on the basis of security issues. The policy positions (or election promises) put forward by parties on these matters, mainly relating to the provision of public services-- if they exist at all-- are vague, and in most cases, ignore the need to find the funding to address them. In many cases, parties propose unrealistic funding measures for their proposals that do not take into account the sources of funding and whether these are indeed sufficient to cover the necessary expenses.

The survey results reveal the **public's understanding that empty declarations are entirely meaningless:** proposals not backed up with sources of funding are perceived by the public as mere populism. A large majority of respondents (approximately 86%) think that public services (such as health, education, welfare, and transportation) should be expanded. However, only 36% of these would be willing to pay more taxes in order to fund such an expansion; 64% would not. Survey findings identify the main reason for the reluctance to pay more taxes as **a lack of trust that the government would indeed use the additional funds to provide more services to the public.**

When these same respondents who reported on the need to expand public services were asked about raising taxes designated to specific purposes (such as health and old age), which the public views as taxation that is separate from the overall tax system, the willingness to increase taxes rose from 36% to around 50%. The survey found that the public feels a sense of solidarity with vulnerable populations and is willing to help them. The willingness to pay more taxes was found to increase with level of income, despite the fact that those with higher incomes already bear a significantly higher tax burden. (The willingness to pay higher taxes in return for expanded public services was found to be 30% among those with below-average incomes, compared with 50% among those with above-average incomes.)

The Public Is Worried

A large majority of the public (79%) are concerned by forecasts predicting that in two decades' time the National Insurance Institute will be unable to meet its commitments.

Most respondents (73%) were aware of the government's budget deficit, and most (83%) also understand, at least to some degree, the implications of the deficit for them. Around one-quarter (24%) confessed not understanding the budget deficit issue at all. Of those who reported that they do understand, 33% believe that the deficit should be reduced, even if it means cutting back budgets for all government ministries, including health, education, welfare, and transportation. Only 11% believe that the deficit should be increased in order to fund an expansion of welfare services. Around one-third believe that the current level of budget deficit should be maintained, and that government budgets should not be cut in order to reduce it.

Satisfaction with one's Personal Financial Situation

Around 35% of the Israeli public is dissatisfied with their personal financial situation, compared with 29% who reported being satisfied. Dissatisfaction is especially high among Arab Israelis (60%) and those with low incomes (47%). Furthermore, a breakdown of the findings by age reveals that initially--satisfaction drops with age, from 34% in the 18–24 age group to a low of 21% among those aged 35–44. However, this trend is reversed beginning with age 45: Satisfaction rises from 27% in the 45–54 age group to 36% in the 55–64 age group, to a high of 46% among those aged 65 and above.

Government Performance Gets Low Grades

More than one-quarter of the respondents gave the government's economic policies a "fail" grade, while fewer than one-quarter awarded them a grade of "good" or "excellent." The average grade was 2.6—below the median score of 3 (on a scale of 1 to 5). Particularly low grades were given to the government's performance in reducing poverty and in narrowing social gaps (2.3) and health (2.4).

Respondents cited as the main reasons for the low scores they awarded the government-- as the political leadership's mistaken priorities and the fact that it doesn't care enough. Almost 60% of respondents cited these issues as their main reasons for low scores in the categories of narrowing social gaps (58%) and reducing poverty (55%); almost half cited them as their main reason for low scores in education (50%), transportation (47%), and health (45%). Only about 22% believe that there are real difficulties in solving problems related to transportation, while between 15% and 17% think the same regarding social issues, including poverty, social gaps, health, and education. Only a very small proportion among the public attribute low scores to a lack of budgets (between 7% and 13%).

Figure 2: This year's budget deficit is expected to exceed the target set by the government. What do you think about this? (% of those who responded that they understand the issue)

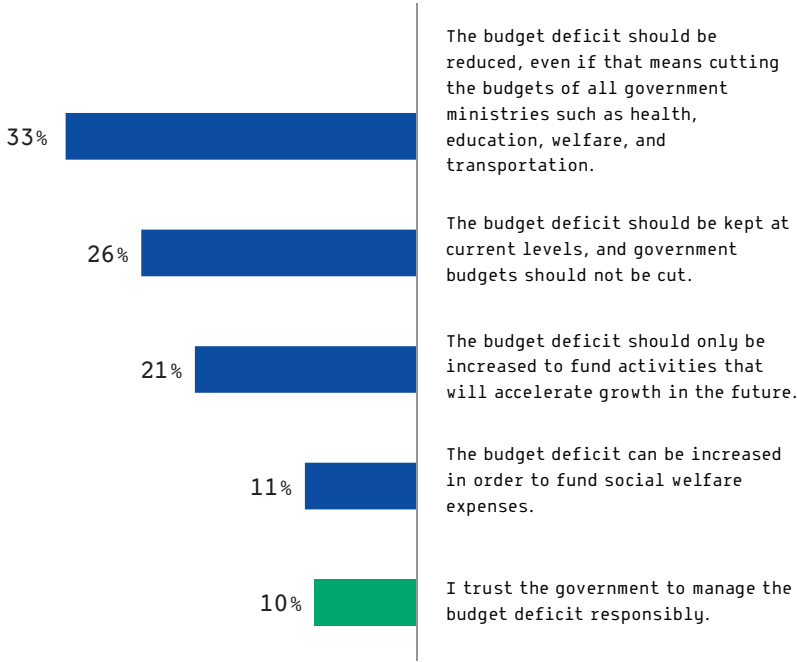
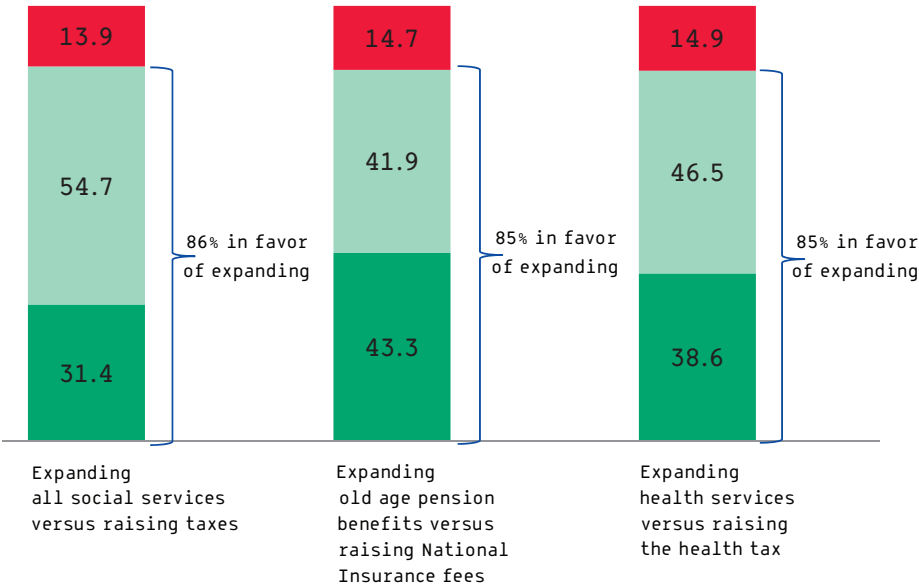
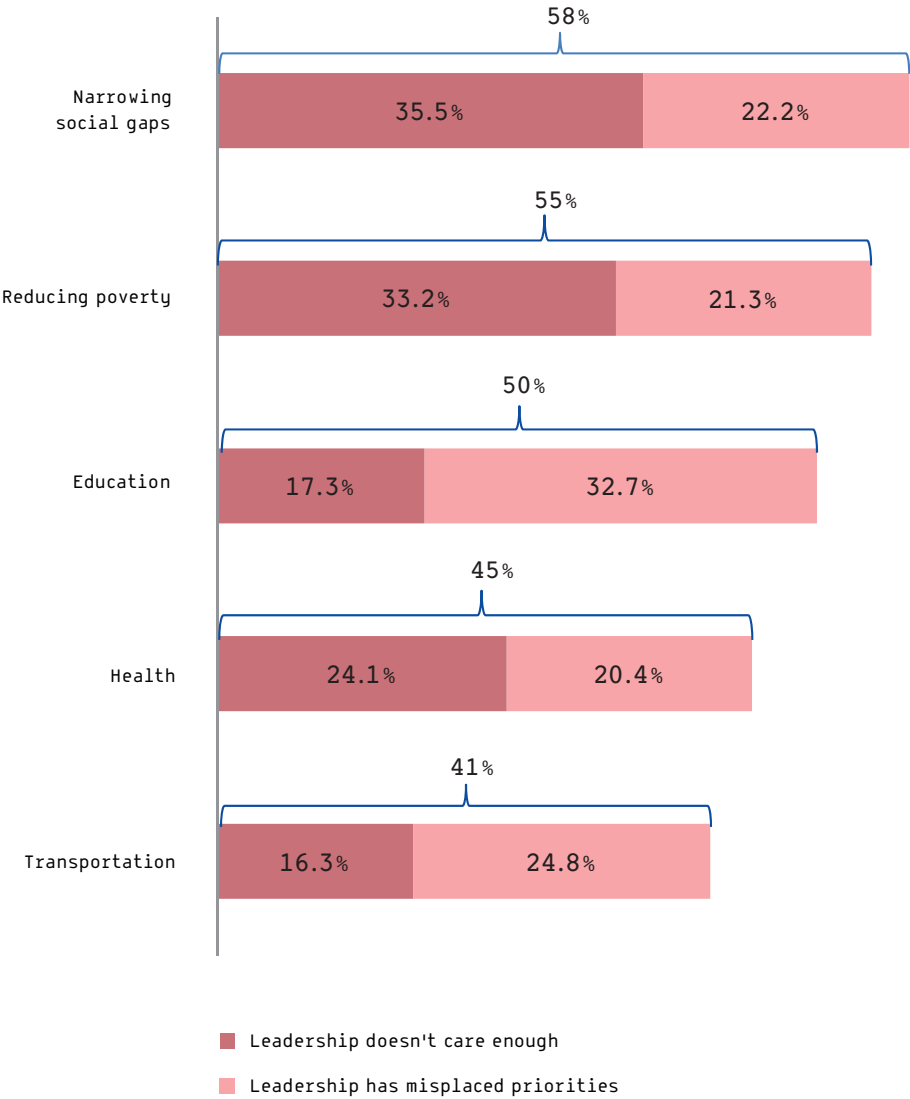


Figure 3: Expanding services versus raising taxes (% of respondents)



- Do not want to expand services
- Want to expand services but not willing to pay more
- Want to expand services and willing to pay more

Figure 4: A large percentage of those who gave low grades in each area justify this by indicating that political leadership has misplaced priorities or doesn't care enough (% of respondents)



Using Ex-ante Pledges to Reduce Dishonesty and Improve Regulation

Dr. Eyal Pe'er, Prof. Yuval Feldman, Omer Selivansky Eden, Daphna Aviram-Nitzan
Israel Democracy Institute

Executive Summary

Reducing regulatory burden is now one of the main goals of many government ministries, and in recent years, numerous reforms have been implemented in this area in Israel and elsewhere. However, easing regulation can sometimes expose the public to risk, as regulatees (citizens, entrepreneurs, and businesses) may act in an unethical and undesirable way, due to the reduced oversight or supervision. This problem may be managed using a “responsive regulation” approach, in which regulatory requirements are adapted to regulated bodies, and behavioral tools are used as a substitute for (or in addition to) more traditional enforcement tools. One such behavioral tool is the use of affidavits (authorized by an attorney) or pledges (usually just signed by the regulatee), in which the regulatee (e.g., an entrepreneur seeking a business license) professes in advance to abide by the regulatory rules and instructions, in return for eligibility for significant concessions in the bureaucratic process. For example, according to a reform to business licensing implemented by the Ministry of the Interior, certain types of low-risk businesses may receive a temporary business license if they provide an affidavit including such pre-commitments.

Studies in behavioral economics have shown that when people are asked to pledge in advance that they will behave in an ethical manner, the likelihood of their engaging in dishonesty reporting decreases significantly. The use of such affidavits (or pledges) may therefore achieve two goals simultaneously: easing the regulatory burden on regulated bodies and preventing unethical behavior by regulatees.

While easing the regulatory burden seems to be a clear and uncontested goal, the impact of pledges on the scale and scope of unethical behavior remains unclear. Similarly, it remains to be determined under what conditions (if at all) pledges may serve to reduce unethical behavior enough to justify concessions

in the application of regulatory, enforcement, and punishment tools in such a way that the public interest will remain unharmed. To date, there has been no research into the impact of pledges over time, which could shed light on whether this is indeed a tool that can be used without harming public security or the public interest. In order to examine the impact of pledges and to assess their effectiveness, we developed an experimental research study in which two large-scale, internet-based experiments were conducted.

Research Method

In order to measure unethical behavior, the study focuses on identifying and measuring the over-reporting of completion of tasks (for the purpose of securing a higher financial profit) in a way that resembles as closely as possible the real-life system of incentives regularly offered to citizens, entrepreneurs, and business owners.

The study used a task involving “matrix problems,” in which participants are shown a series of matrices (tables), each containing 12 numbers with two decimal figures and asked to find the pair of numbers that adds up to 10 within just 20 seconds. Participants in the experimental groups were rewarded according to the number of problems they reported having solved. They were not asked to provide the solution itself (that is, they were given an opportunity to cheat in order to profit), but were told that they will need to provide the solutions for just 10% of the matrices. Participants in the control group were required to provide the solutions to all the problems and were rewarded in return for the solutions.

The observed difference between the number of problems reported as having been solved (by the experimental group) and the number of problems for which solutions were actually provided (by the control group) is defined as “over-reporting” and serves as the estimate of the degree of cheating by the experimental group. Using this method, it is possible to assess the extent to which requiring an ex-ante pledge of honest intentions (in the experimental group) can eliminate or reduce the tendency to cheat.¹

1 This method has been extensively used in recent years in research into unethical behavior. See, for example, Nina Mazar, On Amir, and Dan Ariely, “The dishonesty of honest people: A theory of self-concept maintenance,” *Journal of Marketing Research* 45, no. 6 (2008): 633–644.

Experiment 1

The first experiment was carried out among a sample of 1,158 respondents, drawn from an international online panel. The experiment was conducted in English. Participants were asked to solve 15 matrix problems. They were divided into 10 groups: nine experimental groups and one control group.

In the control group, each participant was asked to enter the solution for each problem they claimed to have solved.

In the nine experimental groups, use was made of pledges and/or fines and/or reminders to reduce cheating, as follows:

- **Pledges (two levels):**
 - “No pledge”
 - “Pledges”—participants were asked to read and rewrite a pledge that had been worded in a very specific and informal manner.²
- **Fine (two levels):**
 - “Full fine”—participants who were asked to provide the solution to a problem they had reported solving but were unable to do so, lost the entire bonus earned during the assignment.
 - “Minimal fine”—if participants were unable to provide the solution, they lost the bonus only for the specific problem being checked.
- **Reminder (two levels):**
 - No reminder
 - Reminder that appeared on the screen showing, according to the relevant case conditions, the participants’ pledges and/or a reminder of the fine imposed for false reporting.

2 The pledge was worded according to a pilot study which identified the most effective wording from a number of alternatives. The chosen wording was as follows: “I promise that I will only report a solution to a problem after verifying carefully that I have indeed found two numbers that add up to 10. I know that I will be paid based on my reporting, and hence it is extremely important to be accurate in my reporting.”

Results

In the control group—referred to as the “standard track”—on the average, participants solved approximately 30% of the problems correctly. In all other groups, the average percentage of problems reported to have been solved, was higher to a degree which indicated over-reporting. As noted above, the extent of over-reporting was defined as a measure for the participants’ cheating rate. The cheating rate was highest in the experimental group that made no use of any prior pledge or fine. The participants in this group reported having solved almost 60% of the problems on average, which is double the rate found in the control group. The gap between these two mean scores provides an estimate of the cheating rate, which was around 30 percentage points.

By contrast, in the experimental group with a prior pledge (but no fine), the percentage of problems reported as solved, dropped to 49%. In other words, the gap between this group and the control group was just 19 percentage points, around one-third lower than the gap found when no pledge was made. Similarly, imposing a full fine with no prior pledge reduced the percentage of problems reported as solved to approximately 48%, a cheating rate of around 18 percentage points. Moreover, applying a combination of prior pledge with full fine reduced the percentage of problems reported solved to 38%—the closest to the control group—indicating a cheating rate of just 4 percentage points.

No significant differences were found between the groups in which a reminder was given and those in which no reminder was given. Similarly, no interaction was found between the pledge and the fine; that is, both the pledge and the fine, independently of one another, caused the participants to moderate their unethical behavior (i.e., their false reporting of having solved problems) in comparison with the conditions in which no pledge was made and no fine imposed. As noted, the use of a combination of both tools—pledge and fine—had a cumulative effect, and led to the highest reduction in cheating of any of the cases observed.

The experiment results are shown in Table 1 and Figure 1 below.

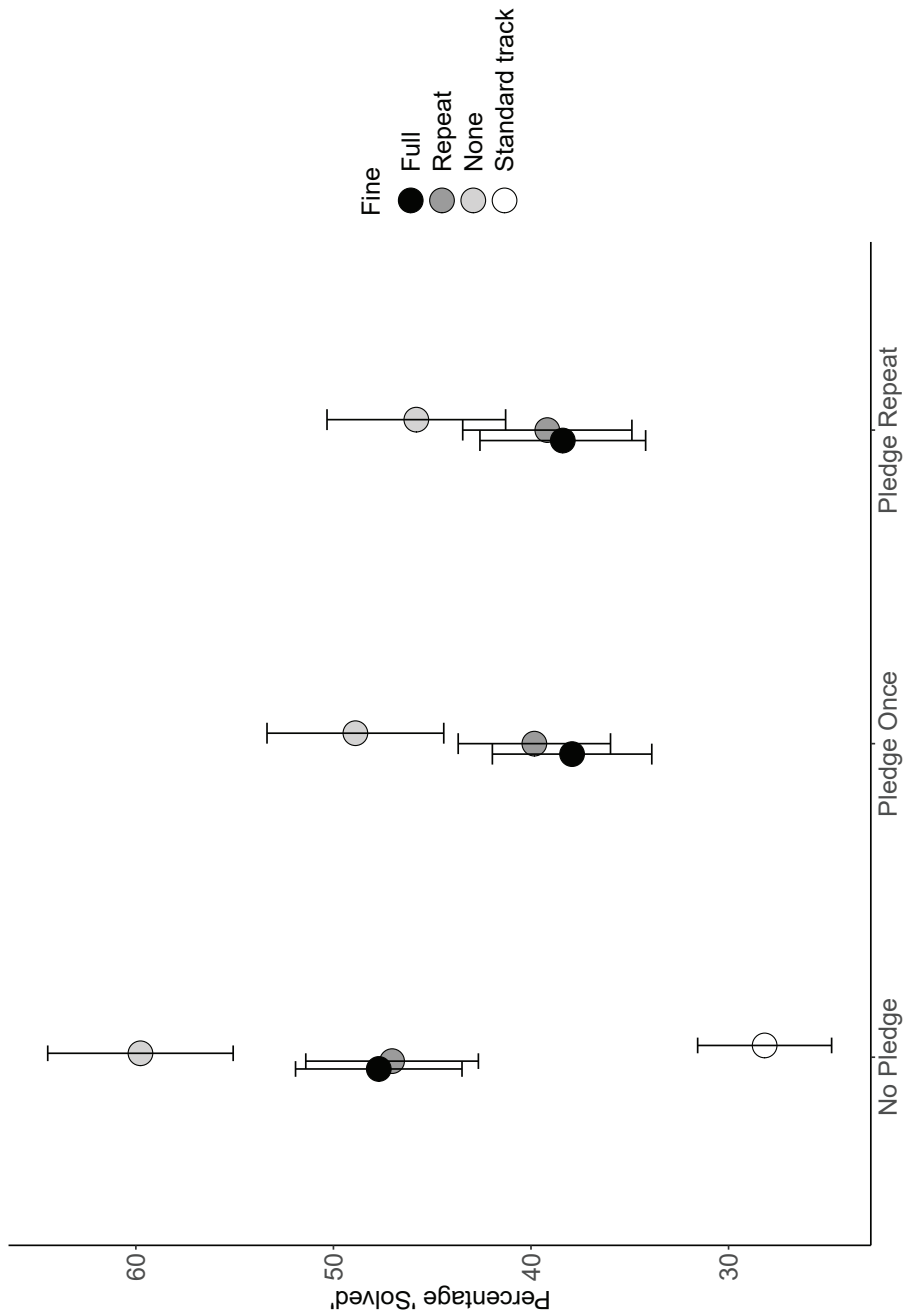
Table 1. Percentage of problems reported solved by experimental groups in decreasing order of mean percentage (Experiment 1)

Pledge	Fine	N	Mean*	Standard deviation	Median	Cheating rate**
None	None	94	59.86	25.68	53.33	200%
Advance	None	98	49.32	24.53	46.67	165%
None	Full	107	48.54	22.94	46.67	162%
Advance + reminder	None	95	48.21	25.40	46.67	161%
None	Full + reminder	115	47.77	25.71	46.67	160%
Advance	Full + reminder	108	39.69	21.25	33.33	133%
Advance + reminder	Full + reminder	94	38.79	22.29	40.00	130%
Advance	Full	91	38.10	20.78	40.00	127%
Advance + reminder	Full	99	37.24	21.9	33.33	125%
Standard track		93	29.89	17.87	33.33	

* The difference between the control group and the experimental groups was significant under all conditions ($p<0.05$).

** The difference in the percentage of problems reported as solved and the percentage of problems actually solved correctly in the standard track (control group).

Figure 1. Percentage of problems reported solved according to group (Experiment 1)



Experiment 2

In order to validate and replicate the results of Experiment 1, an additional experiment was conducted with 491 participants, all from Israel. The research method for Experiment 2 was similar but with two differences: first, the entire experiment, including all instructions and the pledge, was conducted in Hebrew; second, since Experiment 1 found no effect for the warning given to participants, Experiment 2 did not include either an experimental group in which a warning was given or an experimental group in which a full fine was imposed with no pledge. All the other conditions remained the same.

Results

Experiment 2 yielded similar results to Experiment 1. The participants in the standard track (control group) succeeded in solving 33% of the problems on average. By contrast, participants in the experimental group who were not required to give a prior pledge (the “fast track”), reported being able to solve 65% of their problems, while those who were required to give a prior pledge reported solving only 47% of the problems. The group which both made a prior pledge and received a warning that false reporting could result in being fined their entire bonus, reported solving 50% of the problems.

The differences between the groups are shown in Table 2 and Figure 2 below.

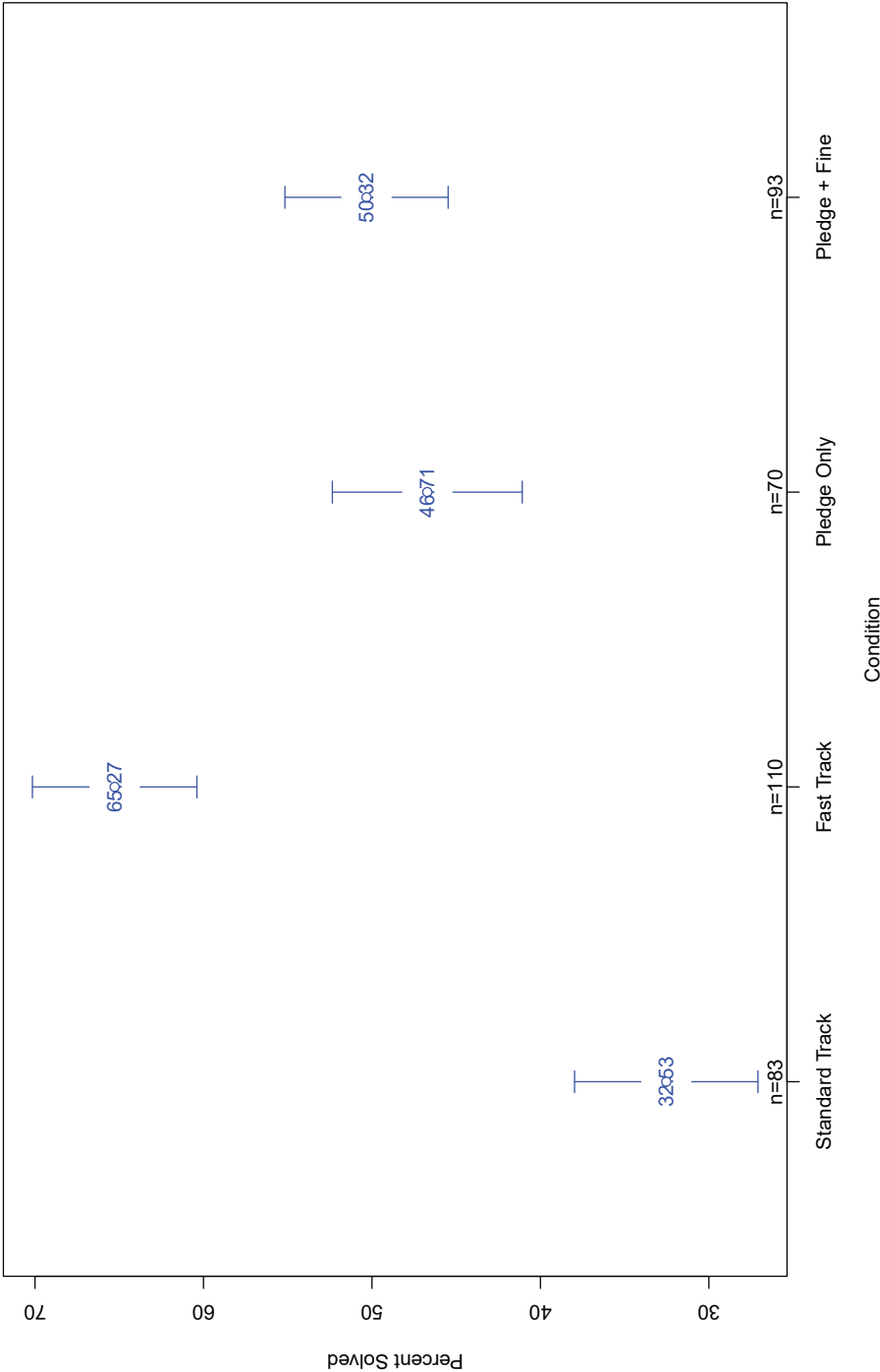
Table 2. Percentage of problems reported solved by experimental groups in decreasing order of mean percentage (Experiment 2)

Pledge	Fine	N	Mean*	Standard deviation	Median	Cheating rate**
None	Minimal		65.3	25.8		33
Advance	Minimal		46.7	23.3		14
None	Full					
Advance	Full		50.3	23.5		17.8
Standard track			32.5	24.5		

* The difference between the control group and the experimental groups was significant under all conditions ($p<0.05$).

** The difference in the percentage of problems reported as solved and the percentage of problems actually solved in the standard track (control group).

Figure 2. Percentage of problems reported solved according to group (Experiment 2)



Summary and Conclusions

The results of the two experiments point to several conclusions.

Conclusion 1: *Pledges significantly and substantially reduce cheating.* The reduction in cheating due to prior pledges (compared to conditions in which no pledge was required) was both statistically significant and substantial on a practical level—reducing between one-third and one-half of the cheating rate.

Conclusion 2: *Using pledges and fines together can result in a cumulative reduction in cheating.* There is a clear benefit to combining pledges and fines for reducing cheating.

Conclusion 3: *The effect of pledges does not decline over time.* In both experiments, no evidence was found of a rise or compensation in the level of cheating over the course of the various problems given to the participants. Instead, the level of cheating remained constant throughout the assignment.

The findings of this study indicate the inherent and unrealized potential in the use of pledges to reduce the regulatory burden while simultaneously maintaining, and even increasing, compliance and preventing cheating and other unethical behaviors. However, it is important to note the limitations of the study conducted entirely online in an artificial controlled environment: The situation faced by participants in this study was different from other situations in which pledges may be used, both because the size of the fine imposed was small, and the test lasted for a relatively short time. We therefore recommend further experimentation on a much larger scale in order to examine the impact of pledges in real-world situations and assess their potential for improving regulation and making it more efficient, while also preventing and reducing cheating and non-compliance. Should the findings prove consistent with the online studies' results, it can be concluded that pledges may also help restore and foster trust between government regulatory agencies and the citizens, entrepreneurs, and business owners whom they regulate.

Overregulation and Corruption

Proposal 28

Omer Selivansky Eden with Yuval Feldman

Abstract

The development of modern states has always gone hand-in-hand with the development of an extensive regulatory system, whose purpose is to set and enforce clear rules for both desired and compulsory behavior that will ensure proper economic activity and promote social values. However, in response to the emergence of the regulatory state and the rise of regulatory bodies, the last decades of the 20th century have seen growing criticism of the proliferation of regulation. Among other things, it was claimed that burdensome regulation risked doing harm to the very areas that regulation was intended to repair, such as bolstering proper governance and reducing corrupt practices. This criticism grew more vocal, as evidence emerged that states with tighter regulation tend to be more corrupt.

These findings can be explained on the basis of the theory of “regulatory capture,” which attempts to explain the ways in which regulators are liable to misuse their powers in order to further their own personal interests or those of their family, friends, or colleagues. The theory points out that while the benefit to any individual citizen from regulatory activity protecting the public interest is only limited, the benefit to any given regulated body from regulation being swayed in its favor, is extremely significant. It is therefore likely that the small number of dominant players in each regulatory domain will invest significant resources in attempting to influence regulators, while the broader public will tend not to get involved. Regulatory capture theory relates mainly to incentives that are offered to regulators in a clear, direct, and agreed upon manner, such as bribery or other illegitimate favors, in exchange for protecting the interests of the regulated body.

In contrast with the regulatory capture theory which focuses on flagrant corruption stemming from conscious and informed decision-making, the field of behavioral ethics emphasizes the influence of the interaction between regulators and those being regulated, and the context within which the regulators operate,

which can often sway them in the regulatees' favor. This is known as "contextual corruption." Regulated bodies may thus gain preferential treatment due to the existence of professional and social frameworks fostering close relationships between regulators and regulatees. In addition, regulators may come to see themselves as sharing a common professional identity with the "regulatees", as experts in the field under regulation, and are also somewhat dependent on the latter's professional knowledge and expertise. This phenomenon is known as "cultural capture."

While most enforcement efforts focus on various forms of blatant corruption, there has been much research indicating that most white-collar crime involving corruption is carried out by law abiding normative individuals who brush aside the problematic nature of their activities. Thus, efforts to address contextual corruption focus on identifying and highlighting problematic situations and arrangements. This is based on the assumption, that bringing to light cases in which public servants harm the public interest, is likely to induce many regulators to act more carefully in its defense, and to avoid placing themselves in problematic situations.

The research literature presents several characteristics of the nature of regulation and the regulatory environment which promote conflicts of interests and problematic behavior on the part of the regulator. These include:

- Forms of regulation that are poorly suited to the nature of the market and the regulated bodies
- Close relations between the regulators and industrial bodies affected by regulation
- Arbitrary regulatory requirements which are clearly influenced by the regulator
- Lack of transparency in regulatory requirements and in the regulator's means of operation
- Lack of accountability in the public sector
- Frequent transitions of senior figures from regulatory bodies to industry, which may create conflicts of interests and the public's perception of corruption
- Regulatory requirements that become anachronistic and irrelevant over time, such that their implementation can lead to problematic practices

This paper presents proposals for actions to mitigate the institutional characteristics that strengthen the linkage between regulation and corruption.

In order to weaken the linkage between regulation and corruption, we must examine the incentives which regulation is liable to generate. We must make certain that regulation is appropriate, transparent, and updated from time to time; that the regulators themselves are aware of the positions of all relevant stakeholders on the regulation and the difficulties it creates for them; that regulators' malfunctioning and failures are carefully examined and they are accountable for them; and that a mechanism is in place to regulate the transition of public servants into the private sector, and vice versa.

Israel 2050: A Strategic Plan for a Thriving Economy in a Sustainable Environment

The Impact on Quality of Life in Israel Executive Summary

Daphna Aviram Nitzan and Erez Sommer

Background

At the beginning of 2019, Israel launched a major initiative to promote the transition to a thriving low-emissions economy, spearheaded by the Ministry of Environmental Protection, the Israel Democracy Institute, the OECD, and the Ministries of Finance, Transport, Energy, and the Economy. Reducing emissions is vital in order to halt global warming, which is generating a range of threats including: changes in the quantity and distribution of precipitation; a rise in the frequency and intensity of extreme weather events (e.g., flooding, drought, heatwaves, and hurricanes); a drop in the volume of water flowing in streams and rivers in the summer months; and the melting of polar ice caps and the associated rise in sea levels, threatening the very existence oceanic island states, and which may eventually flood major coastal cities around the world.

These processes could have a far-reaching impact on Israel's national, economic, and social resilience as well as on its security. The Middle East is heating up at a rate that is double the average global rate of warming, and temperatures in the Southern Mediterranean are expected to reach 46 degrees Celsius by 2050. While Israel, unlike other states further south, is not facing an existential threat due to climate change, being unprepared for the consequences of climate damage may lead to significant crises and pose a real strategic threat. Anticipated challenges include:

- **Strategic and security threats:** The melting of polar ice caps and rising sea levels are already opening up new marine trading routes, which may reduce the strategic importance of the Middle East as a trade route. This scenario may undermine incentives for international support for Israel, resulting in instability in the Middle East and harmful to Israel.

- **Waves of migration reaching Israel's borders:** There is potential for large-scale migrations from areas that undergo desertification and become hotbeds of starvation and violence, due to food insecurity. Waves of migration and refugee camps at Israel's borders could undermine stability and lead to hostile incidents-- and even wars- in the region.
- **Threats to food security and increased dependency on resources:** Global warming is expected to lead to a rise in the prices of strategic resources such as water and food reserves. Israel's ability to continue to import food at any price is not assured. The government is thus responsible for maintaining the resilience of Israel's agricultural sector, which involves ensuring sufficient land reserves for agriculture, replacing protection quotas with direct subsidies to farmers, and continuing to develop the country's water desalination capabilities.
- **Rise in Israel's national debt:** Due to the expected increases in food and water prices and the need to expend large sums in order to import agricultural produce, Israel can expect an increase in its national debt.
- **Threats to energy independence:** Climate change is expected to increase energy consumption (for heating and cooling). Because Israel is an "energy island," forced to supply all of its own energy needs with no support from neighboring countries, it is important that the country ensures maximum energy efficiency, maintains energy reserves, and develops storage solutions for renewable energy. This will be particularly important toward 2050, when Israel's gas reserves are expected to be exhausted.
- **Damage to economic growth:** Climate change is expected to threaten economic growth worldwide, including in Israel. According to estimates by the US National Bureau of Economic Research,³ the effects of climate change may reduce Israel's GDP by 1.4% by 2050, and by around 4% by 2100.
- **Reduced competitiveness:** OECD states are already preparing for the threat of climate change by introducing strict new regulations and setting ambitious targets for clean economies. The Israeli business sector will have to adapt to

3 Matthew E. Kahn, Kamiar Mohaddes, Ryan N.C. Ng, M. Hashem Pesaran, Mehdi Raissi, & Jui-Chung Yang, *Long Term Macroeconomic Effects of Climate Change: A Cross-Country Analysis*. National Bureau of Economic Research, Cambridge, MA, 2019. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3416284.

these stricter international standards, so as to remain competitive. Companies failing to comply with new standards on reduced emissions and the use of green and clean energies will not be able to compete for-- and win-- tenders and export deals around the globe.

At the beginning of 2019, the Israeli government launched a comprehensive strategic plan to address these issues, further to the commitments made as part of the Paris Agreement to meet international targets for reductions in greenhouse gas emissions by 2030. This plan, titled “Israel 2050: A Thriving Economy in a Sustainable Environment,” (hereafter: Israel 2050) involves the first implementation in Israel of the “whole-government” approach for a strategic national project. According to this approach, government ministries should operate “beyond the confines of their defined mission in order to achieve shared goals and to pool resources, so as to be able to respond to various and wide-ranging issues such as the development of national infrastructures. By definition, these issues are inter-ministerial in scope and require cooperation among government ministries. Israel 2050 calls for an innovative implementation of the whole-government approach, and involving inter-ministerial coordination and cooperation, and inter-sectorial cooperation with the business sector and with civil society organizations. The Israel Democracy Institute has taken on the leadership of this initiative, based on the belief that practical application of the whole-government approach is vital for implementing a strategic plan of this type. The Institute’s leadership has created a neutral safe space for discussion among ministries and across sectors, in a roundtable format.

The plan presents a vision and concrete goals for reducing greenhouse gas emissions, which will be translated into a detailed government resolution and a climate law, drafts of which will be presented at the United Nations Framework Convention on Climate Change. Successful implementation of the plan is likely to result in a significant reduction of Israel’s exposure to the harm inflicted by climate change and to associated strategic threats.

In order for the plan to be implemented successfully, the government will also need to take into account its socioeconomic implications. It is important to prevent a situation in which the transition to a clean economy will harm vulnerable populations (due, for example, to increased taxation on fuel or to rising housing

prices caused by environmentally friendly construction standards). Turning a blind eye to the potential harm to these populations, created by the shift to a green economy might generate social unrest, protests, and opposition. This, in turn, could threaten the government's stability and the country's economic resilience, as the weakest strata of society suffer, and inequality grows.

In an attempt to map the potential social consequences of Israel 2050 for the benefit of government decision-makers, the Israel Democracy Institute prepared a comprehensive report that provides a “dashboard” of the plan's expected impact on citizens' quality of life in various areas. The report presents a set of alerts to guide the government and civil society's work towards reducing the plan's negative impact and maximize its benefits for society as a whole. The report assesses the Israel 2050 plan using the wellbeing indicators set by the government to measure quality of life, and thus constitutes a first-of-its-kind implementation of government resolutions 2494 and 4631,⁴ evaluating the implications of the plan in terms of these indicators and in accordance with OECD guidelines.

The report presents the anticipated effects of the plan (e.g., improves/no effect/worsens) on each of the life areas for which Israel has defined wellbeing indicators, as compared with the trends which we anticipate if the plan were not implemented. In addition, the report details a set of policy proposals for ensuring maximum realization of the plan's potential for positive impact on the relevant wellbeing indicators, with the aim of achieving optimal improvement in the quality of life of the Israeli public.

4 This report was written in the spirit of these two government resolutions that were adopted in relation to this issue. Resolution 2494, adopted in April 2015, led to the development of a system of indicators for assessing quality of life, sustainability, and national resilience, with the goal of enabling decision-makers and the Israeli public to assess the impact of government planning and budgeting processes on the quality of life of Israeli citizens. Resolution 4631, adopted in July 2019, called for the adoption of the UN's Sustainable Development Goals in order to improve governance and government strategic planning in Israel. This resolution was designed to ensure that government planning will support the improvement of citizens' standard of living and quality of life, increase the resilience of the country's various complex systems, households, and individuals, and promote sustainable development.

Analysis of the Israel 2050 Plan's Impact on Quality of Life

A positive impact is expected on the **quality of employment** and satisfaction from work, including a higher rate of growth in waste management and related market areas. However, for the plan to be successfully implemented, it will need to be made financially advantageous for companies. If it involves the imposition of taxes or strict regulation on industry without any accompanying support, this could lead-- in the short term-- to reduced profitability, competition, and growth, along with negative consequences for employment. In the long term, the plan will bear fruit by improving competitiveness and supporting growth and employment. The government must explore effective ways of encouraging industry to make the transition to clean technologies, using international experience in this field, and must make advance preparations by providing professional training to meet the needs of the newly developing areas.

There is potential for a positive impact on **housing and infrastructures**. At the same time, there are concerns as to an increased burden on those living in rented accommodations, should the plan lead to a rise in rental prices. This might marginalize vulnerable populations, who would not be able to afford the higher rents in new, environmentally- friendly, high-rise buildings, and would thus have to settle for living in lower quality housing in which energy and water costs will be higher. The government must ensure that vulnerable populations are also able to benefit from environmentally friendly construction, and that every city is planned in accordance with the rules of the circular economy in a way that supports access to a collaborative economy, which mainly benefits vulnerable populations.

In the short term, an increase is expected in housing costs and in both direct and indirect housing payments, but in the mid and long term--there is an opportunity for a steady and continual decline in expenditures on energy and water. Israel's government must examine ways of mitigating this burden in the short term, particularly among vulnerable populations who will struggle to cope with higher costs during the transition period. The plan should also be used to improve the connection and accessibility to basic infrastructures of those populations that have not yet been connected (for example, the Bedouins in geographically distant areas

A positive impact can be expected on Israelis' **material standard of living** and overall satisfaction with their financial situation, particularly in terms of improving the relative situation of populations in the periphery. In the long term, the plan has potential for a positive impact on the standard of living of homeowners, in contrast to the expected negative impact on those in rented accommodations.

In the short term, all elements of the plan are expected to increase the **public debt-to-GDP ratio per person** due to the need for large-scale investment in upgrading national infrastructures, buildings, and cities. It is therefore reasonable to assume that in the short and medium term there will be an increase in public taxation in order to fund the necessary investment. However, in the long term, this trend is expected to reverse, and there will be a decline in the public debt-to-GDP ratio, thanks to the impact of these massive investments on improving competitiveness and accelerating growth.

There is potential for improving the **level of satisfaction with the various education systems**. This is due to improved accessibility to education systems, and to the increased probability that even people born to parents without an academic education will gain an academic education.

Implementation of the plan is expected to increase **general public satisfaction** and to improve Israelis' trust in the efficiency of state institutions, as well as enhancing the areas of leisure, culture, and community life. However, the government bears responsibility for ensuring that environmental standards do not become the sole property of the wealthy, but rather--are accessible to all social groups, including those in economically disadvantaged communities and those perceived as vulnerable populations.

There is a great expectation of improving **personal safety** and reducing the number of serious casualties from road accidents.

An improvement in public attitudes toward government institutions and a strengthening of civic engagement can also be expected. . It is important to ensure, from the earliest planning phases, that the locations chosen for new green energy production facilities (e.g., solar farms, wind turbine farms, or natural gas exploration rigs) do not cause extensive damage to open and green spaces. Damage of this kind undermines public trust in state institutions and in their functioning.

The plan can be expected to bring wide-scale improvement to all the **health and environment indicators** that are measured in the report on wellbeing indicators.

Table 1. Impact of Israel 2050 Plan on Wellbeing Indicators in Israel

Area	Impact on each indicator (positive or negative)			
	Buildings and Cities	Transport	Industry and Waste	Energy
Quality of employment	↑	↑	↑ ↓	↑ ↓
Housing and infrastructure	↑ ↓	↑	↑	↑ ↓
Material standard of living	↑ ↓	↑	↑ ↓	↑ ↓
Schools, higher education, skills	↑	↑	↑	↑
Personal and social wellbeing	↑	↑	↑	↑
Leisure, culture, community	↑	↑	↑	↑
Personal safety	↑	↑	↑	↑
Civic engagement and government	↑	↑	↑	↑
Health	↑	↑	↑	↑
Environment	↑	↑	↑	↑

Policy Recommendations

1. Preparations should be made and concrete plans drawn up for coping with the consequences of climate change on Israel’s economic resilience and security.
2. Options should be explored for preserving and developing Israel’s agricultural sector.
3. Inter-ministerial coordination is needed in several areas:
 - a. Coordination between the four different plans, from the very earliest planning stages;
 - b. Coordination with the Israel Innovation Authority and the Israel Investment Authority;
 - c. Coordination with the planning of industrial areas and regional clusters.

4. Suitable preparations need to be made for training the personnel necessary for implementing all these plans.
5. A comprehensive educational program on sustainability should be implemented. The younger generation is expected to lead change processes that will last for approximately three decades.
6. Coordination is required with other government plans. Steps should be taken to ensure that Resolution 922, on government action to promote economic development in minority populations from 2016 to 2020, will be adapted to and coordinated with this plan in order to prevent a waste of resources and to ensure that these populations benefit from the plan's vision.
7. Coordination with local authorities. Steps should be taken to ensure that the strategic plans of local authorities are coordinated, in order to support the successful implementation of this plan, and that tools enabling government supervision are put in place.
8. Balanced management of the tax burden. Before making decisions on taxation, assessments should be made regarding which populations are expected to bear the brunt of the plan and options examined for limiting this impact: specifically, options for reducing the burden on the public caused by the transition to environmentally friendly construction and for reducing the burden on industry, which will need to make huge investments and to change production processes. The state should ensure that these transition costs do not inflict severe damage to industry profitability, which could lead to worker lay-offs and factory closures.
9. The effects of the plan on housing and rental prices should be carefully managed. The state should ensure that transitional costs do not result in a rise in housing costs and do not harm vulnerable or non-home owning populations.
10. An organized system should be put in place for monitoring and evaluating results, making it possible to measure progress toward quantitative targets and examine the impact on wellbeing indicators.
11. Short term versus long term: The potential harm to citizens' quality of life during the transition period (short term) must be taken into account and steps taken to mitigate this negative impact.

The Growth in the Number of Five-Unit Mathematics High School Graduates – Is the Higher Education System prepared to integrate them

Dr. Eitan Regev and Gabriel Gordon

The Israel Democracy Institute

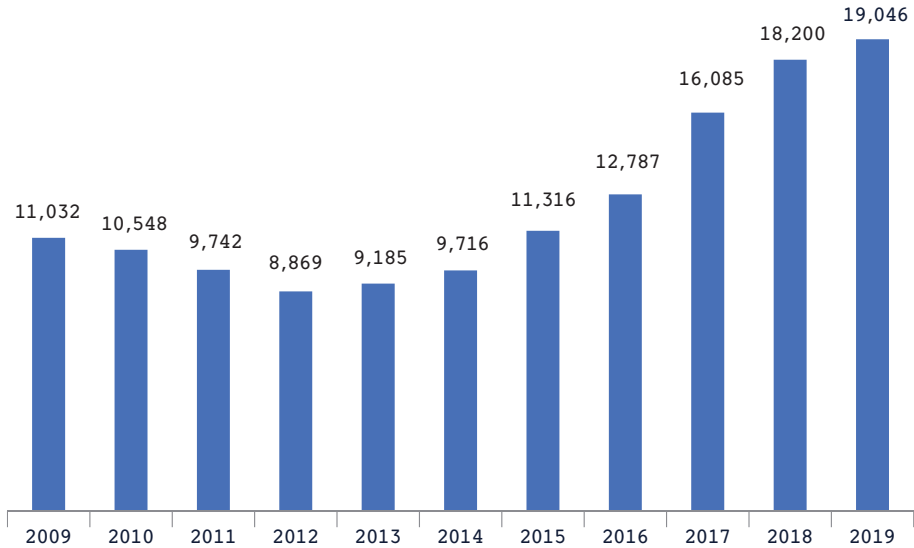
The Five-Times-Two Reform and Its Impact on the Expected Demand for Academic Studies in Science and Engineering

In 2013, the Ministry of Education launched its Five-Times-Two reform in response to the significant drop in the number of students successfully completing high school with five-unit matriculation⁵ in mathematics, physics, chemistry, and technological subjects, and the growing shortage of teachers in these fields. The ministry's data demonstrate the success of this and several of its other initiatives, such as Give Five (since 2015) and Scientific-Technological Cadets (since 2011). Between the 2012/2013 and 2018/2019 school years, there was a nationwide increase of around 10,200 students who graduated with five-unit mathematics (see Figure 1).

5 In Israel's high school matriculation system ("bagrut"), students may opt to be tested at one of three levels: three, four, or five units, with the latter being the highest level academically. Five units in mathematics is a prerequisite for many university degree courses in various scientific subjects.

Figure 1. Number of students graduating with five-unit mathematics 2009–2018.

Source: Authors' analysis of data from the Ministry of Education and the Central Bureau of Statistics



This sharp increase in the number of high school graduates with five-unit mathematics—many of whom are likely to seek entry to science-based degree programs at institutions of higher education—gives rise to questions about the expected growth in demand for these programs in five years from now (2024/2025), when these high-school graduates are due to enter higher education. At what rate can the number of applicants to science and engineering degree programs be expected to grow over the next five years due to this increase in the number of high school graduates with five-unit mathematics? And are the existing resources sufficient to cope with this anticipated growth?

Expected Growth in Demand for Science-Based Degree Programs

The data reveal that the source of most of the growth in the number of new high school graduates with five-unit mathematics can be found in affluent areas of Israel and among the higher socioeconomic population groups. In our research, we used these characteristics to estimate the future growth in demand for science-based degree programs.

By cross-referencing administrative data from the Ministry of Education, academic institutions, and the Council for Higher Education, we were able to analyze cohorts from previous years and establish the probability that students will apply for science-based programs according to the number of mathematics matriculation units. This analysis revealed that around 90% of five-unit mathematics graduates entered academic study programs, with this figure dropping to around 76% for four-unit graduates, and around 54% for three-unit graduates. A breakdown of students' chosen areas of study in 2018 shows that 56.6% of students with five-unit mathematics entered science-based programs (which lead to careers in hi-tech), while this was true for only 30.2% of those with four units, and 13.2% for those with three units.

Assuming that the respective share of high school graduates with five-unit, four-unit, and three-unit mathematics applying to science-based degree programs remains at current levels (but that there will be more applicants with five units),⁶ we can estimate that much of the growth in the number of five-unit graduates will be translated into a growth in the number of applicants to science-based degree programs (as shown below). We thus calculated an estimate for the expected future growth in the number of applicants to these programs in the context of the sharp rise in the number of graduates with five-unit mathematics between 2014 and 2019. Figure 2 below shows how this estimate was calculated.

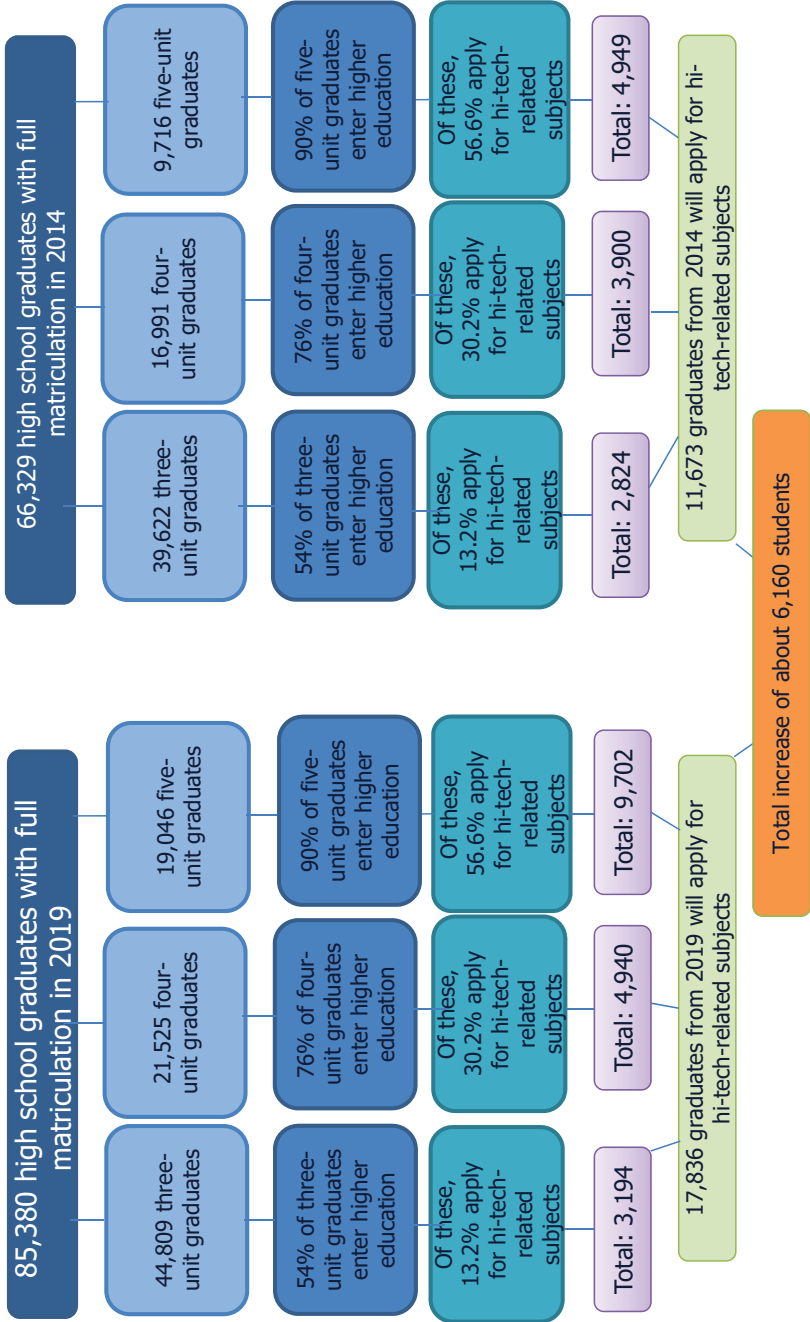
Of all 12th grade students in 2014, 9,716 achieved matriculation in five-unit mathematics, 16,991—in four; and 39,622 achieved three-unit mathematics. By taking the number of five-unit graduates and based on breakdowns of previous years' cohorts, we were able to assume that 90% will apply for an academic degree program, and that 56.6% of these will choose a science-based program.⁷ In other words, of the 9,716 students who achieved five-unit mathematics matriculation in 2014, around 4,949 will apply for degree programs in science-based subjects, as will around 3,900 four-unit graduates and 2,824 three-unit graduates. We performed a similar calculation for the 2019 cohort. Accordingly, of the 19,046 students who achieved five-unit mathematics, around 9,702 will apply for

6 This is a reasonable assumption in this context, as recent years have seen a rise in the proportion of five-unit graduates applying for science-based programs.

7 This rate also takes into account our estimate of an over-demand for science-based programs, as presented below.

science-based degree programs, as will around 4,940 four-unit graduates, and around 3,194 three-unit graduates. Based on both estimates (for the 2014 and 2019 cohorts), we can project that the sharp rise in the number of high school graduates with five-unit mathematics between 2014 and 2019 will lead over the next five years to an annual increase of around 6,160 applicants to degree programs in science-based subjects.

Figure 2. Predicted increase in the number of applicants to science-based programs, graduates with five-unit mathematics (all figures approximate).



Source: Authors' analysis of Central Bureau of Statistics data and administrative data from the Ministry of Education and academic institutions.

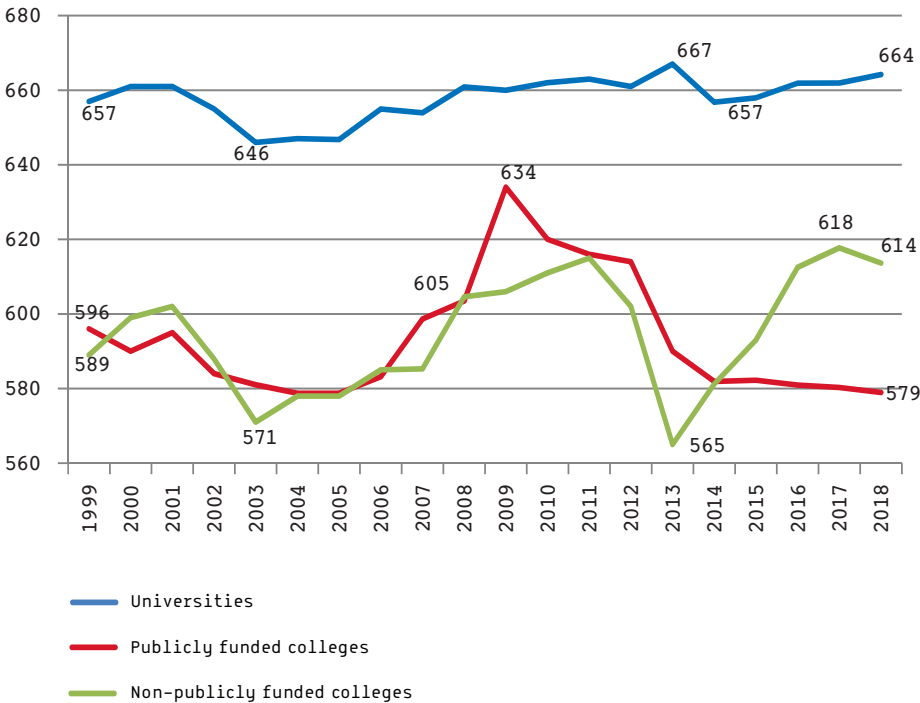
Estimate of Current Over-Demand for Science-Based Degree Programs

The acceptance rates to science-based degree programs currently stand at around 67%, that is, around two-thirds of applicants (about 8,000 people a year) are not accepted. It is difficult to determine how many of these applicants meet the criteria for studying these subjects at either universities or colleges, but are not accepted due to capacity limitations such as inadequate staffing or infrastructure limitations. Figure 3 shows that between 2003 and 2018, there was a rise of around 30 points in the psychometric test score of successful applicants to university programs in mathematics, statistics, and computer sciences (excluding the scores for Ariel University⁸) and around 40 points for privately funded colleges.⁹ This means that many of the candidates, who are not accepted to these programs today, would have been accepted in 2003. Moreover, it is likely that many others do not apply today, due to the rise in the psychometric test score required for entry.

- 8 As of the 2013/2014 academic year, Ariel University was also included in this calculation, and thus this year saw a sharp drop of around 10 points in the average psychometric test scores of students in these subjects. Since then, the steady rise in average scores has continued, reaching 664 in 2018. Thus, we can cautiously estimate that for the rest of the universities (those included in the calculation prior to 2013), the average score in 2018 is approximately 674—a rise of around 28 points relative to 2003.
- 9 In Israel, in addition to the nine established universities, there are also dozens of academic colleges. Some of these, the publicly funded colleges, are budgeted by the Council for Higher Education and come under its supervision; others, the non-publicly funded colleges, are private institutions.

Figure 3. Average psychometric test scores of first-year students in mathematics, statistics, and computer sciences by type of academic institution, 2003–2018.

Source: Authors’ analysis of Central Bureau of Statistics data.



Based on the (reasonable) assumption of a normal distribution, we used the averages and standard deviations of students’ psychometric test scores to arrive at a good approximation of the distribution of scores in each subject for each year. Figure 4 presents the estimates of these distributions for the years 2003 and 2018 in the relevant science-based degree programs.¹⁰ In this figure it is noticeable that at the lower range of scores (on the left-hand side of the distribution of scores),

10 These analyses were only conducted for programs in which a significant rise in the average psychometric scores of successful applicants was noticed between the two periods. Such a rise was observed in university programs in mathematics, statistics, and computer sciences and in physical sciences. In the non-publicly funded colleges, a large rise was also found in programs in mathematics, statistics, and computer sciences and in publicly funded colleges, in engineering and architecture.

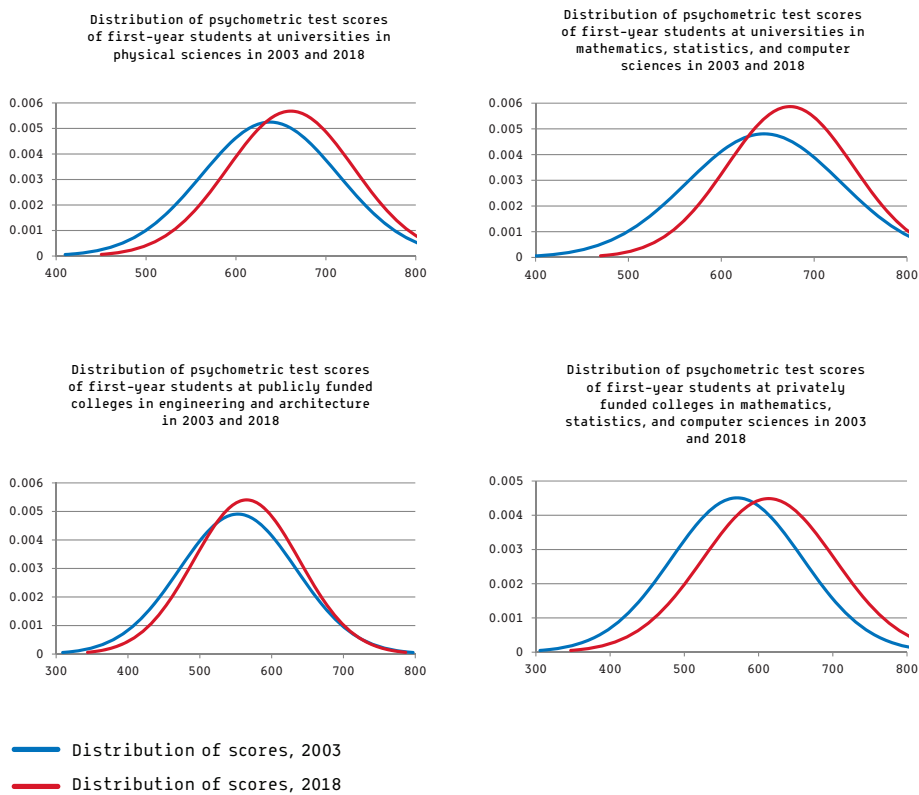
the blue 2003 curve is higher than the red 2018 curve. The area between the two curves, from the zero point of the axes to the meeting point of the curves, represents the share of suitable candidates who were not accepted in 2018 but would have been accepted in 2003 based on their psychometric scores.

An analysis of the differences between the distributions from each year reveals that in 2018 around 18% of suitable candidates (556) were rejected from degree programs in mathematics, statistics, and computer sciences at Israeli universities, and around 20% (231) at privately funded colleges. In the same year, around 24% of suitable candidates (289) were rejected from degree programs in the physical sciences at universities, and around 7% of suitable candidates (331) were rejected from degree programs in engineering and architecture at publicly funded colleges.¹¹ In other words, a total of around 1,408 suitable candidates were rejected from science-based degree programs in 2018. This translates into an excess-demand of around 8.3% in 2018 for science-based programs at Israel's universities and colleges (excluding the Open University). This may, however, be an underestimate, as the rise in scores required for entry to the programs may have resulted in a reduction in the number of applicants.

- 11 In order to translate these figures into numbers of suitable candidates rejected in each subject area in 2018, the number of candidates accepted in 2018 was multiplied by the percentage of those rejected and divided by one minus the rejection percentage. Thus: $R_i = N_i \cdot r_i / (1 - r_i)$ $R_i = N_i \cdot r_i / (1 - r_i)$, where R_i is the number of suitable candidates rejected from a subject area i , N_i is the number of candidates accepted to a subject area i , and r_i is the percentage of suitable candidates rejected from a subject area i .

Figure 4. Estimated distribution of psychometric test scores of first-year students.

Source: Authors’ analysis of Central Bureau of Statistics data.



Breakdown of Expected Growth in Demand for Science-Based Degree Programs

Which science-based degree programs are expected to see the greatest rise in demand five years from now? As stated, the overall estimate anticipates an increase of around 6,160 additional students applying to science-based programs each year. Some subjects will experience a smaller rise, while others will require a far more significant increase in capacity. Table 1 presents the current distribution of students at universities and colleges by subject areas, according to the number of mathematics matriculation units.

Table 1. Distribution of Students by Degree Program Subjects and the Number of Mathematics Matriculation Units in 2018.

	3 Units	4 Units	5 Units	Total
Engineering and architecture	8%	16%	29%	17%
Mathematics and statistics	0%	1%	4%	2%
Computer sciences	2%	6%	12%	6%
Physical and chemical sciences	0%	1%	5%	2%
Biological sciences	2%	6%	7%	5%
Humanities	87%	70%	43%	69%
Total:	100%	100%	100%	100%

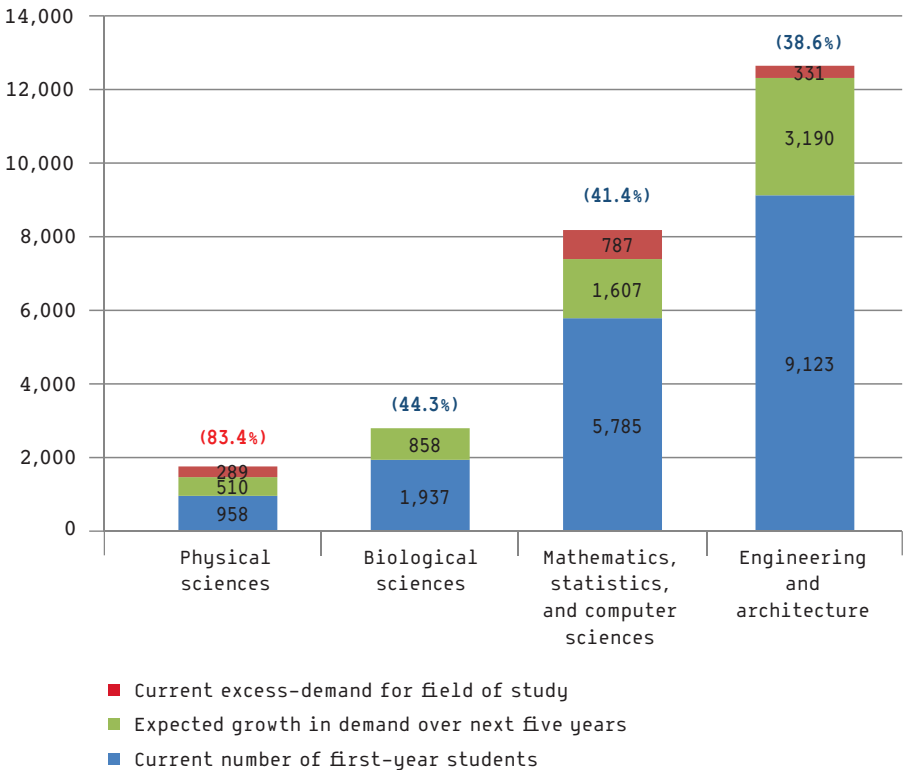
Source: Authors' analysis of Central Bureau of Statistics data and administrative data from the Ministry of Education and the Council for Higher Education.

Assuming a similar distribution by subjects of study for the new high school graduates with five-unit mathematics as they enter higher education in five years from now (or so); it is possible to estimate the expected rise in demand in this period for each of the relevant areas of study. Figure 5 shows both the current number of first-year students in four groupings of science-based degree programs, alongside estimates of the current excess-demand for those groupings and the estimates for growth in demand in five years. It indicates that the demand for engineering and architecture courses over the next five years will be around 39% higher than the current number of students; the demand for mathematics, statistics, and computer sciences around 41% higher; the demand for biological sciences also around 44% higher, and the demand for physical sciences around 83% higher.

Figure 5. Expected growth in demand of suitable candidates for science-based degree programs in five years’ time, by area of study.

(Figures in brackets show the relative difference between demand in the next five years and current number of students accepted.)

Source: Authors’ analysis of Central Bureau of Statistics data and administrative data from the Ministry of Education and academic institutions.



Conclusion

Our analysis of the patterns of entry of high school graduates with matriculation in five-unit mathematics into academic study programs, particularly science and engineering programs, reveals that they are significantly overrepresented in these fields, with the majority of graduates choosing these subject areas. This can be expected to have a considerable impact on the demand for science and engineering degree programs over the next five years; it is also highly probable that this demand will grow considerably. Most of the new five-unit graduates

come from more affluent segments of Israeli society and from locations with a high socioeconomic ranking. This fact supports the assumption that most of the new five-unit graduates will be able to successfully enter science and engineering programs. Based on the assumption that similar rates of integration to science-based programs will be maintained among these new high school graduates, we estimate that, over the next five years, the demand for science-based programs will become 43.2% larger than the current capacity of Israel's academic institutions in these areas—a figure which falls close to the 40% increase target set by the Council for Higher Education.

However, there are differences between the various science-based programs. In the biological sciences, demand over the next five years is expected to reach numbers that are 44% higher than current capacity, in engineering and agriculture, 39% higher, in mathematics, statistics, and computer sciences, 41% higher, and in physical sciences, 83.4%.¹²

In conclusion, we can clearly state that some science-based programs (such as computer sciences and physical sciences) currently have a significant level of excess-demand from suitable candidates, while the situation is better in other science-based subjects. In subjects leading to high-paying careers, the universities have struggled to provide an answer to the problem of excess-demand, and instead have simply raised entry requirements. The main barrier to increasing the capacity of these programs is a lack of senior academic staff, teaching assistants, and physical infrastructure (Report of the Commission for Increasing Trained Personnel for Hi-Tech, 2018). Faculty recruitment presents the biggest challenge due to the cannibalization effect of the hi-tech industry (which recruits most

12 It is important to emphasize that these figures also take into account our estimate of the current level of excess-demand (as of 2018), according to which around 18.6% of suitable candidates for degree programs in mathematics, statistics, computer sciences, and physical sciences are not accepted. This estimate is based on differences in the distribution of psychometric test scores of candidates accepted to these subjects in 2003 and those accepted in 2018 (as calculated based on averages and standard distributions of the scores of successful candidates) and on the assumption that the lower entry standard in 2003 reflects the level of ability required for these studies (as defined by the academic institutions themselves at that time), while the higher standard in 2018 is more reflective of space limitations that force the institutions to reject suitable candidates.

BA graduates immediately after their graduation or even sooner – creating a shortage in advanced degrees), and even though the universities are largely given a free hand in their recruitment efforts, they are still grappling with this task. The findings of this study show that this problem is expected to become more acute over the next five years in light of the sharp rise in the number of high school graduates with five-unit mathematics, and their anticipated entry into higher education.

Recommendations

To cope with staffing challenges, we recommend exploring the possibility of hiring foreign faculty members, particularly from countries such as China and India. Similarly, consideration should be given to changing the structure of academic faculties so as to allow for hiring the limited services of experts (for example, as freelancers) who are currently working in the fields. It may be worth revisiting the idea of making lecturers' salaries dependent on output (as is done in hi-tech), whether in terms of research or teaching hours, and thus being able to provide decent compensation for talented young faculty members. It is also recommended to consider bypassing the limitations on differential pay for lecturers by providing scholarships and generous grants for students in hi-tech-related subjects who commit to pursuing an academic career and entering the teaching faculty. In order to increase the number of teaching assistants, we recommend opening fast-track advanced degree programs for outstanding students and hiring these students as teaching assistants during their studies. Alternatively, we suggest exploring the use of new technologies to reduce the current dependence on teaching personnel.

The market failures regarding hi-tech-related programs at publicly funded institutions of higher education will not be solved by increasing the involvement of the private sector. Only government intervention and suitable budgeting can solve the problem of cannibalization in the hi-tech industry, which limits these institutions' ability to hire faculty members. By contrast, it appears that the non-publicly funded colleges, especially the higher quality ones, have untapped potential for significantly increasing the number of science and engineering students, in particular-- computer science students. These institutions are able to offer competitive salaries for senior faculty members from Israel and abroad

and to grow their staff in response to an increase in demand. Government (and philanthropic) investment and incentives to upgrade the physical infrastructures for science based programs at the private colleges can help increase their capacity for accepting students and thus create a more flexible mechanism that is able to respond quickly to market forces and increase supply when demand grows.

Employment of Older People in Israel

Prof. Yotam Margalit, Gabriel Gordon and Yarden Kedar

Background

Despite the rise in participation in the labor force in Israel, employment rates among the older population remain low. While the employment rate for the 35–44 age group is 85%, among those aged 55–64 it is only 69%. In the Arab sector, the drops more sharply – 56% among Arab men aged 55–64, and a meager 15% among Arab women of the same age.

A low employment rate among older workers (those aged 50 and above) translates into lower income and higher poverty rates among this population. The decline in income in the years before reaching retirement age, coupled with a continuing rise in life expectancy, means that retirees will have to rely on smaller pensions. In 2016, for example, the average drop in income due to retirement was 33% for women and 25% for men. Beyond the adverse impact on the quality of life of the older people themselves, this situation is also likely to impose a growing burden on the public purse. This is expected because significant segments of the older population are likely to be dependent on state support in the form of welfare assistance and income supplements.

In addition, the continuing trend toward digitalization and automation in many domains is likely to create a shift in the types of skills needed in the labor market. This shift is expected to further reduce the demand for those occupations in which older workers are currently employed. Unless an investment is made in closing skill gaps, the employment rate of older workers can be expected to drop even further.

The situation in Israel is far from unique. Employment rates for older workers are low in most OECD countries, and this worrying trend characterizes other developed countries as well. Data from the United States, for example, indicate that approximately 55% of the workers employed in stable full-time positions in their early fifties had lost their job before reaching retirement age, with either an extended period of unemployment or a major drop in income. The loss of the job was mostly due to layoffs or involuntary retirement. The data indicates

that this trend among older workers has been growing more and more acute since the turn of the century. Maintaining the relevance of older workers in the labor market is therefore a major challenge for policymakers in all advanced economies--- a challenge which is expected to grow, as the population ages and automation gathers speed.

Who Are the Older People who Drop out of the Labor Market?

To address this question, we analyzed the annual employment and income data of all individuals in Israel over a period of two decades. We sought to identify those who were employed in full-time work at the age of 45–50, but had dropped out of the labor market a decade later. Our research findings show that workers in quarrying, agriculture, food and accommodation, as well as skilled workers in the hi-tech, communications and financial services industries, tend to leave the labor market at a higher rate than other workers. Individual characteristics, such as gender (being male), a relatively low income (bottom quintile), lower level of education (professional diploma), or living outside Israel's geographic center, are also predictors of early dropout from the labor market. By contrast, workers in health, education and advanced manufacturing industries are more likely than other workers to continue to be employed until retirement age.

The data also point to gender-based differences regarding the probability of being forced out of the labor market before retirement age: academic education is associated with remaining for a longer period of time only among males but not among females; immigrant females tend to remain employed to an older age, while male immigrants do not; and high earning females remain in the labor market while men with high incomes do not.

It should be noted that many of the factors predicting early dropout from the labor market have remained stable over the years, even going back some two decades (to 1997–2007). This suggests that there are structural factors that influence workers' capacity for continued employment in the years leading up to retirement age. Put differently, there is an identifiable and fairly stable profile of workers who are in "high-risk" of early dropout.

Workers' Skills and Early Dropout from the Labor Market

One explanation for the dropout of older people from the labor market is a lack of suitable skills. When older workers lose their jobs, the gap between the skills they possess and the skills now required make it harder for them to find a new job. In order to examine this factor in the Israeli context, we analyzed data from the OECD's PIAAC survey, which measures skills and qualifications among a representative sample of thousands of individuals across a large number of countries. Our analysis found that in Israel, the skills of older people (aged 50–59) are significantly lower than those of younger people (25–39) across all three domains that were examined: reading literacy, math literacy, and computer skills. Moreover, a high proportion of the older population ranked in the bottom two levels of skill (out of seven), which means that they would struggle to perform even basic tasks at a job. Furthermore, a cross-national comparison that we conducted of data from 33 countries reveals that the skills of older Israelis are weak also in relative terms; in reading and math literacy, older people in Israel ranked sixth and fourth from the bottom, respectively.

The inadequacy of skills is also evident among the 40–49 age group. While the performance of this group on skills tests was slightly better than among the over-50s, it was still significantly poorer than among their younger counterparts. Assuming that the skills required in the labor market will continue to change and advance, the poor skills of many Israelis can be expected to become a major barrier to employment for older workers.

These findings highlight the problems entailed in continuing to employ older people without providing them with suitable training. Such training is critical for upgrading workers' skills and enabling workers to remain relevant in the labor market through their 50s and 60s.

What Actions Could be taken to Encourage the Employment of Older People?

To offer insight on this question, we collated and examined the findings of dozens of international evaluation studies from countries that have implemented policies to encourage employment among older workers. These policies can be

divided into five main categories: (1) Active labor market policies (ALMP)—programs in which the state directly intervenes in workers’ training, placement, or employment; (2) policies incentivizing workers to remain in employment; (3) adapting employment conditions and working arrangements to make it easier for older workers to stay in their jobs; (4) policies that encourage employers to hire older workers; and (5) policies that combat ageism in the workplace.

An analysis of the findings reveals that incentives to remain in employment—such as raising the legal retirement age or subsidies to older workers—are the most effective, as compared with other alternatives. These incentives not only encourage the hiring of older people, but also help keep workers in their current jobs. Integrated programs that combine worker training, subsidies for workers, and job search assistance programs were also found to be effective.

We found that flexible employment conditions and initiatives to adapt them to the needs of older workers are only moderately effective. Although these are important issues for many workers, addressing them has only a limited impact on employment rates of older people. Educational campaigns to raise public awareness of ageism were also found to be only moderately effective. It appears that these can influence the level of employment of older people only if part of a more comprehensive plan that includes a broader set of measures for encouraging employment, such as training and subsidies for workers.

Current Policies in Israel

Table 1 presents current policies on the employment of older people in Israel.

Table 1. Policy Tools to Promote Employment of Older People in Israel, 2019.

Type of Policy	Policy Tool	Operating Body
Active labor market policies (ALMP)	<u>“Half-Way” program</u> : Employment guidance centers for 45–75-year-olds providing training, soft skills, and links to employers. Currently in the pilot phase.	Ministry of Labor and Social Affairs, Ministry for Social Equality, the Joint (JDC)
	<u>Employment guidance programs</u> : Provide soft skills, assistance with CVs, and placement services. Target unemployed people.	Israeli Employment Service in conjunction with private organizations
	<u>Opportunity Centers</u> : Provide training and tools to facilitate integration into the labor market. Targeted at e populations served by the ministry (the “welfare population”) including older adults.	Ministry of Labor and Social Affairs
	<u>Employment Clubs</u> : Employment of pensioners by the State for several hours a week.	Ministry of Labor and Social Affairs
	<u>“Sixty Positive”</u> : Employment guidance centers, similar to Half-Way. Serve the 60+ age group.	JDC-ESHEL
	<u>“Experience Required”</u> : Internet portal for job search and for contacting employers. Targets older workers.	Ministry for Social Equality in conjunction with “Vehadarta” NGO
	<u>Funding for training</u> : Funding for training and living stipends for older people in physically demanding occupations.	Ma’agalim Foundation

Type of Policy	Policy Tool	Operating Body
Financial incentives to workers to remain in employment	<u>Various retirement age issues</u> : The legal retirement age has a large impact on actual retirement age.	Legislation
	<u>Old age pension benefits and supplementary income benefits</u> : Current benefits arrangements do not incentivize remaining in employment. The “disregard” ceiling makes work less worthwhile, because even low wages result in loss of eligibility for government support.	Legislation
Education and public awareness campaigns combating ageism	<u>Equal Opportunities Commission</u> : The Equal Opportunities Law and the establishment of the Commission, which provides legal aid for those filing claims against discrimination, runs campaigns to raise awareness, promotes collaborations with employers, and publishes various indexes on discrimination against older people.	Equal Opportunities Commission in the Ministry of Labor and Social Affairs

Recommendations

Our main recommendations are as follows:

The government effort to increase employment among older workers should adopt a **preventative approach** that promotes a set of policies aimed at minimizing the dropout of older workers. Focusing on keeping workers employed for longer, rather than just on reemployment of people out of work is recommended for a number of reasons. First, older people out of a job are often less attractive to potential employers than their employed counterparts; the funding required to keep workers in employment is likely to be far smaller than the sums spent on welfare assistance in support of unemployed older people and the cost of programs aimed at getting them back into work.

In order to track the plan’s progress, an **ongoing diagnostic study** needs to be developed funded and managed on an ongoing basis. Real-time data from such

a study will allow policy makers to identify the industries in which there is a high probability of worker dropout and act accordingly.

We also recommend a set of **legislative and regulatory changes** including: **raising the legal retirement age**, particularly for women; changing the tax regulations that “fine” older people who work by reducing their eligibility to social benefits; and creating an infrastructure for **flexible working conditions** (such as core hours and part-time remote working) which will make it easier for older workers who struggle to work daily for long hours to remain employed till closer to retirement age.

Among our policy recommendations, we also advocate **that expansion of the existing infrastructure of employment guidance and counseling centers**, with an emphasis on integrated programs that have proven their effectiveness. We recommend allocating the funds based in part on the results of evaluation studies that are currently in the field (including randomized control trials). These evaluations will help indicate which programs provide the best cost-benefit ratio. Finally, we recommend the implementation of **programs targeted at employers** and aimed at raising awareness of hiring practices that potentially disadvantage older candidates. Furthermore, we propose steps to encourage the implementation of special work arrangements in part-time positions that are often the preferred option among older individuals.

Challenges, Obstacles, and Failures, in the Functioning of the Vocational Training System in Israel

A Survey of the System in Israel and a Comparison with Selected Countries

Abstract

Eitan Regev | Yarden Kedar | Naor Porat

Introduction

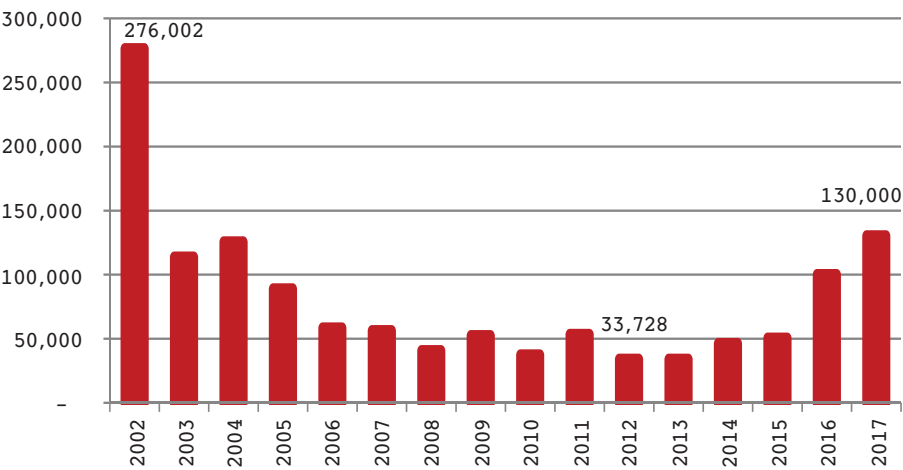
The term “vocational training” refers to a wide variety of courses and study tracks which provide the adult population (over age 18) with the opportunity to acquire a vocation. The courses aim not only at the initial training of unskilled workers, but also at retraining, or enhancing the expertise of skilled workers. In the early days of the State of Israel, the system of vocational training expanded rapidly, primed by the emphasis on productive labor, and became an important element in the national effort to develop the economy. Since the beginning of the 21st century, there have been many changes in this system, as it evolved from a system mainly serving the needs of the economy, into one focusing on providing employment opportunities for the weaker socioeconomic strata. In addition, as part of the global trend, the scope of academic studies has increased, and boundaries blurred between general studies, in which technology and computers are taught, and the core curriculum that was incorporated in vocational studies.¹³ This new paradigm turned the institutions of higher education into the most important channel for providing skilled manpower for the needs of the economy. This has led to a substantial cut in the vocational training system’s scope of activity, and, consequently, its budget. In 2002, the budget for all such courses and programs came to NIS 273 million for an enrollment of 26,351 students. By 2015, the budget had been reduced to only NIS 50 million (a drop of (82%)) and enrollment was only 4,200 students.¹⁴

13 Cuadra & Moreno, 2005.

14 Data obtained from the Ministry of the Economy and the Association for Civil Rights in Israel (Dagan, 2016).

Figure 1. Vocational Training Budget, 2002–2017
(adjusted to 2017 prices, in thousands of NIS).

Source: Authors’ computations of data provided by the Ministry of the Economy, the Association for Civil Rights in Israel, and the Knesset.



These trends have led to a shortage of skilled manpower in a number of fields, and especially in industry. Over the last two decades, the share of manufacturing jobs in the labor market, has shrunk considerably, not only because of the shift to capital-intensive manufacturing technologies—as is the case in many developed countries—but also, in part, because of a severe shortage of skilled manpower, leading, in turn, to a decrease in capital investment in manufacturing. According to economic theory, capital and labor are complementary production factors; that is, a shortage of skilled workers reduces the marginal product of capital, while insufficient investment in physical capital reduces labor productivity (and workers’ earning potential). The shortage of skilled workers, mainly in manufacturing, derives from several mutually reinforcing factors: structural failures and obstacles in the vocational training programs lead to a situation in which the number and quality of vocational training graduates do not meet employers’ needs (especially in industry). As a result, employers find it difficult to recruit a sufficient number of skilled workers and of sufficient quality, and consequently defer from investing in upgrading their production capabilities.

In addition, the shortage of workers is likely to become more acute in the coming decades, as many skilled workers reach pension age. It is estimated that around 32,000 workers will have retired from industrial firms by 2021 (including 10,500 recent and less-recent immigrants from the Former Soviet Union). By 2026 another 42,000 will have retired (including about 15,000 recent and less-recent immigrants from the Former Soviet Union). The overall number of industrial workers who retire is expected to soar in the coming decade, from about 5,400 in 2017 to about 10,800 in 2028, after which the figure will gradually begin to drop. There is therefore a clear need for a substantial increase in the scope and quality of vocational training programs that can provide an appropriate solution to the variable needs of the labor market (especially in manufacturing),

The vocational training system in Israel suffers from structural, planning, bureaucratic, deficiencies and insufficient budgeting, all of which detract from its ability to provide a sufficient number of skilled workers for the required vocations. . The system is complex, and fragmented among many different agencies and organizations—some of which are plagued by failures of various sorts that stem from their unsuitability to both the needs of the labor market and to the needs of the target population—and this hinders workers' entry into the job market. We believe that these failures undermine the operation and efficiency of the vocational training system, severely aggravate the shortage of trained personnel in various industrial sectors, and make it difficult for these sectors to maintain a competitive advantage. The present study has three goals: (1) To portray the current situation of the vocational training system in Israel from the perspectives of organization, planning, budget, and implementation, and compare it with training programs in other developed countries; (2) To identify the main obstacles and failures in each of these aspects; and (3) To draft focused and feasible recommendations that can help policymakers increase the numbers and upgrade the quality of skilled manpower in the Israeli economy and, especially, in manufacturing.

Vocational Training and Technological Education in Israel

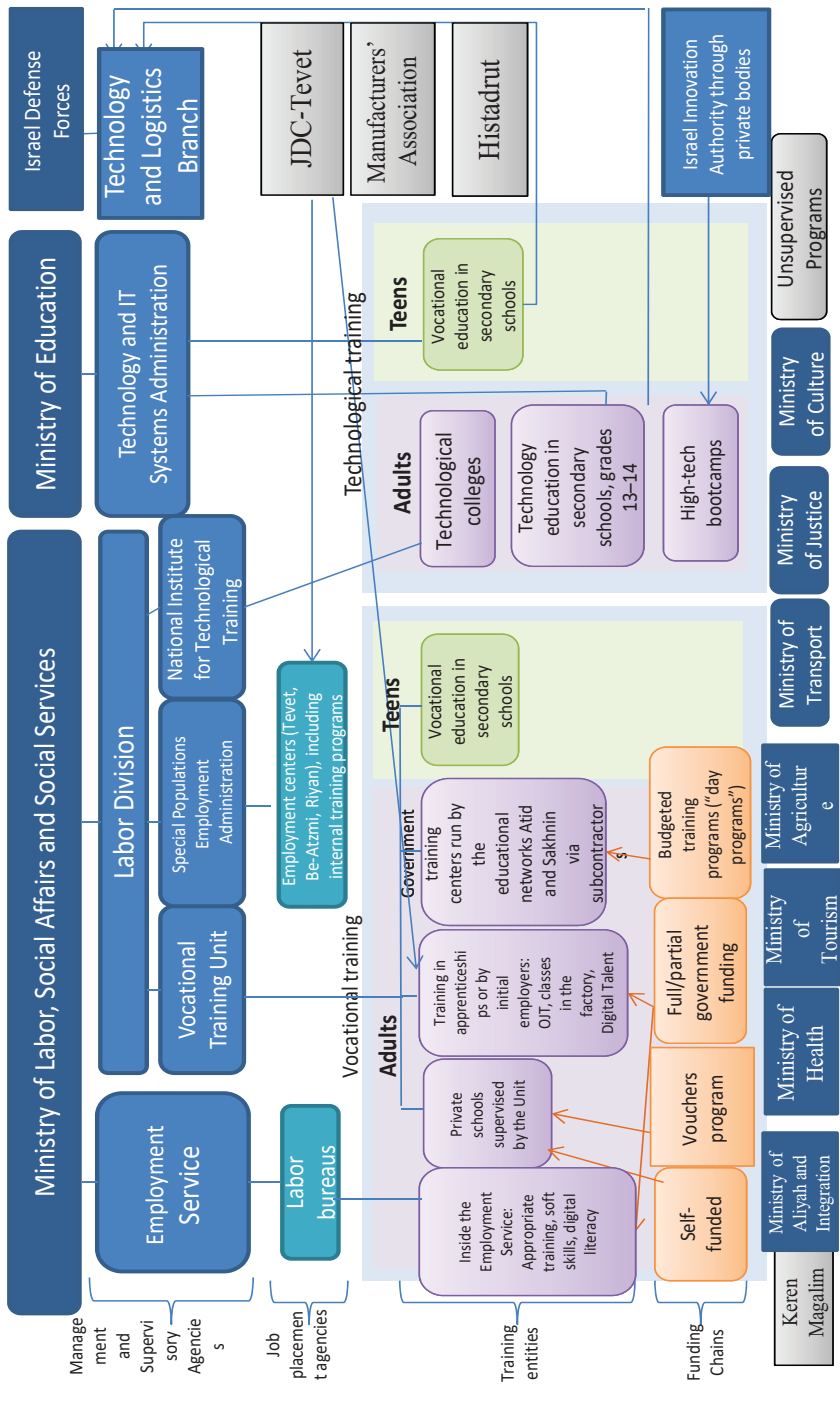
The current division between vocational training and technological education is not clear cut: both systems are not academic, and grant non-academic diplomas. In general, technological education focuses on knowledge-intensive areas and

produces practical engineers and technicians, while the vocational tracks focus on more “traditional” economic sectors such as manufacturing, construction, motor vehicle repair, caregiving, and cosmetology. Despite this general distinction, quite a few vocations are taught by both vocational training centers and technological colleges. Technological education for adults falls under the auspices of the National Institute for Technological Training, which is a division of the Ministry of Labor and Social Affairs, and for Grades 13 and 14-- under the supervision of the post-secondary technological education branch. Vocational training is the responsibility of the Vocational Training branch, which is also part of the Ministry of Labor.

The Training System: Organizational Structure, Types of Courses and Programs, and Means of Funding

As can be seen in Figure 2, the system of vocational training and technology education in Israel is very complicated, and fragmented among many agencies and organizations, with the division of responsibility among them being far from clear. The system seems to be the product of a series of agreements that have been patched together over the years, rather than a product of structured and systematic thinking as to the appropriate division of responsibilities and the optimal structure for achieving national goals in this area. As can be seen, most of the vocational training programs which are overseen by the Ministry of Labor fall under the responsibility of the Vocational Training branch.

Figure 2. The Vocational Training system and Non-Academic Technological Education in Israel.



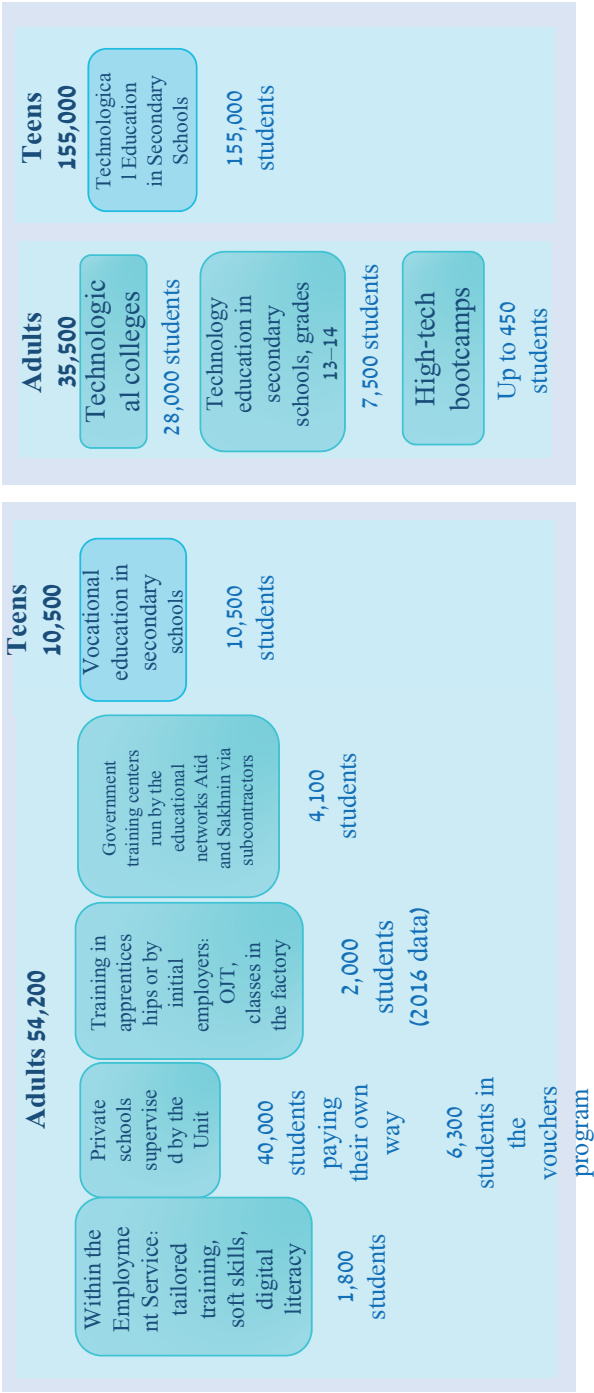
Management and Supervisory Agencies

The Vocational Training branch, part of the labor division of the Ministry of Labor, Social Affairs and Social Services, is the government unit responsible for the vocational training and development of human capital among youth and adults in accordance with the changing needs of the Israeli economy and Israeli citizens.

The Unit defines new vocations and updates existing ones, sets professional and pedagogical standards, oversees the writing of examinations, is responsible for the certification, training, and in-service courses for the teachers in its programs, funds the nationwide government training centers, and supervises both these centers and the private institutions that have been recognized as qualified to teach courses under supervision. courses. The vocational education programs supervised by the Unit are intended for both the unemployed and for those currently employed in unskilled jobs who wish to acquire a vocation or undergo retraining. As can be seen in Figure 3, in 2017 the Vocational Training Unit was responsible for courses that enrolled around 54,000 adults, including 4,100 with full state funding; , 6,300 in partially subsidized courses; , and 40,000 who paid their own tuition.¹⁵ The institutions themselves are not subsidized by the Unit but their curricula, examinations, and diplomas are subject to its supervision. Programs exist in a wide range of fields: construction and the environment, hospitality services, electricity and electronics, computers, education and caregiving, metalworking and machinery, carpentry and furniture-making, motor vehicle repair, and more. The programs include both theoretical and practical courses, in differing proportions according to the field.

15 Avi Waxman, interview with Shuli Eyal, the director of the Vocational Training Unit of the Ministry of Labor, July 17, 2018, www.themarket.com/allnews/premium-1.6278896.

Figure 3. Number of Students Enrolled in Vocational and Technological Training Programs, 2018.
Source: Authors’ analysis of data from the Ministry of Labor, the Employment Service, Ministry of Education, Central Bureau of Statistics, and the OECD.



Obstacles and Failures in the Training System

An examination of the training system's organizational structure reveals that it is complicated and cumbersome in a way that interferes with its ability to function. The division of authority among the various agencies creates unnecessary duplication, while the structure of the system creates incentives for rival organizations to hold on to students merely in order to receive funding for them, even if the students themselves would be better off studying in a different institution. It is obvious from the description of the agencies and organizations that compose the vocational training system, that there is an almost inbuilt separation between administrative units and those that actually do the work, and between the public and the private sectors. This split in the system makes it difficult to design long-term policy and plans. Until recently there was no research unit responsible for the systematic and periodical collection and analysis of data and their presentation in an accessible form that would make it possible to optimize the programs and adapt them to the needs of graduates and of the changing labor market.

This lack of ongoing data collection and analysis with regard to applicants, students, and graduates of the system and the budgets actually allocated for their training, influences policy planning, which is not continuous but is carried out through non-coordinated reforms. This makes it very difficult to assess the extent to which the programs succeed in improving their graduates' employment prospects and earning capacity, and, accordingly, there is no way of providing incentives to organizations based on such success. Many of the organizations are not assessed or rewarded on the basis the rationale for their existence as defined by the relevant government ministries, i.e., increasing employment and providing a solution to the economy's need for a skilled workforce. In addition, the private institutions that maximize their profit by enrolling as many students as possible are not required or incentivized to help their graduates find jobs.

Another problem concerns the division of authority between the agencies. It is not clear which agencies are responsible for the outcomes and achievements of the vocational and technological training programs, nor for the quantitative and qualitative assessment of the programs' attainment of goals.

International Comparison of Training Policies

There are major differences between countries' in their policies on vocational training. European countries with a per capita income exceeding the median for developed countries, typically have extensive specialization systems run by the state. The situation is different in other European countries and parts of North America. In the United States there has been an effort to cut back on vocational training as a separate track in high schools on the grounds that specific skills quickly become outdated and people need to be given the ability to adapt to new technologies before they enter the job market. Elsewhere in Europe, notably Germany, Denmark, and Switzerland, there is a dual system that provides extensive vocational training in the secondary schools and is directly involved in industry through a mechanism of apprenticeships. The justification for the dual system is that the concentration on teaching specific vocational skills enables skilled workers to enter the job market at an earlier age.

Table 1 summarizes this international comparison and shows the main features of the training systems in the selected countries. The main difference between the vocational training systems of the countries shown here and the system in Israel relates to the involvement of employers and relevant partners from the private sector in the training process, despite the fact that Israel has seen a positive trend in this area since 2015. It seems that employers' involvement in updating curricula and providing practical training leads to the implementation of the economic strategy which is regulated by the relevant government ministries, and thus enjoys government support. In addition, the vocational training systems seems to enjoy a positive image in the surveyed countries due to high rates of employment in the chosen vocations, high wages, the stipends paid to apprentices, and the encouragement of academic accreditation and lifelong learning.

Table 1. Training Systems in the surveyed Countries, Selected Features

	Switzerland	Germany	England	Denmark
Inclusion of practical specialization as part of the program	ü 60%80%–	ü 60%80%–	ü 50%	ü 70%
Accreditation of vocational and technological tracks allowing students to transfer to academic studies	ü Channels for transferring at every stage: some require supplementary coursework, others do not	ü People with dual diplomas can apply to university after completing several years of practical work in the field	Partial An institution of higher education may set admissions requirements; in some cases the vocational training suffices	ü
Budgeting method	Practical training: company funded (43%), in some cases industry-wide trade-union foundations Vocational schools: 25% by the federal government, 75% by the cantons	Practical training: full funding by companies + a salary (70%) Courses: partial funding by local councils	Practical training: a progressive specialization levy imposed on companies, plus the apprentice training fund Courses: most institutions receive direct funding from the government and not from local authorities There are some privately funded educational institutions and training programs	Practical training: funding for most of the training + a salary All employers are required to make an annual payment to the vocational training fund Vocational training for adults is supported mainly by public funding Coursework: the post-secondary programs are fully funded by the government; students are also eligible for a trainee's salary and a grant
Year of legislation	2004	1969	2008	1977
Government investment in secondary education as a % of GDP	0.58%	0.58%	0.46%	0.56%

	Switzerland	Germany	England	Denmark
Percentage of employed among IVET* graduates aged 20–34	86.4%	88%	79%	87.4%
Percentage of students in practical programs (out of all vocational training programs)	90.2%	86.4%	56.4%	99.7%

*IVET= initial vocational education and training

The Link between Vocational Training and Labor Productivity

In recent years, the employment rate in Israel has exceeded the OECD average, but labor productivity remains significantly lower than the OECD average. This raises the question of the effectiveness of the Israeli vocational training system, and of whether its purpose is to maximize the employment of disadvantaged population groups or, instead, to train the human capital in a way that will meet the needs of the economy. There is disagreement on this issue among government ministries, with the Ministry of Finance tending toward the former and the Ministry of Labor and the Ministry of Economy favoring the latter.

Labor productivity is an important measure of the national economy's capacity to grow and to raise its residents' standard of living.¹⁶ Despite constant economic expansion, the gap between labor productivity in Israel and the average gap in the industrialized world is not narrowing: in 2017, the gap was \$13 per labor hour, up from \$11 in 2000 (in 2017 prices).

Vocational Training Programs and Labor Productivity

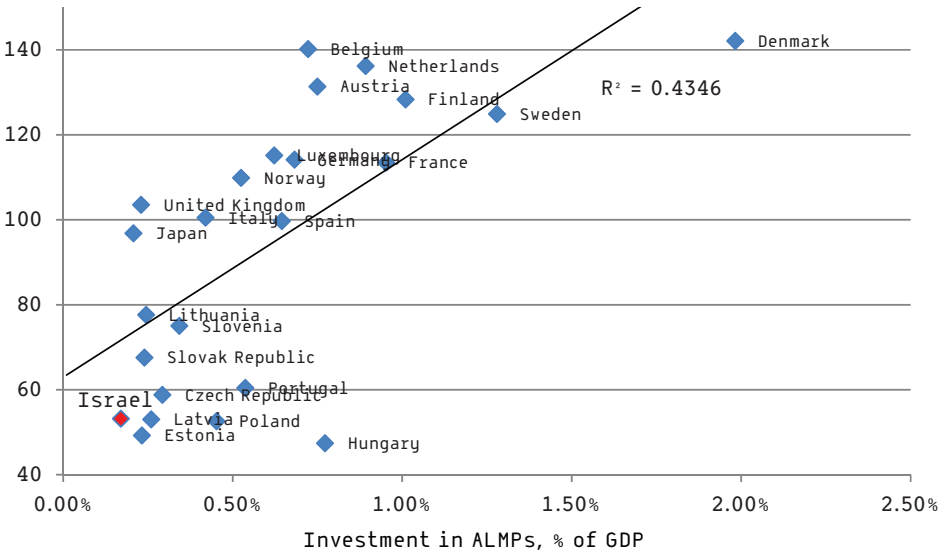
In examining the link between investment in vocational training programs and labor productivity of the various industrial sectors in the OECD countries, we

16 Krugman, 1994.

find that public investment in vocational training makes a positive contribution to labor productivity in industry, especially in the traditional sectors.¹⁷ As can be seen in Figure 4, there is a strong correlation (0.43) between the size of public investment in vocational training programs and labor productivity in traditional industries. It can also be seen that Israel falls at the lower end of both. Although it is well known that the core curriculum of the state education system has a direct influence on labor productivity at later stages, recent research has found that vocational skills and abilities are the most important factor in explaining workers' achievements in the labor market.¹⁸

Figure 4. The Correlation between Investment in Vocational Training and Labor Productivity in Traditional Industries, 2015.

Source: Authors' processing of OECD data.



17 There is a clear correlation in advanced and mid-level industries as well, but it is somewhat weaker.

18 Barconier et al., 2014.

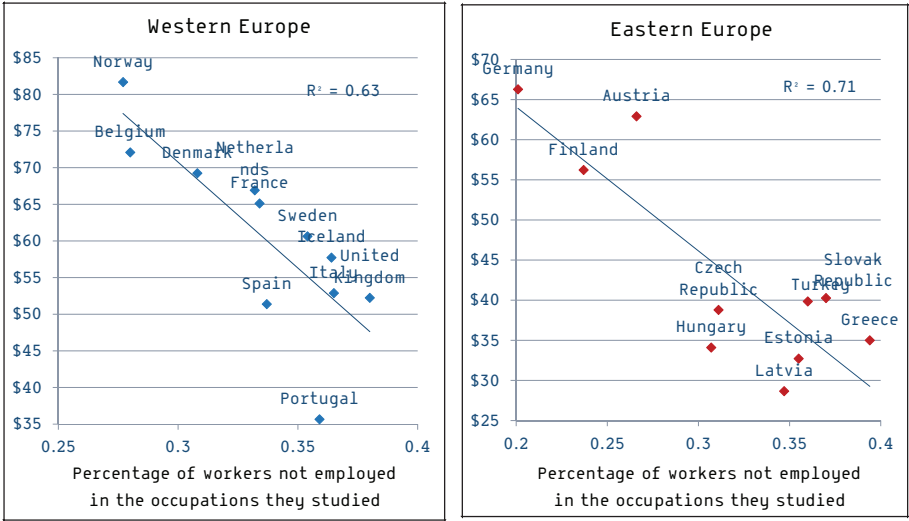
The Importance of congruence between the composition of Human Capital and the Needs of the Labor Market

Most OECD countries have come to the realization that a mismatch between the subjects studied or the training programs and the sector in which their graduates find employment, detracts from growth and wastes resources (which are expended on irrelevant fields). It can even explain some disparities in labor productivity.¹⁹ In fact, the mismatch index has become an important metric for the OECD labor market. Figure 5 displays the link between this index and the level of labor productivity in OECD countries. In order to take institutional and cultural differences between Western and Eastern Europe into account, the two groups of countries are displayed separately. As can be seen, for both groups there is a strong negative correlation between the percentage of workers who are not employed in the occupation they studied and labor productivity; that is, labor productivity is lower in countries with a large percentage of workers employed in the vocation they trained for. These findings corroborate the idea that it is important to increase employers' involvement in the training process, as is the case in all the countries compared above. This involvement can help enhance the match between training programs and the skills acquired through them, and the graduates' actual employment on completing the program and thereby increase labor productivity.

19 McGowan & Andrews, 2015.

Figure 5. Labor Productivity Per Hour Worked. Eastern European and Western European Countries, by the Percentage of Workers Not Employed in the Vocation they Studied Occupation, 2016.*

Source: Authors’ analysis of OECD data.



Policy Recommendations

We recommend improving the vocational training system and creating an infrastructure for formally recognized practical training programs in the private sector. This would constitute an important step toward reducing the market failures in the training system, which are manifested in Israel’s low level of labor productivity and the economy’s less-than-optimum readiness for the Fourth Industrial Revolution.

The Israeli economy’s potential for expansion and the trickling down of growth to all strata of the population depend on skilled human capital. The fullest use of this potential depends to a large extent on the effectiveness of vocational training programs and the relevance and current applicability of their content and the acquired skills to the needs of employers and the profession vocation. Increasing the business sector’s involvement in providing and funding on the job training programs as well as in developing and regularly updating their curricula will greatly contribute to the achievement of this objective.

Our Recommendations

- (1) Formal reorganization of the organizational structure of the vocational training system so as to eliminate the duality of responsibilities and to concentrate all authority in a single government ministry.
- (2) Significant increase in the budget for publicly funded training programs and an increase in their relative share among all training programs.
- (3) Decrease in the duration of training programs; modification of their content to ensure its relevance, and the introduction of modularity.
- (4) Expansion and easing the accreditation process for vocational tracks, expanding the scope of accreditation , and applying the principle of life-long learning so that these diplomas can be the first step toward the acquisition of more advanced qualifications.
- (5) Provision of higher stipends to a larger number of students in vocational training programs.
- (6) Inclusion of on-the-job-training (OJT) in every stage of the training program.
- (7) Constant monitoring and measuring of graduates' performance in the labor market and release of this information to the public.
- (8) Regular measurement of the extent of the mismatch between a field of study and graduates' actual employment.
- (9) Government incentives to increase the business sector's involvement in the training process including its funding, physical infrastructure, internships, and the development and updating of curricula.
- (10) Licensing of private institutions as providers of training programs should be made conditional on relevant measures of performance such as the proportion of students who receive diplomas and the proportion of graduates who find employment in the field they studied and their earning power.
- (11) Providing incentives to the formation of employers' associations at the industry level so as to increase their involvement in training programs and their funding.

- (12) Creation of a platform or organization to regulate and formalize the cooperation between the employers and training institutions (consisting of the social partners, business sector representatives, and professional agencies).
- (13) Regulation and formal recognition of quality standards for organizations that invest in vocational training and help foster the individual's skills.

Retirement Age and Flexible Retirement Mechanisms in the Pension System

Executive Summary

Eytan Sheshinski and Rachel Zaken

Increased life expectancy and changes in the labor market, such as later entry into employment, are leading to changes in the ratio between the number of years of employment and the number of years spent in retirement, thus reducing the incomes of retirees and affecting the actuarial balance of the pension system. This trend is evident in many countries around the world, particularly in the West, where birth rates are low and the burden on the workforce to meet the demands of national insurance payments is constantly on the rise. Many states are therefore taking measures to raise the retirement age in line with life expectancy, while maintaining uniform retirement ages for men and women. Of all the OECD countries, only Israel, Poland, and Switzerland have yet to adopt a policy aligning women's retirement age with men's.

While life expectancy in Israel is among the highest in the world, women's retirement age is particularly low, and has a negative effect on their pension savings. Moreover, because women with low incomes tend to take early retirement, the gaps in income between women over 65 and the rest of the population are growing.

Retirement age has, nonetheless, remained the same, even as lifespans beyond retirement age are increasing, leading to the erosion of pension benefits and undermining the financial stability of the National Insurance Institute (NII). According to actuarial forecasts, by the mid-2030s, **NII disbursements to the public are expected to exceed national insurance contributions received, so the National Insurance Fund will be exhausted** within a couple of decades.

Retirement age, defined as the age at which people can stop working and receive pension benefits, currently stands at 67 for men and 62 for women in Israel. The mandatory retirement age, at which an employee can be forced to leave his or her job, is 67. While the law does not prohibit continued employment beyond age 67, **it sends out a signal to individuals to retire and to employers to be**

prepared for their employees' retirement. Moreover, it creates a norm and establishes a paradigm of thinking, defining the legal retirement age as the right time to retire.

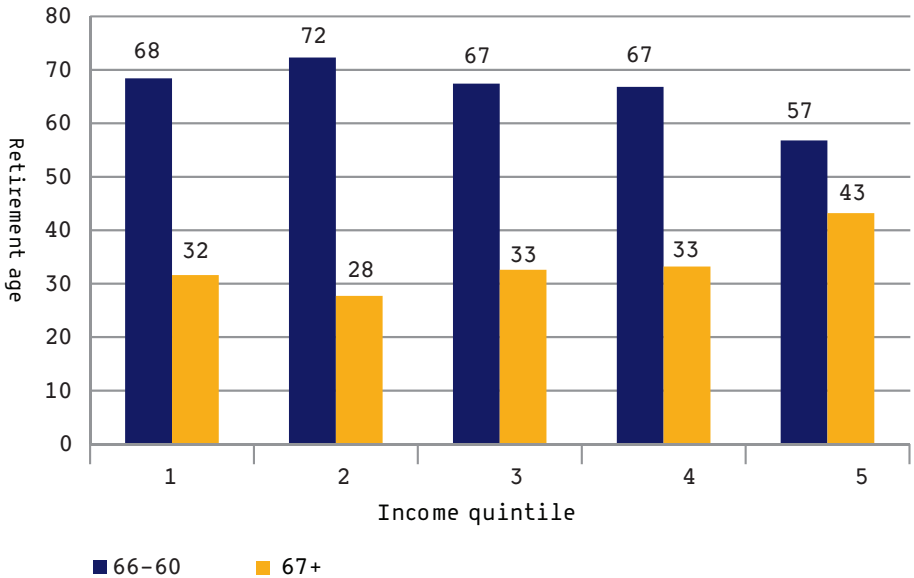
Another implication of the legal retirement age is that it marks the age at which people begin to receive old age pension from the NII. There are two ages relevant to receiving this benefit: first, the legal retirement age, at which the payments are dependent on an income test; and second, the age of 70, when retirees are unconditionally entitled to pension benefits.²⁰ The Retirement Age Law (2004) included a plan for raising women's retirement age to 64, but, due to widespread opposition, this was never enacted. Retirement age has a direct impact on older women with low incomes, women employed in physically demanding occupations, and on women outside the labor market, and it was feared that deferring the retirement age would delay their eligibility to receive old age pension benefits, and thus raise the poverty rate among older citizens.

Our proposal presents a plan for raising women's retirement age to bring it in line with men, and for linking retirement age to life expectancy throughout the population. In addition, in order to address the problems inherent in such a deferment, specifically for vulnerable populations, we present an alternative that takes into account income (from employment and from assets), and that can result in a more just realization of savings (Studies have shown that life expectancy for those with high income, is higher than for low income, resulting in the latter group realizing their pension savings to a lesser extent than the former.) Lowering the retirement age for low-income workers will allow them to receive old age pensions at a younger age, so that their decision to continue working will not be influenced by an income test, which makes receipt of full pension benefits conditional on income, using a sliding scale that goes down to zero. Moreover, the data indicates that those exiting the labor market at an earlier age are mainly low-income workers, including women, while those earning high incomes continue working (see Figure 1). Inequality among older citizens thus continues to grow, making it even more important to raise the retirement age and ensure that low-income women remain at work.

20 For women, the age of entitlement to pension benefits depends on their date of birth. For all people born after May 1950, the age of entitlement is 70.

Figure 1. Average retirement age, by income quintiles, 2015 (% , women).

Source: Authors’ analysis of Central Bureau of Statistics data.



To ensure that older citizens can live in dignity, we need to raise the retirement age and to increase the number employed among them, so that payments to pensions savings funds, grow. In new pension funds, the closer one gets to retirement age, the larger the returns from savings-- in absolute terms-- due to the increase in the capital accrued in the fund. We should therefore encourage people to continue working instead of following current patterns, which jeopardize their ability to live in dignity after retirement. At the same time, we must help those with low incomes who struggle to find a place in the labor market, and take complementary measures such as extending the period of eligibility for receiving unemployment benefits, along with investing resources in professional training.

As stated, we propose a plan for gradually raising women’s retirement age bring it into line with men’s and for linking retirement age to life expectancy for the entire population. Similarly, in order to address the difficulties inherent in raising the retirement age for vulnerable populations, we propose an alternative in which retirement age (eligibility to receive old age pension benefits) is determined on a differential basis according to income.

Proposal for a Uniform Retirement Age Linked to Life Expectancy

The link between retirement age and life expectancy is usually calculated using a 2:1 ratio, based on the rationale that the duration of the period of retirement is around half that of employment. Thus, raising retirement age by two-thirds of the rise in life expectancy in Israel shows that an increase of one year in the retirement age will take around ten years (based on moderate projections). We propose a plan according to which the retirement age for the entire population will be linked to life expectancy using the above ratio, in a process spread over 45 years. In addition, in order to avoid significant differences between adjacent cohorts and to reduce political pressure, we recommend frequent implementation of changes, while preparing the public in advance.

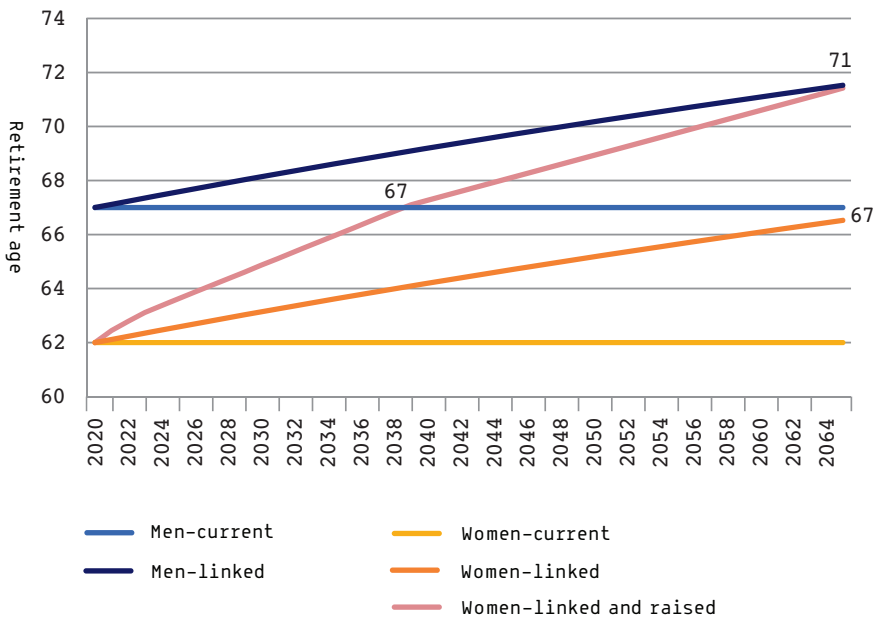
The main principles of the plan are as follows:

- 1. Raising women's retirement age until it is the same as men's.** In its early stage, the plan is similar to the Ministry of Finance's plan for raising the retirement age; however, our plan calls for a continuous rise of women's retirement age until it is equal to men's. The plan proposes raising the retirement age by four months every year for the first three years; then -- by three months a year until it reaches 67; and finally, raising it by two months a year until the gap between men and women is closed. Thus, if the plan is implemented in 2020, retirement age for women will rise to 67 by 2038 (for those born in 1973).
- 2. Linking retirement age to life expectancy for the entire population.** The plan is based on adding two-thirds of the increase in life expectancy to the retirement age every year. According to life expectancy forecasts, by 2065 the retirement age for men and women will be identical, reaching 71 (for those born in 1994).

Figure 2 presents the current situation (retirement age of 67 for men and 62 for women) and the proposed plan for changing it, according to which women born in 1966 will retire at age 65 and women born in 1973 will retire at 67. The overall increase in retirement age will span a period of about 45 years, as described, so that the retirement age for women will rise from 62 in 2020 to 71 in 2065.

The figure also shows the projected increase of the retirement age for men and women when linked solely to life expectancy, from 67 in 2020 to 71 in 2065 for men (the upper line) and from 62 in 2020 to 67 in 2065 for women.

Figure 2. Proposal for raising the retirement age.
Source: Authors’ analysis of Central Bureau of Statistics data



It should be noted that raising the retirement age would reduce the tendency of older people to stop working at 67, and to work only sporadically.. Continuing to be employed, even if on a part-time basis, allows older citizens to make use of their skills and experience for the number of weekly hours that suits both them and their employers. Keeping older workers in the labor market preserves knowledge and experience and has a positive impact on productivity and on workers’ self-image, while also allowing them to continue to contribute to their pension funds and maintain their standard of living after retirement. We should keep in mind that women’s life expectancy, including those who are vulnerable to a rise in retirement age, will also increase, thus linking retirement age to life expectancy for the entire population is inevitable - the sooner it is taken, the more gradual the process can be.

Realization of Pension Savings after Retirement

Implications of the association between longevity and income

Daniel Gottlieb, Eytan Sheshinski, Ofir Pinto, Rachel Zaken, Rafaela Cohen, Gabriela Heilbronn, Miriam Schmeltzer

Studies of the relationship between income and life expectancy have found that life expectancy rises with income, and that the rate of increase in life expectancy has a positive correlation with income from work.

Thus, there are differences in the total pension payments for those with high and those with low incomes. After retirement age, and given their longer life expectancy, the former collect larger payments as compared with those received by the latter; moreover these gaps are expected to increase over time.

The realization rate of pension saving funds represents the ratio between the sum of pension benefit payments received in old age and the sum of pension contributions paid into the fund during working years, and is affected by both life expectancy and the age at which retirees start receiving their pension.

Our study was conducted as part of a collaboration between the National Insurance Institute (NII) and the Israel Democracy Institute and was based on an NII administrative data set with both demographic information and information on income from work from 1987 for six annual cohorts of men who were born between 1930 and 1935 and who reached their legal retirement at the age of 65. We examined the relationship between income at working age and life expectancy for men in Israel and the realization of pension saving funds in old age by income. Similar to other studies around the world, the study population does not include women, as there is less variability in their work incomes. In addition, the life expectancy of women in Israel is longer, and administrative data is thus needed for longer age periods. This data do not yet exist in NII records.

The conversion coefficient is the value used to determine the size of pension payments from the date of retirement until death, taking into account the probability of survivors' benefits. In practice, it assesses the expected number of payments to be paid from the pension fund to the retiree and/or to beneficiaries

after the retiree's death; the higher the conversion coefficient, the lower the monthly benefit payment. In order to assess the rate of realization of pension savings funds, we calculated a conversion coefficient based on two assumptions: (1) the retirees began receiving pension benefit payments at a legal retirement age of 65; and (2) the retirees began receiving their pension benefit payments at around the same time as their NII old age pension was claimed.

Our findings indicate that in Israel, as in other countries, there is a positive correlation between life expectancy and working age income, and that for men born between 1930 and 1935, the gap in life expectancy between the highest and lowest quintile is 4.6 years on average. Similarly, assuming that all retirees began receiving their work pension payments at a uniform age, we found that the rate of realization of pension funds rises with income, and the gap in the rate of realization between the upper and lower quintiles is approximately 16% in favor of the upper quintile. However, assuming that all retirees began receiving their work pension payments at around the same time as their old age pension, the differences in the rate of realization relative to income are less pronounced. Excluding the lowest quintile, the rate of realization among the other four quintiles is around 100%, and the gap between the upper and lower quintiles is only around 7%.

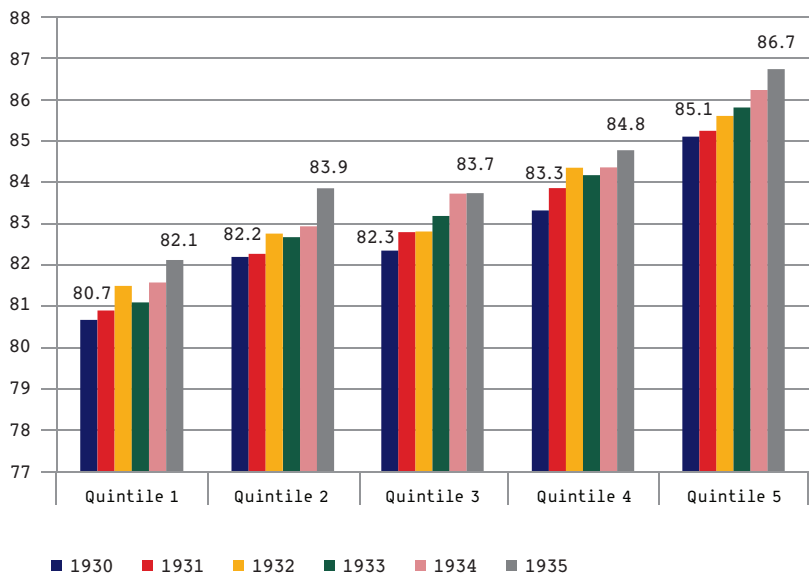
These findings emphasize the influence of two major components on the realization rate of pension savings funds: retirement age and conversion coefficient. The study's significance lies in its contribution to policy decisions, as it reveals the impact of changes to retirement age or the conversion coefficient on reducing the inequality between retirees with different levels of income. The introduction of a variable pension age and/or a conversion coefficient that is linked to work income may reduce existing gaps in the realization rate of savings funds after retirement, taking into account demographic changes and participation rates in the workforce.

It should be noted that the study does not include the realization of pension savings funds before retirement due to employment disability or death, as it is only possible to assess realization rates after retirement. Based on the premise that health outcomes and mortality rates are correlated with income, it can be assumed that the rate of realization of pension savings funds at working age is higher among those with lower incomes.

Life Expectancy According to Income

Figure 1 displays life expectancy in Israel by income, for males born between 1930 and 1935. It shows that in Israel, as in other countries, there is a positive correlation between life expectancy and working age income. Among males born in 1930, life expectancy for those in the first (lowest) quintile is 80.7 compared with 85.1 for those in the fifth (highest) quintile. This gap of 4.4 years in life expectancy increases over time, reaching 4.6 years for men born in 1935. It can also be seen that overall, life expectancy for all quintiles is on the rise.

Figure 1. Life expectancy according to income quintile and year of birth



In addition, Cox proportional hazard regression shows that life expectancy is lower for each income quintile relative to those above it: on average, the mortality risk for men from the first quintile is 1.96 times higher than for men from the fifth quintile and decreases for each quintile from the first to the fifth.

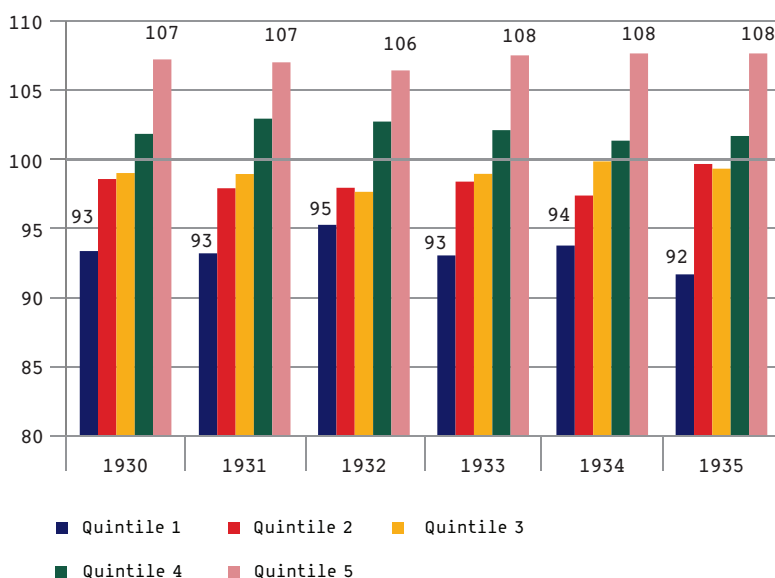
Realization of Pension Savings Funds

Israel introduced mandatory pension contributions for salaried workers in 2008 and for self-employed workers in 2014. An examination of the countable income

of the contributor reveals that there is a gap of around 7% between the bottom quintile and the other quintiles (information on contributions is based on the NII salary dataset from January 2016).²¹

As already noted, the rate of realization of pension savings funds is the ratio between the total value of benefits payments received and the total value of contributions made. Figure 2 presents the results of a simulation used to calculate the realization rate of pension savings funds according to income quintile and year of birth. Assuming that all retirees began receiving their employment pension at a uniform age, the realization rate rises with income. Among the 1930 cohort, the realization rate is 107% for the upper quintile compared with 93% for the lower quintile, and among the 1935 cohort, the realization rate is 108% for the upper quintile and 92% for the lower quintile. The growth in the gap in realization rates between the upper and lower quintiles from the 1930 cohort to the 1935 cohort is thus two percentage points (from 14% to 16%).

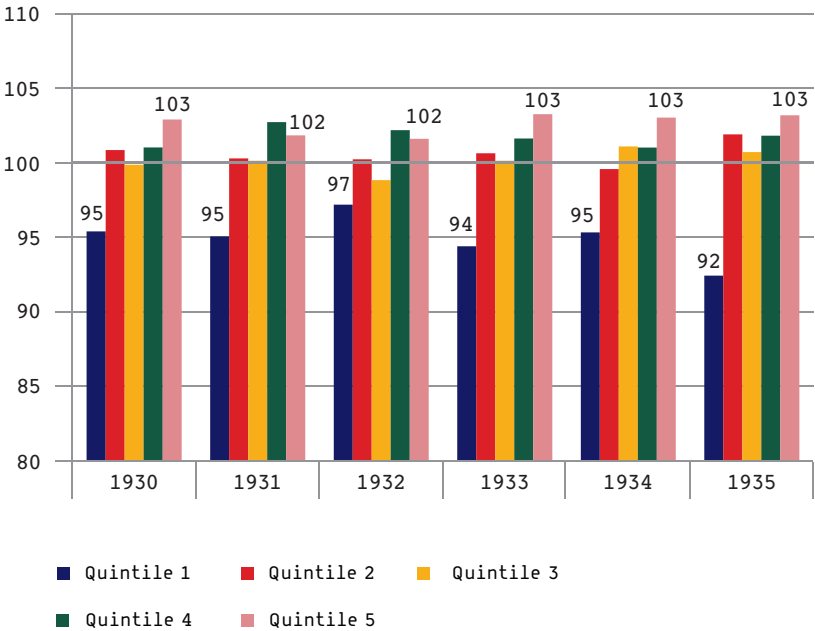
Figure 2. Realization rate of pension funds using uniform retirement age (65) according to income quintile and year of birth (percent)



21 The countable income for pension contributions is the basic income that does not include additional components such as bonuses and overtime.

Figure 3 presents realization rates calculated on the assumption that retirees began receiving their pension benefit payments around the same time as their NII old age pension payments (variable payments). It shows that the differences in the rates of realization of pension savings funds between people with different income levels are less pronounced and that the gap in realization between the upper and lower income quintiles is smaller. This is mainly due to a decrease in realization rate for members of the upper quintile that stems from working longer and continuing to receive an income, thus making them ineligible to receive NII old age pension. The figure also shows that for those in the second and third quintiles, the realization rate improves under this model, reaching approximately 100%. For the first quintile, however, it remains low, reaching only 92% for the 1935 cohort.

Figure 3. Realization rate of pension funds using variable retirement age according to income quintile and year of birth (percent)



As for the gap development,, for the 1930 cohort, the gap between the highest and lowest quintile is only 7.5% compared with 11% for the 1935 cohort. However,

while these findings are based on only six cohorts, when we examine data from the Central Bureau of Statistics on the growth in the gaps in life expectancy according to level of education, alongside findings in some Western countries, these gaps can be expected to increase.

This study also suggests possible policy tools to reduce income inequality among old age pensioners. The current method of calculating the conversion coefficient is based on the average life expectancy of all retirees. In light of what we know about differences in life expectancy and their correlation with income, an alternative conversion coefficient could be calculated based on income, so as to achieve a 100% realization rate of pension savings funds for people at different income levels. This option raises several questions. How might changing the conversion coefficient affect incentives to work? Might it lead to people taking early or late retirement, or is it neutral with no impact on incentives to work? Assuming that those with higher incomes are aware of differences in life expectancy, they are likely, under the current model, to prefer to retire earlier and work less. Making the conversion coefficient sensitive to income will therefore remove the incentive to retire earlier, incentivize working, and contribute to market productivity.

The implementation of a variable retirement age can result in the increased realization of pension savings funds by those with low-incomes. It would also affect those with high-income, as they would remain in the labor market longer, and market productivity would increase. Regarding those with low-income, it is not clear whether they will continue working, since they begin receiving old age pensions at retirement age. Moreover, there are unclear consequences relating to the value of leisure (negative impact) and the substitution rate between retirees' salaries in the labor market and their incomes after retirement (positive impact). Under a variable retirement age policy, there are two possibilities: those with low-income will either retire as early as possible in order to increase their leisure value or, after realizing the effect of their retirement age on their conversion coefficient, choose to continue working. It is thus possible that lowering the retirement age for those in the lowest quintile below the current retirement age, will act as a disincentive to work. Moreover, assuming that those in the highest quintile remain in the labor market and continue to contribute, their projected monthly pension payments will be higher than it is currently, and inequality will therefore increase.

It should be remembered that the income data used in this study does not include income from capital and that there may be some cases in which those with higher incomes who live mainly on income from capital will be able to retire earlier. It would be worthwhile using data on income from additional sources in order to further examine this issue. The dataset is constantly improving, and soon it will be possible to categorize individuals according to their total lifetime income and to study the effects of overall income on life expectancy as well as the effects of income at different stages of life.

It is important to take measures in order to reduce the income inequality that drives growing differences in life expectancy and to find better ways that will lead to a better realization of pension savings funds. In addition, to reduce gaps and inequalities after retirement other measures, such as increasing old age pension for low income people, must be taken

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