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A REFORM IN TAX BENEFITS FOR THE ISRAELI PENSION MARKET

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Abstract

This research aims to evaluate the efficacy of pension-related tax benefits in the presence of a legal obligation to make a pension provision, in terms of the expected poverty rates at retirement. A random sample of 350,000 salaried employees in Israel over six years (2009–14) was used to investigate the proportion of employees in the workforce who do not enjoy pension-related tax benefits. This figure was found to be 47 percent; all of the employees in the first through fourth income deciles and about 55 percent of those in the fifth decile do not enjoy those tax benefits. We also found that according to the existing pension provision and benefits systems, the income expected upon retirement will lead to a decline of three to four deciles, pushing many retirees below the poverty line.

Based on our findings, we propose an alternative mechanism of tax benefits that would provide equal pension benefits to all employees in Israel, help increase the size of occupational pensions, and decrease poverty at retirement without increasing the national budget. The proposed benefit would not be given as tax savings but rather an increase in pension savings. That is, instead of decreasing the amount of tax currently owed, the benefit would be invested in a savings plan to be developed by the government, which would add to the individual's pension savings.

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1. INTRODUCTION

Pension systems in modern advanced economies include legal arrangements regarding an individual's income in old age when they have retired from the workforce (old-age retirement pension annuity). The pension market is linked to macroeconomic issues with significant, broad, and long-term influence. As they approach retirement, individuals need to assess whether their pension savings will allow them to maintain a reasonable standard of living. According to Benartzi and Thaler (2007), individuals possess the cognitive ability to determine how much they will need to live on in retirement and how much they need to save during their working years. However, they have trouble doing so due to a lack of the necessary pension-related knowledge. Other researchers have found that a lack of pension-related expertise makes it difficult for individuals to initiate pension savings and even leads them to avoid dealing with the issue (Lusardi & Mitchell, 2011). The many changes and reforms that have been enacted in the Israeli pension system teach us that individuals are responsible for their financial futures (Achdut & Spivak, 2010). At the same time, the national government is responsible for dealing with issues related to the pension system, mainly as people live longer lives (Spivak, 2013).

The State of Israel has greatly encouraged individuals to save for the long term. This is evident in the decree to expand comprehensive pension insurance in the marketplace, which came into effect in 2008 and obligated all individuals in Israel to put money into a pension plan.[1] At the same time, the state also grants individuals tax benefits at the time that they put money into those plans, to offset the amounts contributed to the pension fund (by the employee and the employer). In addition, it grants long-term benefits that apply to the returns on the money accumulated in the pension funds and monthly pension payments at the time that they are paid out. With the enactment of the mandatory pension, these tax benefits are no longer a factor in the decision of whether or not to save. Nonetheless, they do act as compensation for the money that is subtracted from one's salary for the benefit of the pension. The state continues to grant these benefits, even though pension savings have become a legal obligation.

In light of the great importance of pension savings, this work attempts to evaluate the efficacy of pension-related tax benefits in Israel. For the most part, the effectiveness of a benefit is assessed in terms of how members of the population can enjoy it. As the pension benefit is a tax benefit, it is only relevant for those who owe income tax. Therefore, we can expect that individuals whose incomes are below the threshold for paying income tax will not enjoy this benefit.

In the first part of this study, we assessed the proportion of the salaried population that does not enjoy this benefit. We also characterized the population that does enjoy this benefit relative to the population that does not in terms of two parameters: income decile and gender. To that end, we received from the Central Bureau of Statistics (CBS) a unique sample of

[1] https://employment.molsa.gov.il/Employment/WorkRights/ExtesionsOrders/H095.pdf

individuals randomly selected from the total population for this study. The final sample that served as the basis for the different analyses included 350,000 salaried employees for each of the years 2009–14.[2]

The study findings point to the poor efficacy of the existing pension-related tax benefits, as they are irrelevant to low-income populations whose dependence on pension savings is greater than that of other parts of the general population. These findings reveal the structural problem inherent in the current system of tax benefits: Despite the large amount of money that the government has allocated for pension-related tax benefits, about half of all salaried workers do not enjoy this benefit. Furthermore, the individuals in the half of the general population that does not enjoy the benefit belong to vulnerable populations, underscoring the inequity of these benefits. These results are particularly meaningful in light of a recent (October 2018) OECD report that found that, of all OECD member states, Israel had the largest gap between the richest and the poorest parts of the population, in terms of disposable income per capita for the years 2011–16. The average disposable income per capita in Israel is one of the lowest among OECD states. (In 2016, the average disposable income per capita across the OECD was 55 percent greater than that in Israel.)[3]

In the second part of this study, we calculated the expected income from pension savings after retirement for each income decile. We also predicted the minimum wage at the expected year of retirement for each of the years in our sample by conducting a regression analysis of the minimum wage since 1977 over time (year). We found that, based on the current system of pension provisions and benefits, and an assumption that citizens do not have any additional savings beyond that required by law, the transition to a reliance on an income stream from pension savings upon retirement would lead to an average drop of three to four income deciles, putting many retirees below the poverty line.

To bring the general old-age allowances up toward the poverty line, we examined the option of broadening supplemental payments by redistributing tax benefits without adding to the actual old-age or survivors' allowances. The old-age allowance was increased at the beginning of 2017, which came on top of an increase made at the end of 2015.[4] At the same time, there has not been any change in the pension-related tax benefits and the state grants non-negligible sums of money as tax benefits to those who contribute to pension funds, although such contributions have become mandatory.

Based on our findings, we propose an alternative mechanism that would grant equitable pension benefits to all employees in the country and help to expand occupational pensions. The proposed benefit would not be given as a tax deduction, but rather an increase in pension

[2] This sample was focused on the years 2009–14 because the order for the expansion of comprehensive pension insurance in Israel came into effect in 2008. This order will be discussed in greater detail later in this paper.

[3] http://www.oecd.org/economy/oecd-regions-and-cities-at-a-glance-26173212.htm

[4] Yosef and Spivak (2005) predicted this increase, claiming that future increases in old-age allowances would require workers to contribute more to National Insurance in the future.

savings. That is, instead of decreasing the amount of tax owed in the present, the benefit sums would be deposited in an additional savings program to be developed by the government and would be added to the individual's existing pension savings.

This paper has four sections. In the first section, we present the theoretical framework on which this research was based and different aspects of issues pertaining to tax benefits and the pension system in Israel. The second section describes the methodology used in this research, including a description of the sample and the research procedure and tools. In the third section, we present our findings and propose an alternative mechanism to improve the current system of pension-related taxation. In the fourth section, we summarize our findings and present our conclusions and recommendations for the future.

2. BACKGROUND

a. System of Tax Benefits

The system of taxation in Israel plays several key roles, first and foremost, funding the essential services that the state provides to its citizens. Tax collection is also a tool that the legislature can use to redistribute income and reduce inequality among individuals. Alongside the importance of the taxation system and the necessity of tax collection for the state's revenue, taxation also has unavoidable negative consequences. These include the fact that tax payments are an economic burden on households (reducing their disposable income) that can distort the allocation of resources and subvert the system of incentives placed before individuals. The roles of the system of taxation and the danger inherent in a system that is not constructed correctly make taxation a central and broadly influential policy tool (Trajtenberg et al., 2011).

The matter of an optimal taxation system has occupied researchers, tax experts, and policymakers and has no single solution. The importance of this issue is heightened by the fact that no country, including those dedicated to shrinking the public sector and government services, can exist without some tax collection system. While there is no agreement as to the optimal tax system, it is customary to define a sound system as one that is efficient, equitable, simple, stable, flexible, and internally consistent (DOF, 2014).

Tax benefits are exceptions to tax laws in the form of exemptions or discounts, which reduce or postpone tax payments for particular population groups or types of economic activity. These benefits represent a potential loss of income for the state and sometimes act as government subsidies. Tax benefits are given to encourage economic activity or as part of efforts to achieve particular social goals, expressed as aid to specific groups within the population, support for a particular sector of the economy, or as incentives for behavioral change (OECD, 2010b).

Tax benefits are granted through a series of mechanisms: tax exemptions—sums of money deducted from the tax base; grants—amounts deducted from the taxed amount to reach the tax base; deductions and credit points—amounts deducted from tax liabilities;

reduced tax rates—a reduced rate imposed on a population group or taxable income of a certain type; and deferrals—tax payment postponements that benefit the taxpayer (OECD, 2010a).

Tax benefits have many advantages, such as simplifying the allocation mechanism and the certainty they provide to those who enjoy them. However, tax benefits make the taxation system more complex and less transparent in some instances. In addition, only those who owe taxes enjoy these benefits, making them a tool that increases inequality (Tyson, 2014).

i. Tax Benefits for Pension Savings

Tax benefits for pension savings are widespread among OECD states. The main goal of these benefits is to encourage pension savings to ensure appropriate incomes in retirement. Accordingly, such benefits should focus on workers with low and intermediate-level incomes, as workers with higher incomes will save even without such benefits. Many countries have taken steps to expand pension savings, such as raising the retirement age, encouraging contributions to private pension funds, increasing the level of mandatory pension contributions, and even changing pension-related tax benefits in a manner that acknowledges how progressive the system is and the ability of individuals to take care of themselves in retirement (OECD, 2016). Many countries award tax benefits to those who save money in retirement funds (e.g., US, Canada, UK, Spain, and the Netherlands), even though most of them also make such savings mandatory, as in Israel (NAO, 2014).

The total cost of tax incentives and their distribution are sensitive issues for the pension sector, which had a notable influence on the development of related policies from 1990 through 2014 through its official representation on the Pension Council (Whelan, 2018). A detailed analysis of the reports and consultations of the Pension Council and interviews with key policymakers raised the claim that while issues of pension-related taxation are thoroughly analyzed, in practice, there has been a complete lack of acknowledgment of the findings and recommendations of the OECD's 1994 report, which recommended the reform of pension-related tax expenditures (Maher, 2016). The OECD recommended reforming tax expenditures on private pensions, arguing that tax benefits given for money in private pension funds are a significant tax expenditure. Still, that reform is needed as most of these tax benefits are neither effective nor equitable (OECD, 2008).

Achdut and Strawczynski (2017) argued that the system of tax benefits for pension savings could be made more efficient by the abolishment of some of those tax benefits and the redirection of money saved by the canceling of those benefits. The purpose of pension-related tax benefits is to encourage savings, ensure reasonable incomes in retirement, prevent retirees from having to rely on the public safety net, and prevent double taxation at the time that funds are deposited and the time that they are withdrawn. Those researchers also noted that those making mandatory pension contributions do not have access to accumulated pension funds until retirement and that, therefore, tax benefits serve as compensation for the state's intervention in the individual's decisions.

In the US, tax benefits for contributions to pension funds serve as a savings incentive for many workers, following the move from defined-benefit plans to defined-contribution plans.[5] Following that change, most workers have taken advantage of tax-benefit incentives to save for their retirement (Campbell, 2016). Pension-related tax benefits serve as an incentive for high-income workers and, therefore, the motivation to make pension provisions is more significant and more commonly found among such populations, as opposed to lower-income populations (Brender, 2010). Financial incentives for individuals are not relevant for those whose incomes are below or near the poverty line as, in any case, they cannot afford to put money into optional, supplemental pension plans and rely on the social safety net in their old age. It is up to policymakers to determine whether all individuals should receive equal benefits for their savings. Financial incentives can be granted equitably for the contributions of each individual, independent of income level and marginal tax rate, to achieve equality between income groups. These approaches increase the attractiveness of saving for retirement for those with low to intermediate-level incomes, while decreasing the attractiveness of such savings for those with higher incomes. Fixed subsidies can be relevant as they are more structured than tax incentives and their value is not limited by the tax obligations of the individual (OECD, 2018).

As mentioned above, the current system of tax incentives does not provide an efficient way of achieving appropriate individual pension contributions, despite the generous support of tax benefits. Individuals tend to transfer funds from other investments instead of increasing their total retirement savings. The system of tax benefits is inequitable and, in the end, the tax benefits are granted to those with high incomes, in a manner that is unfair to those with low incomes. In practice, the marginal tax benefits are more than twice as valuable for the minority of high-income individuals (Whelan & Hally, 2018).

Significant tax pension benefits serve as a subsidy to those who pay income tax, leading to inequality in income distribution. The old-age allowances paid by Israel's National Insurance Institute facilitate the redistribution of income; whereas the funds paid out by private pension funds have the opposite effect. This is because the higher the marginal tax rate, the greater the subsidy for contributions to private pension funds (Bowers & Fox, 2018). For this reason, additional resources are needed to increase the size of pension annuities, so that there will not be a need to raise taxes on workers, as is currently the case in some European countries. Increasing the size of pension annuities would contribute significantly to equality among the elderly population, which currently experiences the highest level of inequality (Yosef & Spivak, 2006).

[5] Defined-contribution plans are post-transaction benefit plans in which the reporting entity makes fixed payments to a separate entity (fund). In this scenario, there is no legal or implicit obligation to pay out any additional payments in a situation in which the fund does not have sufficient assets to pay all the benefits due to the worker based on his or her current and previous service. Defined-benefit plans are post-transaction benefit plans that are not defined-contribution plans.

Tax rules should be simple and stable. Complex tax incentives can reduce the effect of incentives for retirement savings. Similarly, frequent changes to the tax rules run the risk of decreasing trust in the pension system and making it harder to plan appropriately (OECD, 2018).

ii. Tax Benefits in Israel

Tax benefits in Israel were first mentioned in the Budgetary Principles Law[6], which stated, "a prediction of sums that will not be collected due to tax benefits shall be attached to the law". The law does not define how tax benefits will be granted nor does it refer to any monitoring or supervision of the tax benefits. Based on the Budgetary Principles Law, the Chief Economist publishes an annual report on the scope of estimated tax benefits and defines a list of those tax benefits as deviations from the normative tax system.

Strawczynski (2015) argued that the Israeli government has never had uniform and consistent tax policies. Changes have been made primarily in response to crises and have focused on indirect taxes. Similarly, Strawczynski noted that not only has the list of benefits remained the same, but tax rates have also remained fixed for decades. This means that Israel is dependent on a tax system that is not adequately constructed and does not include periodic evaluations of the efficacy of tax benefits. In practice, when it comes to tax benefits in Israel, the default option is to preserve that which already exists, even when there is no economic or social justification for doing so and even when the tax benefit is not an effective means of achieving the desired goal. A taxation system that is not constructed correctly can lead to increased income inequality. An analysis of the effects of taxation on inequality revealed that taxes have a causal influence on inequality in gross incomes.

To date, in Israel, as in other countries, no mechanism has been developed to oversee and overcome the problems presented by tax benefits. In practice, it is not clear whether any agency has the designated responsibility for managing tax benefits.[7] This leads to a situation in which the subject of tax benefits comes up for discussion per the state's immediate funding needs. These benefits generally are evaluated quickly and superficially, without any professional support, to fill in gaps that have appeared during the development of the state budget. So, essential questions such as those related to the scope of governmental intervention and relinquished income are not discussed in an orderly fashion, and even fundamental questions about individual tax benefits are left unanswered. In this situation, tax benefits become fertile ground for distributing funds based on political considerations under

[6] For more information, please see the Budgetary Principles Law of 1985.

[7] In accordance with the Budgetary Principles Law (https://www.nevo.co.il/law_html/Law01/P233_001.htm), the Israel Tax Authority is responsible for monitoring tax benefits and annually publishes broad surveys of existing benefits and their estimated costs as part of the Chief Economist's annual reports. However, no governmental body is obligated to conduct any periodic, in-depth evaluation of the efficacy, cost, and/or necessity of these benefits.

the cover of professionalism, as different interest groups apply political pressure (Gony, 2015; Israel Tax Authority, 2013). In the Bank of Israel's 2014 report, the then-Governor of the Bank, Prof. Karnit Flug, expressed support for reducing unjustified tax benefits. She argued:

> *To meet the needs for government services and infrastructure and provide support for engines of growth, civilian expenditures must be increased. To the extent that they are increased and as long as it is not possible to decrease the share of defense expenditures, there will be a need for additional sources of revenue to fund those expenditures. That extra revenue could come from reducing tax exemptions with no socioeconomic justification. In contrast, increasing the deficit would only push off the problem to future years.* (Bank of Israel, 2014)

Similarly, in the 2015 Bank of Israel report, the Governor emphasized the importance of pension savings and said:

> *There is a difficulty with the recommendation to allow pension-savers to take loans backed by their pension savings because, among other things, that recommendation conflicts with one of the government's goals—the goal of encouraging long-term savings that will ensure an appropriate income in retirement, and because [that recommendation] includes options to redirect to current needs the tax benefits that were intended to encourage pension savings.* (Bank of Israel, 2015)

The exceptional intervention of the State of Israel regarding the encouragement of pension savings is based on the assumption that many citizens will not save for retirement independently. In the past, it could be argued that tax benefits were justified as an incentive for pension savings, but since the law making pension savings mandatory came into effect, there is no longer any need for that incentive and these tax benefits serve to redistribute income, which is something that could be accomplished by adjusting the tax brackets (Abramson & Sarel, 2015).

According to Gabay (2015), tax pension benefits should be maintained since they are congruent with the government's tax strategy regarding pension savings. In his review, he argued that, in the early 1990s, the Israeli government decided to cancel all tax exemptions on savings before retirement and to focus tax benefits on the retirement years. This policy was enacted to allow retirees to preserve the standard of living that they enjoyed before retirement and to prevent those who had saved for retirement from becoming a burden on the social safety net.[8]

In the proposed Arrangements Law for fiscal year 2016, it was proposed that the tax benefit for employers' contributions to pension funds should be lowered from four times the

[8] As part of this strategy, the tax exemption on contributions to provident-fund savings plans was cancelled for 15 years, to make the tax benefits associated with provident funds similar to those associated with managers' insurance plans.

average salary to three times the average salary. However, this affected only the top decile and abolished a tax credit with no socioeconomic justification. According to the annual report of the Israel Tax Authority, experience teaches that it is difficult to cancel tax benefits due to political pressure from those groups negatively affected by the change. This is in contrast with the inability of the broader public, which is harmed by such benefits, to exert similar pressure.

Tax benefits for pension savings are not necessary since the enactment of mandatory pension savings and the sums of those benefits could be more efficiently used to reduce poverty, particularly among the elderly (Menachem-Carmi & Kimhi, 2018). An examination of pension-related tax benefits by the Knesset Research and Information Center found that, in 2013, more than 40 percent of all of the pension-related benefits given at the time that funds were deposited went to the top decile of salaried employees, that is, individuals making over NIS 20,000 a month (Kaufman, 2013).

Pension-related tax benefits have two major disadvantages. The first disadvantage is tied to the complexity of these tax benefits. Individuals tend to have little motivation and poor understanding of pensions and, therefore, have a hard time making pension-related decisions. The second disadvantage is related to the fact that the tax benefits for pension contributions are regressive and irrelevant for workers who do not earn enough to pay income tax. Their relevance increases as the marginal tax rate on the deposited funds increases (Achdut & Trotsky, 2015).

b. The Pension System in Israel

The pension system in Israel has three main layers. The first layer includes a governmental pension plan that ensures the payment of a universal old-age allowance at a rate set in advance. This plan is managed by the National Insurance Institute and funded by National Insurance payments and general income from taxes. The second layer is occupational pensions based on the individual's income and arrangements in the workplace. This layer is anchored in individual and group work agreements in the private sector and budgetary pension plans in the public sector. The third layer is comprised of personal savings and investments and is relevant for property owners and those with the ability to save. Since this study concerns the second layer, we will now discuss that layer in greater detail.

As noted above, the order to expand comprehensive pension insurance that came into effect in 2008 applies to all workers in Israel. According to this order, any worker who does not already have a pension plan is entitled to pension contributions after six months of employment. A worker who already has a pension plan who starts to work for a new employer is entitled to pension contributions after three months of work, to be applied retroactively from the first day of work for the new employer. This rule applies to all men over the age of 21 and all women over 20, through retirement age. An individual who continues to work after reaching retirement age and does not receive an old-age allowance other than that provided by the National Insurance Institute is entitled to continue contributing to a pension plan.

The pension insurance includes coverage for old-age retirement pension annuities, survivors' insurance, and disability insurance. The salary used to calculate pension contributions is the "base salary" plus all of the supplemental payments received by the employee. The smaller the proportion of the total salary designated as the pension salary, the lower the expected income of the individual in retirement. The law mandating pension savings includes a ceiling on the insured income (from which pension contributions are derived) equal to the average salary.[9]

The rate of contributions to pension insurance in Israel has risen gradually from 2.5 percent of the insured salary in 2008 to 18.5 percent of the insured salary today. Currently, the employee's required contribution stands at 6 percent of the insured salary, the employer's required contribution stands at 6.5 percent of the insured salary, and the employer's required contribution to a severance pay fund stands at 6 percent of the insured salary.

c. Tax Benefits for Pension Savings in Israel

As noted at the start of this paper, Israel is among the countries that grant tax benefits to those who save for retirement, and it stands out for its exceptional intervention in this area. Gabay (2015) questioned the efficacy of these tax benefits in light of Israel's mandatory pension system. He argued for continuing the tax benefits at the retirement stage, since those tax benefits are congruent with the state's tax strategy for savings. He also noted that, in the early 1990s, the state decided to cancel all tax exemptions on savings granted pre-retirement and focus its tax exemptions granted in the retirement years. This policy was enacted to allow the elderly population to preserve the standard of living they had been accustomed to before retirement and to prevent their becoming a burden on the social safety net.[10]

Pension-related tax benefits include benefits granted based on the employee's contributions to the pension fund and benefits granted based on the employer's contributions to pension and severance funds. The tax benefits are granted as tax savings when the contributions are made and as a reduced tax on profits at the returns stage. In addition, when retirees withdraw money from the pension fund, they enjoy a tax exemption up to a particular ceiling.

Tax benefits based on employee contributions: Employees are entitled to this benefit when they receive their salary. This benefit is awarded as both a credit and a deduction.[11] The benefit that is given as a credit decreases the amount of tax by 35 percent of the amount contributed to a provident fund that pays an annuity. (There are also provident funds that do not pay an annuity, and savers can pool the saving fund as a lump sum at the age of retirement,

[9] As of 2019, the average salary in Israel was NIS 10,273 per month.

[10] As part of this strategy, tax exemptions on contributions to provident funds were cancelled for 15 years, to make the tax status of such contributions similar to that of contributions to managers' insurance.

[11] A "credit" in that it decreases the amount of income tax owed for the taxable income and a "deduction" in that it decreases the amount of income that is taxable.

depending on tax restrictions, up to the legal limit.[12]) This means that only individuals who owe income tax enjoy this benefit. The tax benefits that take the form of a deduction are granted for pension contributions made independently by workers whose salaries are not insured by their employers.[13] That benefit is granted as a reduction of the taxable amount of income, with the reduction equal in size to the contribution. Hence, the size of the benefit matches that of the marginal tax.

Tax benefits based on employer pension contributions: Amounts that the employer contributes for the employee are a tax benefit for the latter. A benefit with monetary value is subject to all taxes that apply to a base salary. That is, the amount that the employer contributes to a pension fund for an employee is taxable at the marginal rate that applies to the employee. The tax benefit granted to employees for these contributions is received when the contributions are made. The money that the employer contributes to the pension fund is not considered part of the employees' gross income and is not subject to tax, up to the legal limit.[14] Money that the employer contributes to a pension fund, up to the legal limit, is considered taxable income when the contribution is made. The actual accounting of the tax is carried out at the time that money is withdrawn and, at that point, there is also a tax exemption subject to limits on the amount of money withdrawn.

Tax benefits based on employer contributions to a severance fund: Similar to what we noted regarding employer contributions to pension funds, employer contributions to severance funds are also considered a benefit and, therefore, are taxable. The tax benefit for these contributions is received when the contribution is made. The money that an employer contributes to a severance fund is not considered part of an employee's gross income and is not taxable up to a limit set in the law.[15] Any money above this ceiling that an employer contributes to a pension fund is considered taxable income at the time of the contribution.

[12] The contribution ceiling for the tax benefit is defined by the rate of contribution to the pension fund and the salary for the contribution: The maximum rate for the employee's contribution is 7 percent and the maximum monthly salary eligible for this benefit is NIS 8,800 (as of 2019). That is, the contribution limit for calculating the tax benefit is 8,700 × 7% = NIS 690. Therefore, the maximum monthly credit that an employee can receive is 609 × 35% = NIS 213 (that is, a savings of up to NIS 213 on the tax due each month).

[13] This benefit is set out in Section 47 of the Income Tax Ordinance.

[14] The amount of the contribution granted as a tax benefit is limited by the pension contribution rate: The maximum rate for the employer's contribution to a pension fund is 7.5% and there is a limit on the level of contribution that is set at 2.5 times the average salary (NIS 25,683, in 2019 terms).

[15] The amount of the contribution eligible for the benefit is limited by the rate of contribution to the severance fund: The maximum rate for an employer's contribution to a severance fund is 8.33 percent of the employee's income, up to a limit of NIS 32,800. This means that the maximum severance contribution is 34,000 × 8.33% = NIS 2,833 (in 2019 terms).

The limit on monthly severance contributions was enacted in 2017. Until that time, there was no legal limit on employers' severance-fund contributions.

3. METHODOLOGY

This study was based on information from a database belonging to the Central Bureau of Statistics (CBS), which includes data collected using Form 126. This form is used to collect data regarding salary components as they appear in the salary reports made to the Israel Tax Authority (ITA). The process of randomly sampling individuals from the general population over six years (2009–14) was carried out by the CBS in their laboratory, especially for this project.

The sample included only individuals who met the following criteria: work status of "fully salaried", above the age of 15 (following the definition of "labor force" in the CBS Labor Force Survey), worked at least one entire month during the year, and had a gross monthly salary[16] at least NIS 1,000 above the minimum wage. The following data were collected for each individual: gross salary, gender, age, and number of credit points, to calculate the exact amount of income tax for each individual.[17]

In the annual samplings, there were a few individuals for whom data were missing. The final sample included about 350,000 individuals. Descriptive statistics of the sample are presented in Table 1.

[16] Gross monthly salary was calculated by dividing the gross annual salary by the number of months that the employee worked.

[17] We did not collect data regarding the amount of income tax owed, since the tax calculated on Form 126 is the final tax after personal credits and pension-related benefits and, at this stage, we were interested in the amount of income tax without any benefits. The amounts contributed to pension funds were also not collected, but were calculated separately based on the gross-salary data and each year's contribution ceiling.

Table 1
Descriptive statistics[18]

	2009	**2010**	**2011**	**2012**	**2013**	**2014**
No. of individuals	329,618	375,683	337,582	348,774	381,297	**396,913**
Average age	40	39	38	37	36	**36**
Median age	38	37	36	35	33	**33**
Average salary (NIS)	7,496	7,128	6,915	6,976	7,210	**7,447**
Median salary (NIS)	5,218	4,978	4,811	4,850	5,040	**5,250**
Mode salary (NIS)	4,400	4,102	3,999	4,020	4,172	**4,497**
Minimum salary (NIS)	1,397	1,358	1,358	1,358	1,358	**1,358**
Maximum salary (NIS)	968,249	671,267	937,869	938,865	723,017	**652,192**
Maximum salary, excluding the top thousandth (NIS)	65,192	68,450	70,000	72,069	73,600	**76,609**

For each year, the sample was 49 percent women and 51 percent men and the age range was 15 to 99, with most participants around 30–40 years old. To examine whether our sample was representative, we compared the sample data with the CBS household survey data for each year.[19] This comparison was based on gross monthly income deciles.

[18] Salary data are presented in monthly terms.
[19] https://old.cbs.gov.il

Table 2

Comparison of gross monthly income deciles in our sample and among the general population for each year

Upper limit of the decile		2009	2010		2011		2012		2013		2014	
	Household survey	Sample	Household survey	Sample	Household survey	Sample	Household survey	Sample	Household survey	Sample	Household survey	Sample
1	2,047	2,109	2,069	1,845	2,248	1,780	1,518	1,874	1,795	1,964	1,527	2,034
2	3,352	2,937	3,501	2,530	3,633	2,384	3,189	2,435	3,513	2,595	3,456	2,798
3	4,106	3,691	4,316	3,326	4,454	3,128	4,368	3,157	4,595	3,307	4,519	3,531
4	4,961	4,400	5,049	4,101	5,153	3,953	5,246	3,998	5,537	4,158	5,562	4,354
5	5,846	5,218	5,984	4,982	6,130	4,814	6,273	4,855	6,578	5,042	6,707	5,253
6	6,938	6,305	7,051	6,002	7,260	5,836	7,617	5,901	7,964	6,094	8,114	6,238
7	8,437	7,900	8,587	7,517	89,100	7,272	9,504	7,299	9,728	7,535	10,098	7,774
8	10,990	10,442	11,229	10,052	11,464	9,750	12,393	9,720	12,736	10,000	13,289	10,259
9	16,007	15,649	16,290	15,020	16,891	14,713	18,212	14,765	18,665	15,114	19,347	15,500
P-value	0.828		0.6401		0.3017		0.4811		0.4575		0.4903	
Average income	6,712.45		6,578.45		7,262.36		7,791.8		8,253.53		8,643/5	

As shown in Table 2, the comparisons of the data for each year revealed no significant differences between our sample and the data from CBS survey of households. Our sample appears to be representative of the general population, as examined by the CBS.

a. Research Procedure

As noted, this research aimed to optimize the mechanism for equitably granting pension-related tax benefits for all workers in the economy and to prevent additional individuals from falling into poverty in retirement. To that end, in the first part of this study, we assessed the efficacy of the tax benefits and distinguished between individuals who enjoy those benefits and those who do not. In the second part of this study, we assessed expected income at retirement and evaluated whether individuals whose earnings kept them above the poverty line during their working years would fall below that line in retirement. In accordance with those findings, we assessed the contribution level necessary to ensure an income above the poverty line during retirement.

i. Step One: Assessment of the Efficacy of Pension-Related Tax Benefits

The efficacy of the pension-related tax benefits depends on the worker's ability to enjoy those benefits. Those benefits are neither relevant nor effective for workers who do not enjoy them. Our analysis identified the individuals in the sample who did not enjoy the tax benefits and those who did enjoy those benefits, based on income deciles, prevalence within the sample population, and gender.

a. Theoretical tax calculation: To calculate the theoretical tax for each individual in the sample[20], we calculated the monthly gross salary by dividing the gross annual salary[21] by the number of months each individual worked. Then, we calculated the theoretical tax for each individual based on their gross monthly salary, in accordance with the credit points awarded based on the personal information for each individual in the data set.

b. Calculation of pension contributions: In this stage, we calculated the employee and employer contributions to pension insurance. We took into account the upper limits on the contribution rate, which were 6 percent for the employee's contribution and 6.5 percent for the employer's contribution to the pension, to calculate the maximum possible benefit accruing to each individual for pension contributions. (We note that the difference between the ceiling for a minimum pension contribution and that for a maximum pension contribution was an insignificant 1 percent.) To assess the pension contributions, the employee contribution recognized for the tax benefit was calculated

[20] As noted, the tax data were not collected from the data set used in this study, since the tax data in the data set (Form 126 data) represent the final tax after personal credits and credits for pension contributions. To assess the enjoyment of the tax benefits, we needed to calculate the tax with and without the pension benefit.

[21] The database included annual gross salary.

as the smaller of the following two values: 7 percent of the upper limit[22] defined by law and the calculated contribution. The employer contribution was calculated as the smaller of the following two values: the calculated employer contribution and the upper limit.[23] Since employers' severance contributions were not capped during the sample period, the tax benefit was calculated based on the amount of income without an upper limit.[24]

c. Assessment of the enjoyment of tax benefits for pension contributions: To calculate the enjoyment of the tax benefit, we calculated the tax twice, first without the pension-related tax benefit and then with that benefit. Individuals for whom the tax benefit led to a reduction in tax expenditures enjoyed the benefit. The tax benefit for employee contributions was calculated as a tax credit of 35 percent of the amount recognized for that benefit (calculated in the previous step). The tax benefit for the employer's contributions was calculated based on the difference between (a) the calculated tax for the gross salary together with all of the employer's pension contributions and (b) the tax on the gross salary together with the employer's pension contributions above the legal ceiling. The tax benefit for the employer's severance contributions is the difference between (a) the calculated tax for the gross salary together with the employer's severance contributions and (b) the tax on the gross salary not including the employer's severance contributions. These calculations are described in detail in Table 3.

[22] The income ceiling is the highest salary for which tax credit can be awarded to the worker for a contribution to a provident fund (NIS 8,800/month in 2019) multiplied by the maximum rate per worker (7 percent). The upper limits were calculated for the sample each year in accordance with the legal limit that year. The upper limits were in accordance with the Income Tax Ordinance (Sections 45A–47).

[23] The salary ceiling for employer contributions to a provident fund (up to 7.5 percent of it) will not be credited as taxable income of the worker at the time of the contribution, up to 2.5 times the average wage (NIS 25,683 in 2019). The ceilings were calculated for each year of the sample in accordance with each year's legal limit.

[24] Starting January 1, 2017 and in accordance with the Arrangements Law, this tax benefit was legally limited as follows: Employer contributions to a provident fund that pays an annuity for an account that includes severance insurance, in amounts that exceed the severance ceiling [contribution at a rate of 8.33 percent multiplied by the employee's salary on the date of the contribution or NIS 34,000 (as of 2019; the lower of the two values)] will be calculated as taxable income for the worker at the time of the contribution, excluding contributions made to an annuity-paying provident fund that was authorized before 1995.

Table 3
Calculation method for the assessment of the enjoyment of the tax benefit by each individual in the sample

Calculation of Net Tax With the Benefit	**Calculation of Net Tax Without the Benefit**
Base salary + Employer **SHAVEI GEMEL** (above a salary of NIS 25,683 for 2019)	*Base salary* + Employer **SHAVEI GEMEL,** from the first shekel + Severance contribution, from the first shekel
Taxable salary	**Taxable salary**
Gross tax according to the tax bracket (credit points and personal credits) Employee's credit **SHAVEI GEMEL**	Gross tax according to the tax bracket (credit points and personal credits)
Net income tax including the pension-related tax benefit	**Net income tax without the pension-related tax benefit**

d. Analysis of individuals who enjoy the pension-related tax benefit: In the fourth step, we distinguished between the individuals in the sample who enjoyed the pension-related tax benefit and those who did not, within each income decile and gender. To identify the individuals who did and did not enjoy the tax benefit, we calculated the difference between the net income tax without pension-related tax benefits and the net income tax including pension-related tax benefits (Table 3). Individuals who did not earn enough to owe tax before the pension-related benefits and for whom the tax without pension-related benefits was NIS 0 did not enjoy the pension-related tax benefits. In contrast, individuals who did owe tax enjoyed pension-related benefits equal to the tax to be paid or the pension benefit (whichever amount was lower).

ii. Step Two: Estimating the Contributions Necessary for Retirement Pay-Outs That Would Put a Person above the Poverty Line

In this part of the study, we evaluated whether the transition to a pension-based income stream at retirement would be expected to cause individuals who were living above the poverty line before retirement to fall below that line.[25] To that end, we calculated the expected income from pension savings for each decile in accordance with the laws regarding the

[25] The poverty line is a socioeconomic measure that refers to the minimum level of income needed by an individual or family for a reasonable existence. Individuals or families whose total income regularly falls below that line are considered to be poor. In Israel, the poverty line is defined as half of the median disposable income (danger of poverty is defined as 60 percent of the median disposable income; report on poverty levels and social gaps from 2017). According to a National Insurance Institute publication for 2017, Israel has a lot of poverty relative to other advanced economies.

minimum required rate of savings. We also predicted the minimum wage in the year of retirement for each year in our sample, by performing a regression analysis of the minimum wage since 1977 over time (year). Finally, we estimated the minimum monthly contribution necessary to ensure that the pension income after retirement would not put the retiree below the poverty line. These analyses are described in detail below.

A. Estimation of expected pension income at retirement: Since we did not have any past data for the individuals in our sample, we relied on the following assumptions in our calculation of the amounts accumulated in their pension accounts:
   1. Years of work before retirement – The men in the sample would work 35 more years before reaching retirement age and the women in the sample would work another 30 years before retiring.
   2. Salary growth – Salaries would grow an average of 2 percent per year[26] and pension contributions would increase accordingly.
   3. Pension contributions would earn interest based on an assumed general rate of return of 4.26 percent per year, in accordance with a communication from the Ministry of Finance's Capital Markets Division from August 12, 2013, regarding the assumed return for conversion coefficients for pension payouts and a 0.5 percent fee deducted from the accumulated amount. The accumulated amount in the pension fund for each individual under the above assumptions was divided by the predicted actuarial coefficient for their gender[27], which was calculated using a table of payout coefficients for pension plans that do not include life-expectancy annuity payment insurance.[28] The obtained result is the expected monthly payout, that is, the expected monthly income from pension savings.

B. Estimating the poverty line at the time of retirement: Among the OECD states, the poverty line is defined as 50 percent of the median income.[29] Since the expected median income is unknown, it was estimated after we predicted the minimum wage. Using this approach, the poverty line was estimated as follows:
   1. We predicted the minimum wage at the time of retirement by performing a regression analysis of minimum-wage data since 1977 over time (year):

$$\text{Minimum wage} = \beta_0 + \beta_1 * \text{Year} + \varepsilon \quad (1)$$

[26] The growth in salary was calculated in accordance with the estimated salary growth listed in public publications.

[27] In our analyses, we distinguished between men and women because, in the calculation of the size of the pension, we needed to apply different actuarial coefficients for men and women.

[28] In accordance with publications from the Menorah Mivtachim Insurance Company

https://data.oecd.org/inequality/poverty-rate.htm#indicator-chart

where minimum wage is the minimum wage in 1977. We found that the time variable explained 97 percent of the variance in the minimum wage, at a significance level of 1 percent.

2. We estimated the median income in retirement based on the relationship between the median income and the average minimum wage, using the sample data.
3. We used the median wage to calculate the poverty line. As noted, the poverty line is defined as half of the median income.

C. Estimating the minimum monthly contribution to ensure that pension income after retirement will not fall below the poverty line: To estimate the minimum monthly contribution, we estimated the total accumulated amount in the pension fund that, when divided by the actuarial coefficient, would be expected to provide an income above the predicted poverty line at the time of retirement. After we estimated the total accumulated amount, we calculated the necessary monthly contribution using the terms estimated in the first part of this study.[30] Here, the additional pension contributions necessary to ensure an income above the poverty line after retirement were calculated for each decile according to the difference between the size of pension contributions at the minimum legal rate[31] for each decile and the minimum contribution necessary to ensure an income above the poverty line after retirement, as calculated above. The full amount to be supplemented by the state for each decile was calculated by multiplying the percentage of women among all salaried workers in each decile by the supplement for women in each decile and by multiplying the percentage of men among all salaried workers in each decile by the supplement for men in each decile.

4. RESEARCH FINDINGS

a. Examination of the Efficacy of Pension-Related Tax Benefits: Scope and Characterization of Those Who Enjoy Those Benefits

While all of the individuals were legally obligated to put money into pension accounts, the tax benefits were enjoyed only by those individuals who owed income tax. In Table 4 and Figure 1, we present the number of individuals in the sample population who enjoyed the tax benefits for contributions to pension insurance in 2014 and the number who did not, by income decile. Individuals who did (not) enjoy the tax benefits were those for whom the tax

[30] The amount of the monthly contribution was estimated based on estimations of years of work, salary growth, and rates of return, from the first part of this study.

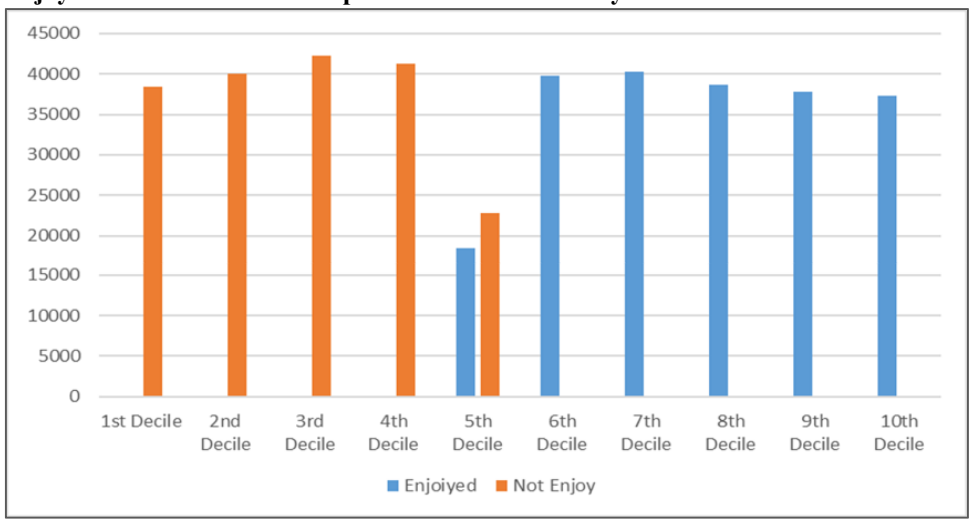
[31] In the calculation for each decile, we calculated contribution rates according to the legal minimum levels of 6.5 percent for the employer and 6 percent for the employee. We did not take into account severance-account contributions since an employee might withdraw those funds at some point before retirement.

benefit was larger than (equal to) zero. The results for the years 2009–14 were qualitatively the same and, therefore, only the 2014 results are presented in the body of this paper.

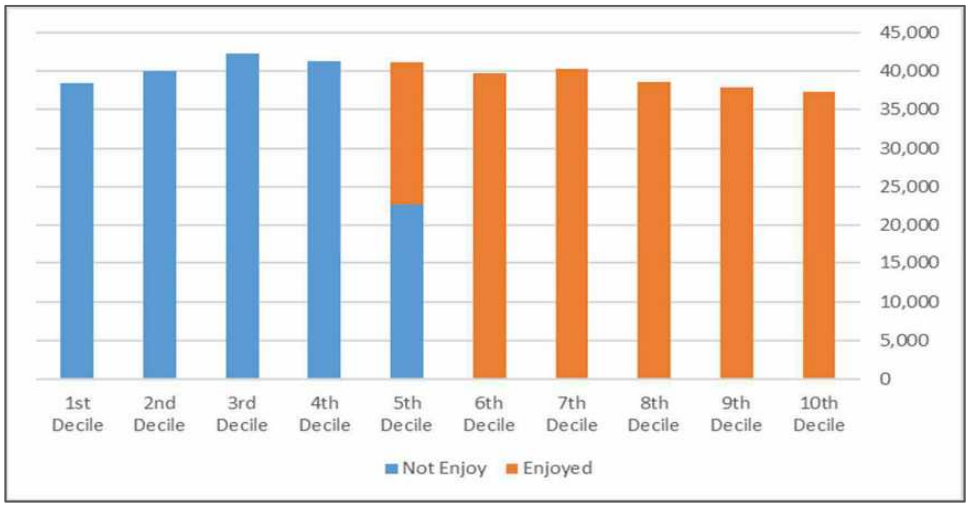
Table 4
Number of individuals in the sample who enjoyed the tax benefit for pension contributions in 2014

Decile	Did Not Enjoy	Enjoyed
Decile 1	38,420	0
Decile 2	40,025	0
Decile 3	42,288	0
Decile 4	41,256	0
Decile 5	22,764	18,451
Decile 6	0	39,726
Decile 7	0	40,248
Decile 8	0	38,654
Decile 9	0	37,825
Decile 10	0	37,256
Total	184,753	212,160
Proportion (%)	46.55	53.45

Figure 1
Enjoyment of tax benefits for pension contributions by income decile in 2014



Benefit from the pension tax benefit according to income deciles for 2014



The findings presented in Table 4 and Figure 1 show that the full enjoyment of the tax benefits for employee and employer contributions is found among Decile 6 and above. In contrast, Deciles 1 through 4 do not have any enjoyment of the tax benefits granted for pension contributions. Within Decile 5, 55 percent of the individuals enjoy the benefit. Overall, we found that 53.45 percent of the individuals in the sample enjoyed the benefit and

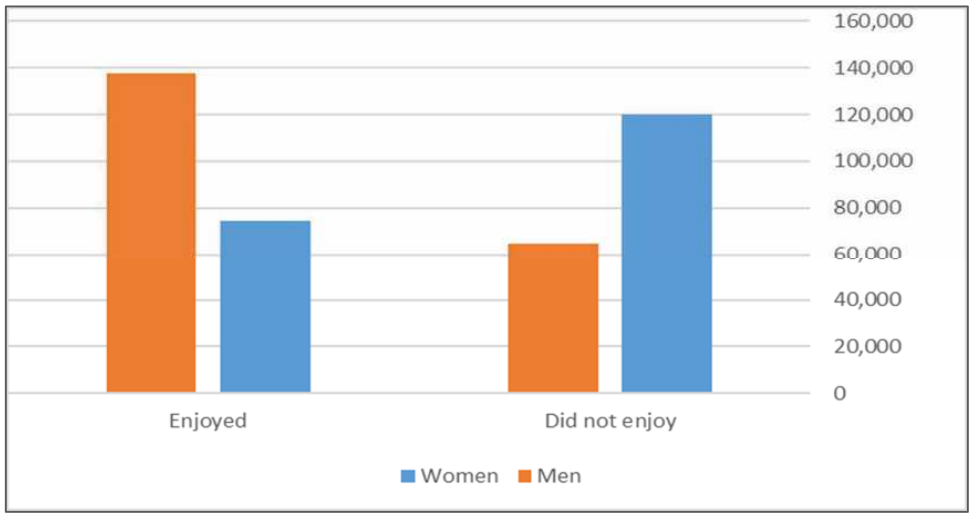
46.55 percent did not. That means that for slightly less than half of the population, concentrated in the lower deciles, these benefits are not at all relevant.

In Table 5 and Figure 2, we present the number of individuals in the sample population who enjoyed the tax benefit given for pension contributions, as compared to the number who did not, for 2014 and broken down by gender.

Table 5
Enjoyment of tax benefits for contributions to pension insurance among men and women, 2014

Gender	Did Not Enjoy		Enjoyed		Total
Women	119,825	61.61%	74,662	38.39%	194,487
Men	64,928	32.07%	137,498	67.93%	202,426
Total	184,753	46.55%	212,160	53.45%	396,913

Figure 2
Enjoyment of tax benefits granted for contributions to pension insurance by men and women, 2014 (monthly wage, NIS)



As can be seen in Table 5 and Figure 2, 67.9 percent of the men in the sample enjoyed the tax benefit for pension contributions, as compared to only 39.39 percent of the women. That is, most of the individuals who did not enjoy the benefit were women. These results indicate an inverse integration of the enjoyment of this tax benefit among men and women.

To test the statistical significance of these findings, we used a chi-squared test and Cramér's V to examine the relationship between the variables. The findings regarding the

relationship between enjoyment of the tax benefit and income level (i.e., income decile) and the findings regarding the relationship between enjoyment of the tax benefit and gender were statistically significant at a significance level of 1 percent.[32]

These findings reveal the irrelevance of the current system of tax benefits for members of the lower class and half of the middle class. In practice, about half of the population does not enjoy this benefit and, absurdly, that half of the population is the poorer half, which needs tax benefits or possible incentives to help increase its pension savings. In the next part of our study, we examined expected income relative to the poverty line, to determine whether those individuals who do not enjoy this tax benefit are those who are likely to fall below the poverty line in retirement.

b. Estimation of Expected Income in Retirement Relative to the Poverty Line

After analyzing the groups of individuals who do and do not enjoy the tax benefits in terms of income decile and gender, we wanted to examine whether the transition to a pension-based income stream following retirement would cause additional individuals to fall into poverty. To that end, we first predicted the expected poverty line at the theoretical time of retirement, by performing a regression of the minimum wage, as a function of time (years) and minimum-wage data since 1977, for each year of the sample.

We found the proportion of explained variance to be 97 percent. That is, the year of the calculation explained 97 percent of the variability in the minimum wage at a significance level of 1 percent.[33] The median income was calculated in accordance with the relationship between the minimum wage and the median income calculated for the sample for the period 2009–14. Then, we calculated the poverty line as half of that median income.

Then, we calculated the expected pension income for each income decile, in accordance with the legally required minimum savings rate. The analysis was performed separately for men and women since the calculation of the pension payouts involved different actuarial coefficients[34] for men and women. The accumulated pension savings based on the expected future years of work at the average age in the sample relative to retirement age (with a distinction made between men and women), including the interest accumulated

[32] As shown in the findings presented in Appendix A.

[33] See the regression results presented in Appendix B.

[34] An actuarial coefficient is the number used to translate the accumulated amounts of pension savings into monthly payments for the rest of the beneficiary's lifetime.

customarily[35], was divided by the predicted actuarial coefficient for each gender[36], to yield the expected monthly pay-out from the pension savings.

In Table 6, we present a comparison of the expected payouts in retirement with salary levels in 2014. This data is broken down by income decile. Incomes below the poverty line in 2014 as compared to incomes below the poverty line in retirement are presented in Figures 3 and 4. The findings regarding predicted pension payouts for the years 2009–14 are presented in Appendix C.

Table 6
Expected pension payouts (NIS) relative to current gross monthly salary for 2014

	Women		Men	
Decile	Current salary	Expected payout	Current salary	Expected payout
1	**1,587**	**1,385**	**2,610**	**2,391**
2	**2,210**	**1,930**	3,635	**3,330**
3	2,778	**2,425**	4,569	**4,185**
4	3,311	**2,891**	5,445	**4,988**
5	3,926	**3,429**	6,458	**5,916**
6	4,744	**4,142**	7,803	7,148
7	5,945	**5,191**	9,778	8,957
8	7,858	6,862	12,924	11,839
9	11,776	10,283	19,369	17,744
10	49,060	42,840	80,691	73,918
Poverty line	2,625	5,828	2,625	5,828

As can be seen in Table 6, following retirement, the income of individuals is expected to fall two to three deciles, pushing many individuals under the poverty line. In 2014, Deciles 1 and 2 were near the poverty line (i.e., below the poverty line or in danger of falling below it). However, at the predicted retirement date of members of the sample for that year, women in Deciles 1–7 and men in Deciles 1–5 are expected to find themselves below the poverty line, assuming that their pension income is their only income. This trend held across all of the examined years.

[35] The calculation was based on an assumption of total returns of 4.26 percent per year, in accordance with the Ministry of Finance Capital Markets Division's communication from August 12, 2013 regarding assumed returns for conversion coefficients for pension payouts and a deduction of 0.5 percent of the accumulated amount as a fee.

[36] According to the table of payout coefficients for an annuity payment plan that does not include life-expectancy payment insurance (from publications of the Menorah Mivtachim Insurance Company).

Another trend that could be observed from the findings was that women were at a greater risk of poverty in retirement than men were. This can be explained by the fact that women tend to work fewer years, earn less than men, and have a higher actuarial coefficient. All of these factors lead to lower pension returns for women.

Figure 3
Earnings below the poverty line in 2014

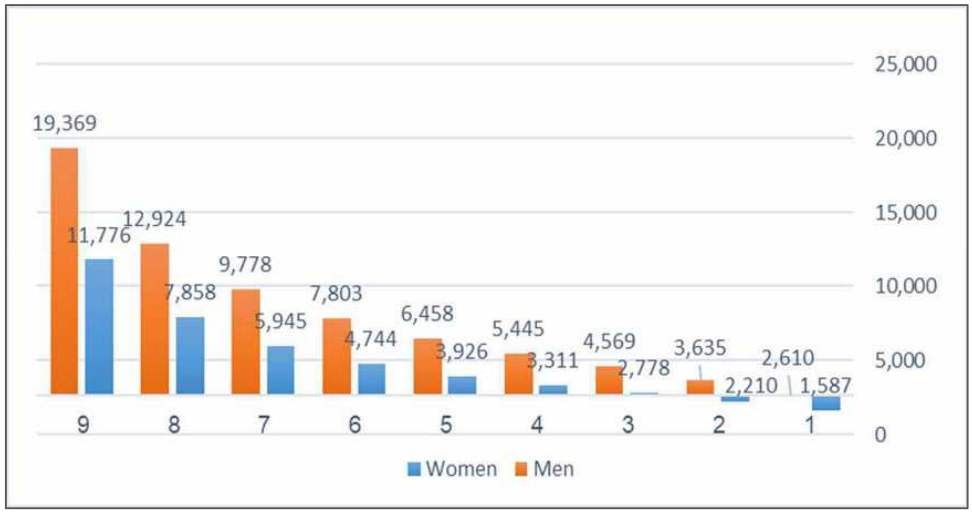
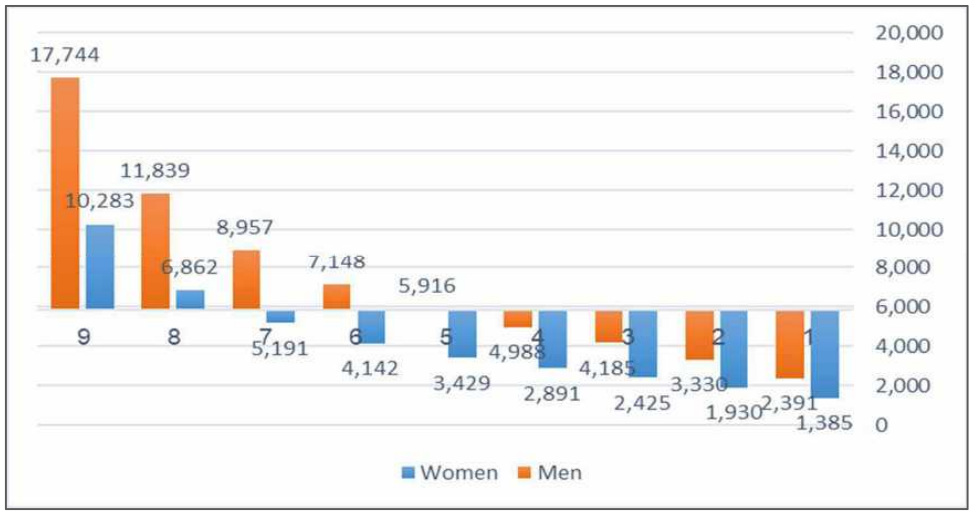


Figure 4
Expected earnings below the poverty line in retirement by income decile



Current (2014) earnings below the poverty line are presented in Figure 3 and expected earnings below the poverty line in retirement are presented in Figure 4. As noted above, and based on the National Insurance Institute's 2017 poverty report, Israel is one of the poorest countries in the OECD, despite the fact that about half of all the poor families in Israel are working families. Most of the poor people in Israel hold a job and are attempting to earn a dignified living, but are still not able to meet that threshold. A clear example of this can be seen in Figure 4, which depicts expected earnings below the poverty line in retirement. At the same time, many individuals who hold jobs, earn above the poverty line, and contribute to a pension are expected to have earnings below the poverty line in retirement.

It is important to note that, in this calculation, we did not take into account the old-age allowance paid out by the National Insurance Institute, which is the first layer of the pension system in Israel.[37] This is because we wanted to evaluate pension payments relative to the poverty line, which is the lowest possible baseline, with the goal not to reach that line, but rather to exceed it so that there will not be any fear of falling below that line as a result of regulatory changes at the time of retirement. In addition, the retirement years are characterized by increased consumption of medical and nursing services for many retirees, who receive support in these areas from the state. Therefore, the goal should be to strive for pension earnings that will put retirees above the poverty line before they receive basic National Insurance payments. The examination of the expected income from the second layer of the pension system for individuals in the population was performed relative to the sums of money that the state allocates for pension-related tax benefits, in an attempt to recalculate the tax benefits in the form of transfer payments. The goal of this was to bring equity to the distribution of the funds allocated for pension-related tax benefits in the state budget so that additional individuals could be brought above the poverty line in retirement without having to rely on National Insurance allowances. This way, the National Insurance old-age allowances could serve as additional funds for the varied needs experienced in retirement, as opposed to the basic income necessary for survival.

c. Estimation of the Minimum Monthly Contribution Necessary for a Retirement Income above the Poverty Line

In accordance with the findings presented in Table 6, we calculated the exact minimum amount that would need to be contributed to the pension fund each year for the income in retirement to be above the poverty line. The calculated minimum contributions were NIS 866 for women and NIS 803 for men. The income levels needed to reach this size of a minimum

[37] The base old-age allowance for an individual stands at NIS 1,554 and is subject to eligibility criteria, www.btl.gov.il/benefits/old_age/Conditions_of_eligibility/Pages/default.aspx)

contribution per the current law were NIS 7,000 for women and NIS 6,500 for men.[38] Individuals who make more than those amounts will not fall below the poverty line in retirement (Table 6). To allow all individuals to earn above the poverty line, we would require additional monthly contributions for individuals who would be expected to earn below the poverty line in retirement. To that end, we calculated the size of those supplemental contributions for each decile whose pension contributions were less than the average contribution, to bring the individuals in that decile above the poverty line in their retirement.

d. Estimation of the Supplemental Pension Contribution Needed to Ensure Earnings above the Poverty Line in Retirement

To calculate the supplementary pension contribution for individuals in the deciles below the necessary minimal pension contribution that we calculated (about NIS 7,000 for women and NIS 6,500 for men), we used the current salaries of the men and women in our sample for each year and broke them down by income decile. The supplemental contribution was calculated based on the difference between the minimum contribution and the average salary for the decile. Then, we checked the number of salaried workers in each decile, according to the CBS data for salaried workers in 2014. Since, in that data set, no distinction between men and women was made in the number of salaried workers, we estimated the relative proportions of salaried men and women each year based on our data set, which was 51 percent men and 49 percent women. The average monthly salary was calculated for each decile, in order to calculate the size of the supplements. The supplemental pension contributions were calculated based on the difference between the amount contributed for each decile at the minimum legal rate[39] and the minimum contribution needed to ensure earnings above the poverty line in retirement (NIS 866 for women and NIS 803 for men). The total amount of supplemental payments from the government for each decile was calculated by multiplying the percentage of women among all salaried workers in each decile by the supplement for women in each decile and by multiplying the percentage of men among all salaried workers in each decile by the supplement for men in each decile. The calculations presented in Table 7 are for 2014. The same calculations were performed for each year of the study, 2009–14, and yielded similar results.

[38] Today, the minimum legal rates for pension contributions are 6.5 percent of the gross salary for the employer and 6 percent of the gross salary for the employee. That is a total of 12.5 percent, calculated as 866/0.125 = 6,928 and 803/0.125 = 6,424.

[39] For each decile, we calculated the contribution rate according to legal minimum pension contribution, 6.5 percent for the employer and 6 percent for the employee. We did not consider contributions to severance accounts as the worker might withdraw those funds at some point before retirement.

Table 7
Calculation of supplemental pension contributions for each decile to ensure earnings above the poverty line in retirement

Decile	Monthly salary, men, 2014	Minimum monthly pension contribution (employee 6%, employer 6.5%)	Supplement needed to reach a contribution of NIS 803	Monthly salary, women, 2014	Minimum monthly pension contribution (employee 6%, employer 6.5%)	Supplement needed to reach a contribution of NIS 866	Salaried workers per decile (in thousands)	**Supplement for each decile (NIS thousand)**
1	2,610	326	**477**	1,587	198	**668**	308.9	176,159
2	3,635	454	**349**	2,210	276	**590**	308.9	144,187
3	4,569	571	**232**	2,778	347	**519**	308.9	115,048
4	5,445	681	**122**	3,311	414	**452**	308.9	87,713
5	6,458	807	**0**	3,926	491	**375**	308.9	56,798
6	7,803	975	**0**	4,744	593	**273**	308.9	41,322
7	9,778	1,222	**0**	5,945	743	**123**	308.9	18,598
8	12,924	1,616	**0**	7,858	982	**0**	308.9	0
9	19,369	2,421	**0**	11,776	1,472	**0**	308.9	0
10	80,691	10,086	**0**	49,060	6,133	**0**	308.9	0
Total			**1,180**	**93,195**		**2,999**	**3,089**	**639,825**

As shown in Table 7, the government supplement necessary to ensure that all salaried workers will have pension earnings that put them above the poverty line in retirement is NIS 639,825 thousand per month, which comes out to NIS 7,677,900 thousand per year. These results support the need to grant pension benefits to individuals in the lower-income deciles, so that they will not find themselves below the predicted poverty line and dependent on external financial support in their retirement, and to reduce social gaps. We note that our data set only included data for salaried workers. For that reason, the calculation of contributions and the alternative mechanism was performed in accordance with CBS's table of income deciles for salaried workers. The workforce includes both salaried workers and the self-employed. The CBS does not have a chart of income deciles for the self-employed, but based on their surveys, the incomes of the self-employed are about 15 percent higher than those of salaried workers. Accordingly, the alternative mechanism that we propose would benefit all of the individuals in the workforce, whether they are salaried or self-employed.

e. Proposed Alternative to the Existing System of Pension-Related Tax Benefits

In light of the findings regarding the low rate of enjoyment of the pension-related tax benefits (approximately 50 percent of the population) and the expected decrease in the standard of living of many individuals when they retire, as calculated above, we conclude that the current model of pension-related tax benefits is not efficient. The large sums of money that the government allocates for these tax benefits, while pension contributions are already mandatory, are transferred only to individuals in the middle class and above who, in any case, are not at risk of falling into poverty in retirement.

We propose an alternative to these pension-related tax benefits that would come into effect at *the contribution stage*. The proposed model would abolish some of the tax benefits granted at the contribution stage and use the budget freed up by that change to grant equitable benefits to all individuals in the country in the form of retirement savings. The move from pension-related tax benefits to a grant for future, equitable retirement savings for each individual would achieve two objectives: First, it would distribute the pension budget in an equitable manner among all of the individuals in the country, as opposed to only those who owe income tax (i.e., it would be a retirement grant as opposed to a tax benefit). This means that the grant would be received equitably by all individuals, independent of the size of their salaries, similar to the National Insurance old-age allowance that is paid out in an equitable manner independent of salary level. The second objective is to increase retirement savings and reduce poverty among retirees. To be eligible for the government grant, the individual would need to have an active pension account (as a salaried employee or as a self-employed person). The state would make monthly deposits to that account and those funds would be accessible only in retirement.

Below, we explain how we used our sample to estimate the sums currently paid out as tax benefits at the contribution stage and how we calculated the supplemental retirement savings that would be granted to each individual in our proposed model. We emphasize that we do not recommend changing the tax benefit on contributions that is granted as a deduction.[40] A proposal to lower the ceiling on tax benefits granted for employer contributions has been presented by Achdut and Strawczynski (2017). They argued for reducing the tax benefit granted as a deduction for independent contributions of salaried workers. In response to their argument, we note that the taxation system in Israel is already more progressive than the systems in other countries and that abolishing tax benefits for the upper deciles would only make it more progressive, a move that is of doubtful necessity.

We believe that the optimal alternative, as presented in this paper, would preserve the tax benefits granted as deductions to individuals who save more than the legal minimum amounts. We hold this position for two reasons: The first reason is tied to the nature of the Israeli taxation system, which is already progressive relative to the systems of other countries,

[40] We refer here to benefits granted to individuals who independently make pension contributions above the legally required level.

and so individuals who save more than the legally required minimal amounts would experience the benefit as a reduction in their salary. The second reason is that this benefit encourages saving in that it is granted only to individuals who save more than the legally required amount. In this case, the tax benefit does indeed encourage saving for retirement and increases retirement savings above the legally required level.[41]

In conclusion, the proposed changes pertain only to the contribution stage and not to the accumulation stage or the payout stage, with the goals of encouraging saving, ensuring adequate earnings in retirement, and distributing the budgeted funds to all in an equitable manner. The pursuit of those goals requires that we focus on the contribution stage.

f. Converting the Tax Benefit for Employee Contributions at the Contribution Stage into Pension Savings

The proposed plan would convert the pension benefits from the tax benefits currently granted as a tax credit when individuals who owe income tax put money into a pension fund into a benefit that could be enjoyed by everyone (whether or not they owe income tax) in the form of monthly savings. Individuals who deposit money into a pension account would receive the benefit through a savings account at a bank or insurance company, based on the preference of the individual. Individuals who currently enjoy the tax benefit would also enjoy this benefit, as the state would also deposit money in their pension accounts. That money would be available for withdrawal only in retirement, like other pension earnings. This way, instead of the benefit being liquid today (the tax benefit increases the disposable incomes of those who enjoy it), it would be preserved as retirement savings. The proposed model is equitable and would increase the sums of retirement savings available to individuals in retirement.

To make sure that the proposed model would not increase the government's costs, relative to the current model, we calculated the precise sum currently granted as a tax credit at the contribution stage to those individuals who enjoy that benefit. To calculate the precise size of the benefit, individuals in the sample were sorted by income decile and, for each decile, we calculated the precise maximum tax credit received by each individual.[42] This calculation was performed for the 2014 data[43] (the last year in our sample). The results are presented in Table 8.

[41] For the most part, individuals who save more than the legally required amount belong to the higher income deciles. The Israeli tax system is progressive in that the higher deciles are subject to a higher tax rate than the lower deciles.

[42] As noted above, the tax benefit was calculated based on the legal minimum contribution rates (6 percent of income up to NIS 8,700, as of 2014).

[43] Identical results were obtained for 2019, when the corresponding limits and deciles were examined. The calculation of the model was performed for the years of our sample, so that we could use our precise findings regarding the enjoyment of the benefit by different deciles. The maximum contribution rate and the relevant income ceiling did not change between 2014 and 2019.

Table 8
Monthly tax benefit received as a tax credit, 2014

Decile	Monthly salary (NIS) according to CBS	Current monthly credit (NIS)	No. of individuals in the decile, according to CBS (in thousands)	Size of the monthly benefit in thousands of NIS
1	1,527	0	308.9	0
2	3,456	0	308.9	0
3	4,519	0	308.9	0
4	5,562	0	308.9	0
5	6,707	135	308.9	41,702
6	8,114	159	308.9	49,115
7	10,098	213	308.9	65,796
8	13,289	213	308.9	65,796
9	19,347	213	308.9	65,796
10		213	308.9	65,796
Total		**1,145**	**3,089.0**	**3,536,905**

As shown in Table 8, the amount of money granted as a monthly tax credit is NIS 3,536,905,000 and the total number of individuals is 3,089,000. So, if we want to grant the tax benefit to everyone in an equitable manner, the benefit for each individual would be NIS 114.50/month and the ceiling for this benefit, as presented in Table 7, would be NIS 5,400.[44] At the same time, the tax benefit would be changed to a pension grant of NIS 114.50 that would be granted to all individuals who have a pension account. As shown in Table 7, in this model, women who are in Deciles 1–7 and men who are in Deciles 1–4 would still have earnings below the poverty line in retirement, but they would be closer to that line. Men in Decile 4 and women in Decile 7 would be very close to the poverty line. For the current tax credit to become a transfer payment that would be received as pension savings in an equitable manner and for all retirees to find themselves above the poverty line, it appears that those payments would have to be increased. But, since we aim to avoid increasing the budget for pension-related benefits while ensuring that individuals will be able to earn above the poverty line in their retirement, we performed a new analysis of the tax benefits received for employer contributions to pension and severance funds.

[44] This amount was calculated by dividing the benefit granted for the maximum legal contribution and the credit rate tax recognitions: 114.5/0.06/0.35 = 5,452.

g. Lowering the Ceiling for Tax Benefits for Employer Pension Contributions for a Redistribution of Funds

Despite the redistribution, there is still a need to provide supplemental sums to ensure earnings above the poverty line in retirement. To that end, we have proposed the redistribution of the benefits received for employer pension contributions. As noted above, the tax benefit for employer pension contributions is granted at the contribution stage and makes it so that there is no tax owed on those contributions, up to a legal limit.[45]

The proposal in this section is to lower the ceiling for this benefit from 2.5 times the average salary to 2 times the average salary and to distribute the difference to everyone as transfer payments that are supplementary pension contributions. If the income ceiling for this benefit were lowered from 2.5 times the average salary (NIS 22,338 in 2014) to twice the average salary (NIS 17,910 in 2014), only Deciles 9 and 10 would be adversely impacted. Individuals in Decile 9 earn NIS 13,289–19,345/month. That means that only those individuals who earn between NIS 17,910/month (the proposed ceiling of 2 times the average salary) and NIS 19,345/month (limit of Decile 9) would be adversely impacted by the reduction. In Decile 10, individuals earning between NIS 17,910/month (the old ceiling) and NIS 22,338/month (the new ceiling) would be negatively impacted. Since the insured salary differs for each individual, we used our sample to calculate precisely the sum by which the benefit to Deciles 9 and 10 would be reduced. We found that the benefit to individuals in Decile 9 would be reduced by an average of NIS 250/month and that the benefit to individuals in Decile 10 would be reduced by an average of NIS 1,780/month. The amount of tax benefit that would be abolished by the proposed plan is, therefore, 250 + 1,780 = NIS 2,030/month. We propose that those freed-up funds be redistributed to the whole population in an equitable manner independent of income decile. The amount to be distributed to each individual in each decile is 2,260/10 = NIS 226. In exchange for the canceled credit benefit and the reduced benefit for employer pension contributions, the state would give each individual who has a pension account an additional NIS 341 (NIS 115 from the cancellation of the tax credit and NIS 226 from the lowering of the ceiling for the tax benefit on employer contributions from 2.5 times the average salary to 2 times the average salary). The results of our calculation are presented in Table 9.

[45] The contribution ceiling is 2.5 times the average salary, which was NIS 22,338 in 2014. The maximum pension contribution rate is 7 percent.

Table 9
Payments relative to the poverty line after the redistribution of the tax benefits, NIS

Decile	Monthly salary, men, 2014	Supplemental contribution above the poverty line, men	Amount to be paid in the new model	Supplement to ensure earnings above the poverty line in retirement	Monthly salary, women, 2014	Supplemental contribution above the poverty line, women	Amount to be paid in the new model	Supplement to ensure earnings above the poverty line in retirement
1	2,610	**477**	**341**	**136**	1,587	**668**	**341**	**327**
2	3,635	**349**	**341**	**8**	2,210	**590**	**341**	**249**
3	4,569	**232**	**341**	**0**	2,778	**519**	**341**	**178**
4	5,445	**122**	**341**	**0**	3,311	**452**	**341**	**111**
5	6,458	**0**	**341**	**0**	3,926	**375**	**341**	**34**
6	7,803	**0**	**341**	**0**	4,744	**273**	**341**	**0**
7	9,778	**0**	**341**	**0**	5,945	**123**	**341**	**0**
8	12,924	**0**	**341**	**0**	7,858	0	**341**	**0**
9	19,369	**0**	**341**	**0**	11,776	0	**341**	**0**
10	80,691	**0**	**341**	**0**	49,060	0	**341**	**0**

In Table 9, we can see the individuals in each decile who would earn above the poverty line in retirement, before and after the proposed change. After the proposed change regarding tax benefits for employee contributions and the lowering of the ceiling for employer contributions, men in Deciles 1 and 2 would earn below the poverty line, with the men in Decile 2 earning quite close to that line, and women in Deciles 1–5 would also earn below the poverty line. The proposed model could help an additional three deciles to earn above the poverty line in retirement. The proposed model also includes the equitable distribution of the money those changes would save the government, such that even the higher deciles that lost the benefit would enjoy the redistributed funds. In this section, we do not propose any reduction of the tax credit granted for employer contributions to severance funds. That severance money will not necessarily reach the worker, as workers may leave their jobs under circumstances in which they would not be eligible for severance pay. Therefore, the legal ceiling is important only for employers who make severance-fund contributions above the legal ceiling.

5. SUMMARY AND CONCLUSIONS

In modern advanced economies, pension systems are linked to public issues of long-term economic importance. Before retiring, individuals need to examine their savings in an informed manner, to determine whether or not they will be able to maintain a reasonable standard of living in retirement. Similarly, the national government, which is responsible for dealing with the issues that accompany the pension system, must evaluate existing levels of savings, particularly as lifespans increase.

As described in detail above, Israel is among the countries that award tax benefits for retirement savings and views the encouragement of long-term savings by individuals as something to be supported. Its exceptional intervention in this field stands out in comparison with the actions of other advanced economies. The order to broaden comprehensive pension insurance in the market, which came into effect in 2008, is a prime example of this behavior.

Convinced of the importance of the issue of pension savings, in this research we sought to evaluate the efficacy of pension-related tax benefits in Israel. We chose to investigate this issue through the use of a unique data set assembled especially for this work from the CBS database.

The findings of this work indicate that the current pension-related tax benefits are not effective, as they are irrelevant to lower-earning populations whose dependence on pension savings is greater than that of other populations. These findings reveal the inherent structural problem in the current approach to pension-related tax benefits. Despite the large budget that the state allocates for pension-related tax benefits, about half of all workers do not enjoy those benefits. Furthermore, those workers who do not enjoy the tax benefit are those who are already economically weaker, indicating that the granted tax benefits are inequitable.

In practice, the structural inequity of the tax-benefit mechanism exacerbates the gaps between classes. High earners receive a benefit that leaves them with more disposable income that can be used for current expenses or put into other types of investments that can improve the investor's financial welfare in retirement. At the same time, the obtained data indicate that, according to the current system of contributions and tax benefits and assuming that individuals have no other savings besides that required by law, the transition to a pension-based income stream in retirement is expected to cause individuals to decline an average of three or four income deciles, pushing many below the poverty line. These findings are particularly important in light of a recent OECD report that stated that Israel has the largest gap between rich and poor of any OECD state and also has one of the lowest levels of disposable income per capita.

In terms of methodology, we should mention a significant difficulty encountered in this study. The unique data set that we received from the CBS for this study included only some of the salaried workers in the economy. Therefore, we could not precisely calculate the tax benefits, but only estimate those values for the individuals in the sample based on their income deciles. We were also unable to calculate the benefit for the self-employed, but could estimate it based on CBS publications.

This difficulty and the findings of this unique study indicate an immediate need to establish a mechanism for the intelligent and consistent supervision of these tax benefits, with the findings of that work included in the annual reports of the Budget Department of the Finance Ministry, as part of the process of developing the state budget. Today, the subject of tax benefits is not on that department's agenda and, surprisingly, is not even defined as one of that department's areas of responsibility. In practice, there is no clarity regarding the existence of an entity tasked specifically with the responsibility of managing the system of tax benefits in Israel. The Budgetary Principles Law does specify that the Israel Tax Authority is responsible for monitoring tax benefits, and that office does publish a forecast and broad-ranging survey of the existing benefits, but no government entity is obligated to perform any periodic, in-depth evaluation of the efficacy of the system of pension-related tax benefits and their current relevance. Different government agencies possess tremendous sets of data regarding all of the individuals in the economy, both those who are salaried and those who are self-employed, and that data could be used to conduct a precise, in-depth analysis of the pension-related tax benefits, including the exact returns to all individuals.

In conclusion, based on the findings reported here, we have tried to develop a balanced plan to aid all three layers of the existing system of retirement earnings:

A. The development of a system to grant pension benefits to all workers in an equitable manner, which could lead to increased occupational pensions and in which (as described thoroughly in this paper) the benefit would be granted as increased pension savings, as opposed to tax savings.
B. Preserving a balanced state budget with regard to pension benefits and the appropriate redistribution of budgetary funds across the entire population.
C. Since the transfer payments would be made only to individuals who are already contributing to a pension account (both salaried workers and the self-employed) and would be made equitably, the proposed system could encourage individuals who are not currently in the workforce to enter the workforce. This would increase the number of employees in the economy and help to reduce social gaps.

We hope that our findings concerning the efficacy of tax benefits in Israel will serve as a basis for additional studies in this field, contribute to the public discussion of societal inequality, and help policymakers make good decisions about issues related to the pension system in Israel.

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APPENDICES

Appendix A

Values for Chi-Squared Tests and Cramér's V

		Decile		Supplementary contribution		Age group		Gender		Central region		Nationality	
		value	*df*	value	*df*	value	*df*	value	*df*	value	*df*	value	*df*
2009	Chi2	5.105	8	17.294[a]	1	4.289[a]	7	14.708[a]	1	26.994[a]	1	3.035[a]	5
	Cramers	.887		.868		.668		.762		.780		.115	
2010	Chi2	5.026	8	22.356[a]	1	4.183[a]	7	18.774[a]	1	22.232[a]	1	3.329[a]	5
	Cramers	.900		.900		.688		.755		.699		.110	
2011	Chi2	4.989	8	18.227a	1	3.976[a]	7	77.856[a]	1	16.843[a]	1	4.016[a]	5
	Cramers	.901		.734		.714		.773		.762		.109	
2012	Chi2	5.031	8	20.249[a]	1	4.378[a]	7	22.571[a]	1	17.591[a]	1	2.991[a]	5
	Cramers	.868		.762		.673		.868		.736		.093	
2013	Chi2	5.006	8	22.893[a]	1	3.516[a]	7	25.433[a]	1	20.318[a]	1	3.114[a]	5
	Cramers	.892		.775		.771		.938		.604		.090	
2014	Chi2	5.010	8	23.712[a]	1	3.958[a]	7	27.890[a]	1	19.874[a]	1	2.468[a]	5
	Cramers	. 890		.773		.801		.762		.666		.079	

Appendix B
Regression for the Minimum Wage

SUMMARY OUTPUT								
Regression Statistics								
Multiple *R*	0.983867							
R Square	0.967994							
Adjusted *R* Square	0.966394							
Standard Error	143.0884							
Observations	22							
ANOVA								
	df	*SS*	*MS*	*F*	Significance *F*			
Regression	1	12384521	12384521	604.8819	2.02E-16			
Residual	20	409485.6	20474.28					
Total	21	12794006						
	Coefficients	Standard Error	*t* Stat	*P*-value	Lower 95%	Upper 95%	Lower 99.0%	Upper 99.0%
Intercept	-233657	9653.121	-24.2053	2.75E-16	-253793	-213520	-261123	-206190.1399
Year	118.262	4.808505	24.59435	2.02E-16	108.2317	128.2924	104.5802	131.9438562

* The data set included minimum wage data for 1997–2018, as that data appears in the records of the National Insurance Institute.

Appendix C
Expected Pension Pay-Outs Relative to Gross Monthly Income in 2009–2014, NIS

	2009				**2010**			
	Women		Men		Women		Men	
Decile	Current salary	Expected pay-out	Current salary	Expected pay-out	Current salary	Expected pay-out	Current salary	Expected pay-out
1	**2,109**	**1,856**	**2,516**	**2,319**	**1,478**	**1,299**	**2,431**	**2,238**
2	2,937	**2,585**	3,462	**3,099**	**1,952**	**1,716**	3,211	**2,956**
3	3,691	**3,161**	4,370	**4,028**	**2,487**	**2,186**	4,091	**3,766**
4	4,400	**3,873**	5,385	**4,964**	3,126	**2,747**	5,141	**4,733**
5	5,218	**4,593**	6,498	5,990	3,793	**3,333**	6,238	5,743
6	6,305	5,550	7,824	7,212	4,582	**4,027**	7,536	6,938
7	7,900	6,954	9,609	8,857	5,661	**4,975**	9,310	8,571
8	10,442	9,192	12,673	11,682	7,525	6,614	12,377	11,395
9	15,649	13,775	19,138	17,640	11,322	9,950	18,622	17,143
10*	65,192	57,385	94,823	87,403	55,388	48,676	91,098	83,865
10	968,249	852,295	807,248	892,486	544,106	850,926	894,912	743,153
Poverty line	2,609	5,382	2,609	5,382	2,489	5,471	2,489	5,471

	2011				2012			
	Women		Men		Women		Men	
Decile	Current salary	Expected pay-out	Current salary	Expected pay-out	Current salary	Expected pay-out	Current salary	Expected pay-out
1	**1,410**	**1,297**	**2,319**	**2,125**	**1,339**	**1,173**	**2,203**	**2,023**
2	**1,832**	**1,684**	3,013	**2,760**	**1,793**	**1,571**	2,949	**2,709**
3	**2,375**	**2,184**	3,906	**3,578**	**2,353**	**2,062**	3,871	**3,555**
4	3,008	**2,766**	4,948	**4,533**	2,972	**2,604**	4,889	**4,489**
5	3,650	**3,356**	6,004	**5,500**	3,620	**3,172**	5,955	**5,468**
6	4,437	**4,079**	7,297	6,684	4,390	**3,846**	7,220	6,630
7	5,484	**5,042**	9,019	8,262	5,463	**4,785**	8,985	8,251
8	7,298	6,710	12,004	10,996	7,317	6,410	12,034	11,051
9	11,060	10,169	18,191	16,664	11,022	9,655	18,128	16,647
10*	54,236	49,867	89,203	81,716	52,678	46,147	86,642	79,564
10	706,542	500,279	1,162,076	819,798	705,793	618,943	1,160,844	1,067,141
Poverty line	2,405	5,560	2,405	5,560	2,425	5,650	2,425	5,650

	2013				2014			
	Women		Men		Women		Men	
Decile	Current salary	Expected pay-out	Current salary	Expected pay-out	Current salary	Expected pay-out	Current salary	Expected pay-out
1	**1,388**	**1,214**	**2,282**	**2,093**	**1,587**	**1,385**	**2,610**	**2,391**
2	**1,902**	**1,664**	3,129	**2,870**	**2,210**	**1,930**	3,635	**3,330**
3	**2,502**	**2,188**	4,115	**3,774**	2,778	**2,425**	4,569	**4,185**
4	3,083	**2,696**	5,071	**4,651**	3,311	**2,891**	5,445	**4,988**
5	3,746	**3,276**	6,161	**5,651**	3,926	**3,429**	6,458	**5,916**
6	4,517	**3,951**	7,429	6,814	4,744	**4,142**	7,803	7,148
7	5,646	**4,938**	9,287	8,518	5,945	**5,191**	9,778	8,957
8	7,538	6,592	12,397	11,370	7,858	6,862	12,924	11,839
9	11,288	9,873	18,566	17,028	11,776	10,283	19,369	17,744
10*	51,512	45,053	84,724	77,705	49,060	42,840	80,691	73,918
10	505,161	617,298	830,858	1,064,682	728,655	441,117	1,198,447	761,120
Poverty line	2,520	5,739	2,520	5,739	2,625	5,828	2,625	5,828

* Upper limit of the last decile after the removal of the top thousandth from the sample, to neutralize the effect of outlier values.