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The Effect of Israel's Pension System Reforms on the Savings Rate, 2006–2019[1]

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The Effect of Israel's Pension System Reforms on the Savings Rate, 2006–2019

Kobi Braude and Yoav Friedmann

Abstract

In this paper, we examine the effect of a number of significant reforms in Israel's pension system on the savings rate. Using administrative wage data, we find that between 2006 and 2019, total pension contributions for employees increased by 1 percent of GDP. About half of this increase was due to the introduction of a mandatory pension plan. Rising contribution rates were the second most important factor in accounting for the increase in total contributions. The increase in contribution rates reflected several developments, primarily the understanding that, in view of the transition to a fully funded defined contribution scheme via new pension funds, expected pension benefits would be insufficient unless contributions were increased. The transition from an unfunded defined benefit pension scheme to a fully funded defined contribution scheme in the public sector accounts for only one eighth of the total increase in contributions. This is probably due in part to the fact that this transition had already begun at least a decade before the period examined here, and hence most of its effect had already taken place earlier. We use findings reported in the literature on the rates at which individuals offset increases in pension contributions by reducing other savings to estimate the net effect of the pension reforms on the overall increase in Israel's household savings rate. We do so while accounting for the offset rate relevant to each reform in view of the nature of the reform, and the characteristics of the employees who were affected by that reform. We find that altogether, the reforms accounted for a 0.7 percent of GDP increase in household savings.

Keywords: Pensions, Pension system, Mandatory pension, Unfunded defined benefit pension, Savings

השפעת הרפורמות במערכת הפנסיה על שיעור החיסכון בישראל, 2006 – 2019

קובי ברוידא[*] ויואב פרידמן[**]

תמצית

עבודה זו בוחנת את ההשפעה של מספר רפורמות משמעותיות שהונהגו במערכת הפנסיה על שיעור החיסכון של משקי בית בישראל. בהתבסס על קובצי שכר מנהליים אנו מוצאים כי בין 2006 ל-2019 עלו ההפרשות של שכירים לקצבה באחוז תוצר אחד. הנהגת פנסיה־חובה תרמה כמחצית מעלייה זו. הגורם השני בחשיבותו לעלייה זו היה הגידול בשיעורי ההפרשה. המעבר מפנסיה תקציבית לצוברת במגזר הציבורי תרם כשמינית בלבד מהעלייה האמורה, בין השאר, ככל הנראה, משום שמעבר זה החל לפחות כעשור לפני תחילת המדידה שלנו. בהסתמך על אומדנים מהספרות ביחס לשיעורים שבהם פרטים מקזזים גידול בהפרשות לפנסיה באמצעות הקטנת יתר החיסכון שלהם, אנו אומדים את התרומה נטו של הרפורמות הנדונות להגדלת שיעור החיסכון של משקי הבית, תוך התייחסות להבדלים בשיעורי הקיזוז הנוגעים לכל רפורמה בהתאם למאפיינים שלה ושל העובדים שהושפעו ממנה. אנו מקבלים כי התרומה הכוללת של הגידול בחיסכון הפנסיוני לחיסכון של משקי הבית הסתכמה בכ-0.7 אחוזי תוצר.

מילות מפתח: פנסיה, מערכת הפנסיה, פנסיה-חובה, פנסיה תקציבית, חיסכון

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1. Introduction

In the past three decades, Israel's pension system has undergone several significant reforms relating to the share of wage set aside for pension. These include closing old pension funds to new members and opening new pension funds for them (from 1995 on); transferring new public sector employees from an unfunded defined benefit (DB) pension plan to defined contribution (DC) schemes (the process began in the 1990s and is ongoing; DB pension arrangements for new employees were totally discontinued in 2004); and the introduction of a mandatory pension arrangement (from 2008 on). These reforms had direct and indirect upward effects on the pension contribution rates over time, via mechanisms that included collective agreements over the years.

Israel's national savings rate rose by 2.6 percent of GDP in the past two decades—from an average of 24.6 percent in 1995–2004 to an average of 27.2 percent in 2015–2019. This important macroeconomic phenomenon has affected the economy in many ways, including the buildup of a large and protracted surplus in the current account of the balance of payments. Several authors—Bank of Israel (2017), Ben-Bassat (2020), and Bahar and Leiderman (2020)—have in the past few years addressed Israel's high savings rate in recent decades and traced this to the pension system reforms *inter alia*. These authors, however, neither substantiated nor quantified this assessment. In contrast, Gronau and Spivak (2020) believe that the pension system reforms were not a factor in the increase in the private savings rate because the surge in private saving did not coincide with the onset of swift growth in net pension contributions. To the best of our understanding, Gronau and Spivak's observation does not suffice to underpin a diagnosis of the effect of the pension reforms on the savings rate.[1]

In this paper, we present quantitative estimates of the upward effect of the increase in pension contributions from wages on the increase in the household savings rate between 2006 and 2019. We base our estimates on an analysis of contributions for employees (by

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[1] The timing mismatch between the increase in savings and in pension contributions may have been abetted by nonrecurrent events that do not reflect long-term processes. In addition, Gronau and Spivak studied net contributions (i.e., net of withdrawals). In our opinion, in discussing the effect of the reforms on savings one should study gross contributions (without netting of withdrawals) because acute changes in withdrawals create "noise" in the net series that does not reflect the determinants of pension savings.

employees and employers) as shown in employers' payroll reports to the Israel Tax Authority, and on estimates in the literature about the connection between pension contributions and savings. The use of administrative wage files has many advantages including data accuracy, the ability to test data on the basis of uniform definitions across a lengthy period, broad coverage of the employee population, and the ability to tally the personal-level data in our possession and thus create a macroeconomic aggregate that is comparable to the increase in the aggregate savings rate. A long-term examination is needed because these reforms were introduced rather far apart in time, and due to the lengthy term needed to amass their effect on the aggregate savings rate. This long-term point of view is necessary because some of the reforms were applied only to the flow of new hires and not to existing headcount; because individuals' behavioral adjustment to statutory changes (such as raising contribution rates by means of collective agreements, among other mechanisms) is gradual; and because even reforms that did not distinguish between long-standing and new staff presented a roadmap for gradual implementation (for example, the increase in the minimum rate of contribution to mandatory pension). Data constraints preclude estimations for years preceding 2006. We chose to end the estimate in 2019 due to the outsized effects of the COVID-19 crisis on employment, wages, and saving from early 2020 onward.

We find that employees' pension contributions increased from 2 percent of GDP in 2006 to 3 percent in 2019. Around 70 percent of the upturn originates in wages paid in the private sector, while the rest traces to public sector wages—a distribution that aligns with the weight of these sectors in total national wage payments. In our estimation, among the aforementioned reforms, the largest upward effect—about half of the total increase in employees' pension contributions—was made by the introduction of mandatory pension saving. This figure relates solely to wages on account of which employers did not contribute to pension savings before the mandatory pension reform went into effect. The second most important determinant of the upturn in contributions by employees in general was the increase in contribution rates, reflecting an upturn in contributions due to the closure of old pension funds to new members and the referral of the latter to new

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funds[2], the realization that without an increase in contributions the pension benefit would be undesirably small, an increase in contributions mandated by the expansion order pertaining to the mandatory-pension rollout, and tax incentives and subsidies. Notably, the increases in the minimum rates that were established in the mandatory pension arrangement over the years, particularly in 2016 and 2017, caused these rates today to resemble those commonly attested throughout the private sector. Thus, it is hard today to determine whether the contributions reflect the minimum required under the arrangement or are part of an accord between workers and employers. The transition from an unfunded defined-benefit pension scheme to defined-contribution arrangements in the public sector contributed 0.13 percent of GDP—about one-eighth of the increase in employees' contributions countrywide. The upward effect of this transition on contributions by public sector employees, however, was key, at 40 percent of the increase.

It is no simple matter to estimate the effect of the upturn in pension contribution rates on the upward movement in the household savings rate. To do this, one has to deal with the claim that the upturn (voluntary or imposed) in pension contribution rates may cause people to save less in other channels, perhaps even fully offsetting the increase in these contributions. Such an offset would reduce the net upward effect of the pension reforms on the growth of the total savings rate. To estimate the rate of offset from other savings occasioned by the increase in pension contribution rates that each reform set in motion, we examine findings from the literature and a detailed analysis of the income and age distribution of the population groups that were affected by each reform. Thus, the differences in the offset rates pertaining to each reform mainly reflect differences in the characteristics of the population that was affected by the reform and, where apt, differences in the characteristics of the reforms. On the basis of these assumptions, we estimate the overall net contribution of the reforms to raising the household savings rate at 0.7 percent of GDP. Notably, data constraints force us to make this estimate only from 2006 onward, whereas the impact of the switch to new pension funds and the transition from DB to DC pension arrangements in the public sector began earlier.

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[2]   If we observed a lengthier period, we would probably find that the closure of the old pension funds had a larger positive effect on the increase in contributions because these funds were closed to new members in 1995 whereas data constraints, as stated, forced us to begin the test only in 2006.

In this study, we do not deal with the reform that raised the retirement age, announced in 2003 and implemented gradually in 2004–2009. It was immensely important for the economy and its pension system, and probably had an upward effect on national saving. Nevertheless, it differs from the other reforms mentioned above in that, among other things, it did not have a direct upward impact on the share of wage devoted to pension savings. For this reason and for additional reasons specified below, estimating the effect of this reform on the total savings rate is beyond the scope of this paper.

The rest of this study is organized as follows: Section 2 gives a brief survey of the pension system reforms discussed in the paper. In Section 3, the impact of these reforms on the increase in pension contribution rates in the private sector and the public sector is analyzed. In Section 4, the contribution of the reforms to growth of the savings rate is analyzed. For this purpose, we combine the estimates of the gross effect in Section 3 with assumptions concerning the rate of offset and the distribution of the burden of pension contribution between employers and employees. A brief conclusion appears in Section 5.

2. Israel's pension system reforms

Israel's pension system took on its current contours through a series of reforms that began in 1995 and have continued for more than two decades. As a result of the reforms, the vast majority of employees in Israel now have an occupational pension. The reforms have increased pension contributions in order to assure savers a large enough pension, strengthened the relation between contributions during working years and the level of benefit paid out after retirement, and effectively negated the possibility that the country's pension funds would be unable to meet their obligations to members due to actuarial deficits, particularly in view of the increase in life expectancy.[3]

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[3] The fund's liabilities are structured such that most risks fall upon the members themselves and not on the fund in any case. This aside, regulation ensures that insofar as an actuarial deficit forms, it will be corrected rather quickly with the participation of all members. This should rule out the possibility of a situation in which one generation receives a pension in line with what it was promised up front while the fund cannot meet its liabilities to the next generation.

The two reforms that focused on the transition to DC pension plans were invoked for new members of the system only. Old members retained the arrangements that had been theirs before the reform. As a result, even today, some thirty years after the old pension funds were shut down to new members and more than twenty years after new employees in the public sector were denied access to DB schemes, some active employees continue to participate in the old arrangements. Additionally, changes in the system that were made many years ago continue to create a dynamic in pension contributions today. Table 1 summarizes the main pension system reforms in the past thirty years that pertain to contributions from wages to pension savings. A brief description of these reforms follows[4].

Table 1 | Key reforms in pension contribution rates

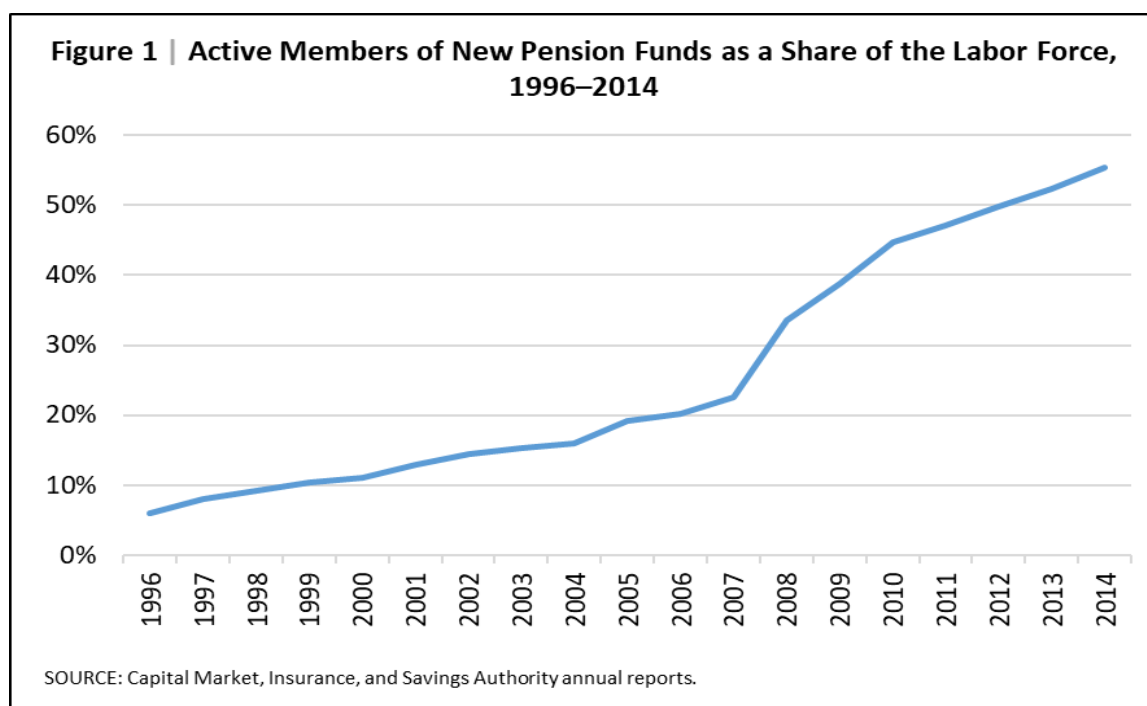| Reform	Type of arrangement	Year applied	Workers affected
Closing old pension funds to new members	Contributions to entitlement-based funds	1995	Current members—reduced benefit entitlements, larger contributions, government aid*
New pension funds established	Contributions to accrual-based funds	1995	New workers who would have joined old pension funds until 1995
Discontinuing DB pension arrangements for those newly joining the public sector	Entitlement-based arrangement with no contributions and no pension fund	In phases; from 2004 on, new members are not admitted.	New public-sector employees, who will be insured with new pension funds.
Mandatory pension	Compulsory contributions to a defined contribution pension fund	Effective 2008; rates of contribution raised gradually until 2017	Employees who lack a pension arrangement thus far or whose contributions (employee plus employer) fall short of the minimum established
Collective agreements	Increasing contributions to (old and new) pension funds	Various years. Main agreements: 2011, 2013, 2016	Members who are insured with pension funds

* These changes were implemented in 2003.

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[4] For further discussion of the pension-system reforms, see, for example, Gronau and Spivak (2020), Ahdut and Spivak (2010), and Yosef and Spivak (2008).

Closing old pension funds to new members and opening new pension funds: In 1995, the government closed the existing pension funds to new members and required new members to save for their pensions via new funds and under terms different from those of the old ones. The old pension funds were DB funds, that is, members' pension contributions conferred defined entitlements post-retirement as a function of their years of saving and the level of the insured wage. Members of the fund (or those representing them) had no interest in increasing their contributions to savings because their pension entitlements were not directly contingent on the rate of contributions. Supposedly, members were protected from the risks that accompany pension savings, particularly risks to pension fund yields and increases in life expectancy. Figure 1 shows the share of new pension fund members as a percent of the labor force, and indicates that the proportion of active members increased rather steadily until 2008, reflecting the phased entry of new employees into the labor force. The mandatory pension arrangement, which went into effect in 2008 (see discussion below), caused a sharp increase in the number of active members of the new pension funds.

The old pension funds were found to be in such actuarial deficits that it was already clear by the late 1980s that most would be unable to meet their obligations to members. It was this and its implication—that the funds' members had not saved enough to fund their entitlements after retirement—that led to the closure of the funds to new members. In 2003, the old pension funds were nationalized and the government and the Histadrut (General Federation of Labor in Israel) agreed to eliminate the actuarial deficit through several steps: reducing pension entitlements somewhat, increasing active members' current contributions, and funding some of the funds' actuarial deficits from the state budget. The increase in contributions from wages added up to 3 percentage points and was phased in across a four-year period, 0.66 percentage points each year (employee + employer) in 2004–2006 and another percentage point (employee + employer) in 2007. The increase in pension contribution was divided between employees and employers equally. (The economic apportionment of the burden between employees and employers is discussed separately below.) The government shared the burden by awarding tax benefits for contributions and lowering employers' burden of National Insurance

contributions at a rate equal to that of the additional burden that they shouldered on account of pension contributions.[5]

Figure 1 | Active Members of New Pension Funds as a Share of the Labor Force, 1996–2014

SOURCE: Capital Market, Insurance, and Savings Authority annual reports.

The new funds that were activated after the old ones were closed to new members were DC funds, in which retirement benefits were set commensurate with the accrual of individual members' savings.[6] This model encourages members to increase their pension contributions, especially when they fear that their benefits will be small, by creating a direct and close connection between the level of contributions and the benefit to be received. This makes it easier for employees and employers (relative to members of old funds) to agree on an increase in pension contributions, either by raising the contribution rate or by widening the wage base that determines the level of the contribution.[7] Indeed, over the years, bilateral collective agreements have been broadened by expansion orders to apply the increase in pension contributions from wages at the new funds to the entire economy.

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[5] For a detailed description of changes in the terms applying to members of old pension funds and, particularly, of changes in pension contributions, see Yosef and Spivak (2008).

[6] The new funds' contribution rates are set by agreement between employers and employees, unlike the old funds, in which the rate is determined in the fund's statutes.

[7] These mechanisms, which make it possible to increase the contribution rates from time to time, are helpful, *inter alia,* in preserving pension value as life expectancy grows.

Discontinuing DB pension plans for new public sector employees: The unfunded DB arrangement ensures pension payout at the expense of the employer's current budget, with no contribution to savings whatsoever (by employee or by employer) during the employee's term of employment.[8] This setup is materially different from other pension schemes, in which employees and employers make regular contributions to pension savings together.

In 1999, the state and the Histadrut signed an accord governing the switch to the defined contribution pension system. According to this agreement, employees currently enrolled in DB plans would remain there, whereas those newly hired would insure their retirement with new DC funds. A law regulating the transition was passed in 2002, and no new employees have been allowed to join the DB arrangement since 2004. (The last to make the switch were employees of the defense forces.)

Figure 2 | Employees Joining DB Arrangements as a Share of Total New State Employees, Employees Who Remain With One Employer for More than 4 Years*

* The pension arrangement for those hired before 2004 pertains to their pension scheme in 2004. For example, someone hired as a temporary worker and placed in a defined-benefit pension plan, who receives tenure under such an arrangement, is considered, for our purposes, as having been hired under DB terms. Those who switched to defined contribution schemes before 2004 are considered as having been hired under this kind of scheme. We are unable to determine the pension track of some observations at the beginning of the period. We therefore plot a plausible path with a broken line.

SOURCE: Mazar and Friedmann (2014).

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8 For several years now, a certain sum is deducted every month from the wages of active employees who are included in the DB arrangement. These amounts, however, do not accumulate in a pension fund and are effectively a wage decrease for those enrolled in DB pension schemes.

In practice, the DB arrangement was cut back even before the agreement was signed. Public sector employers had begun to place large percentages of new employees in DC schemes by the 1990s (Figure 2). The outcome was a protracted decline in the share of employees (and wages) in DB plans and, concurrently, a growing proportion of employees (and wages) in DC schemes and of pension contributions in total public sector wages. It will take approximately two decades for all active public sector employees to be enrolled in DC plans. Until then, the number of employees eligible for DB pension and the share of their wages in the total public sector payroll will continue to decline.

We do not know of macro data that illuminate the development of the share of public sector wages covered by DB arrangements since the 1990s. By processing the data in the file in our possession (see details below), we estimate that the wages of employees in DB plans accounted for around 31 percent of the total public sector payroll in 2006, and that this rate has been falling by about 1 percentage point per year, such that in 2019 it was 17 percent of total wage payments in this sector (Table 4).

Mandatory pension saving: From 2008 on, it has been compulsory to contribute to the pension savings of all employees countrywide with the exception of young employees (women under age twenty and men under age twenty-one) and those in their first months in the labor force. The legal foundation of this obligation is a series of framework accords that were concluded between the Coordinating Bureau of Economic Organizations and the Histadrut, the first of which was signed in 2007, and expansion orders issued by the competent minister that mandated compliance with these accords by all employers countrywide.

Mandatory pension was rolled out in phases. In the first year of the accord and the expansion order (2008), the mandatory pension contribution was very small, at 1.66 percent of the determining wage (employee's contribution and employer's contribution to pension, net of employer's contribution for severance pay). Later on, the mandatory contribution rate was raised gradually in accordance with the original expansion order and by force of agreements and expansion orders signed in later years. Since 2017, the minimum mandatory contribution has been 12.5 percent of the determining wage (6 percent at the employee's expense and the rest at the employer's, excluding the

severance pay component). Mandatory contribution applies only to that part of wage that is below the national average wage. There is no mandatory contribution on the portion of wage that exceeds the national average.

Until mandatory pension went into effect, no contributions were deducted for pension or provident funds for a sizable share of wage payments countrywide. Thus, in 2006, private sector employers did not make pension contributions on 32 percent of total wage payments. This share fell to 19 percent by 2009 and to only 13 percent in 2019 (Figure 4). In other words, after mandatory pension was introduced, private sector employers began to withhold pension contributions on nearly 20 percent of private sector wage payments from which no contributions had been made before.

Collective agreements that increase pension contributions: Over the years, various collective agreements (and accords between employees and their employers) have led to an increase in pension contributions from wages. Although these agreements do not constitute a reform of the pension system per se, the reforms described above constitute the background that encouraged the parties to endorse them. Barring new members from old pension funds and public sector DB pension arrangements reduced the pension entitlements of new employees who would have benefited from such arrangements were it not for the reforms, and the transition to DC schemes promoted the increasing of contributions.[9] These two factors together, in addition to the tax benefits that pension contributions confer (for both employees and employers, up to a ceiling) made it easier for employers and employees to conclude terms for larger contributions. A public sector framework accord signed in January 2011, for example, boosted the pension contributions of employers and employees in two installments, from 11.5 percent of the determining wage (5.5 percent at the employee's expense and 6 percent at the employer's) to 13.5 percent starting in January 2013. In May 2013, another public sector collective agreement raised pension contributions by another percentage point, to 14.5 percent of the determining wage (increases of half a percent at the employee's expense

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[9] On the switch to the new pension funds, see our explanation. In regard to DB pension arrangements, it is almost self-evident because those working under this scheme made no contributions and received a benefit. Furthermore, according to all estimates, this benefit exceeds that foreseen under a DC pension scheme for a worker at a similar wage level who would be employed for a period similar to that of a veteran employee who qualifies for a DB pension.

and half a percent at the employer's). A prominent framework accord for the private sector that helped to increase pension savings contributions, concluded in 2016, set the minimum contribution at 12.5 percent (6.0 from the employee, 6.5 from the employer). An expansion order applied the mandatory minimum pension contribution set in this accord to the entire economy.

Raising the retirement age: The reform that raised men's and women's retirement age by two years was set forth in 2003 and applied incrementally between 2004 and 2009. It comprised three changes in the rules applying to individuals who reach retirement age: raising (a) the age of eligibility for old-age benefits; (b) the age of eligibility for benefits from an old pension fund; and (c) the compulsory retirement age. The reform led to an increase in the effective (actual average) retirement age[10] and, in turn, the number of years in which individuals and their employers make pension contributions. It thus boosted the absolute size of the pension contributions for workers who postpone their retirement. Unlike the reforms mentioned above, however, this measure did not affect the pension contribution as a **percentage** of wage. In contrast to our approach in this paper, in which we compare an employee's level of contribution under different pension schemes, in order to estimate the effect of raising the retirement age on savings one must, at the very least, compare the amount that workers save in their added years of work with the savings of similar individuals had they been on pension in the same years— a complex operation that lies outside the scope of the current study. Furthermore, the discussion of the reform's effects on national saving is affected not only by the impact of the reform on individuals but also by changes in the share of employees in the economy relative to that of pensioners. This entails a different approach from that taken here. For these reasons, discussion of the effect of raising the retirement age on national saving should, we believe, be separate from the discussion of the other pension system reforms and is therefore not dealt with here.

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[10]   See Bank of Israel, *Annual Report* for 2018, Chapter 8.

3. Analysis of the effects of the pension system reforms on employees' pension contributions

3.1 The data

Our analysis is based on a file of wage payments (according to payslips) that covers a sample of 10 percent of employees countrywide. The anonymized file, based on employers' payroll reports to the Israel Tax Authority (Form 126), includes data on wages, wage deductions, and other personal data for 2006–2019. We will use the data on pension contributions from employees and employers to analyze the changes in these contributions and assess the effect of the various pension reforms on them.[11] Until 2006, Form 126 gave no detailed reportage on contributions from wages. As such, we cannot use it to conduct an analysis of the kind undertaken here. We ended the analysis in 2019 due to the effects of the COVID-19 crisis on wages and savings from the beginning of 2020 onward.

The sample data dovetail well with the official wage data published by the Central Bureau of Statistics. Between 2006 and 2019, total wage payments countrywide according to the wage-data file in our possession constituted 96–100 percent of total wage payments according to the CBS, and the number of payslips (employee posts) shown in our data ranged from 98 percent to 103 percent of that presented by the CBS (Figures 1 and 2 in the Appendix).[12]

Our data point to a 50 percent increase in pension contributions (employees' and employers' contributions, net of employers' severance-pay contributions) during the period investigated—from 5.9 percent of total wage payments in 2006 to 8.7 percent in

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[11] We exclude severance pay contributions because they behave under different rules from those applying to pension contributions. In particular, individuals may draw on severance pay funds when they terminate their employment with a given employer even before they retire.

[12] As we track wage-paying companies or public entities over the years, we find entities in that file who "disappear" from the file in certain years and return later on. This constraint of the file does not affect the outcomes or the conclusions of this study because, as described, the data in the file aptly capture the evolution of total wage payments and total employee posts countrywide over the years investigated.
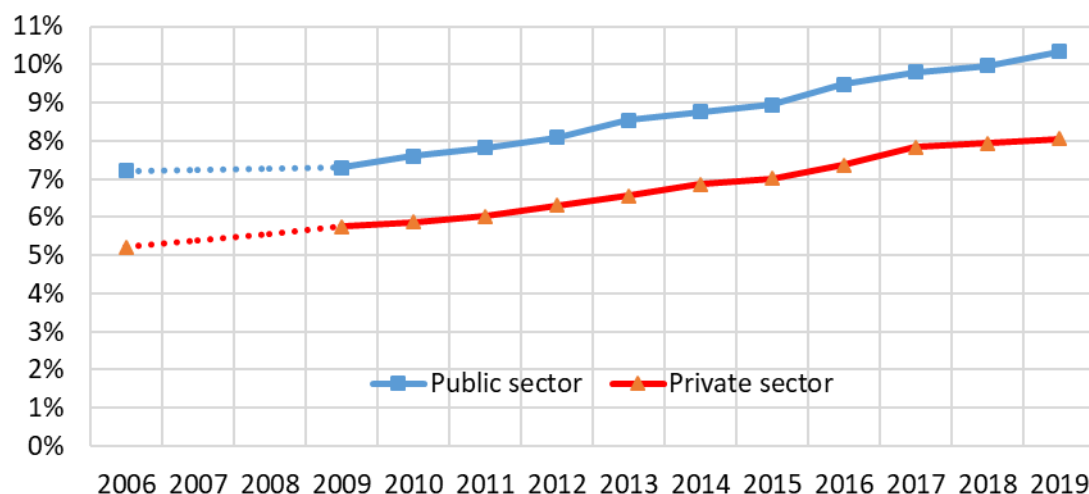
2019.[13] This amounts to an increase of 1 percent of GDP—from 2 percent of GDP in 2006 to 3 percent in 2019. The upturn in pension contributions reflects a combination of all the pension system reforms over the years, foremost the introduction of mandatory pensions, the increase in contributions from members of old pension funds, the promotion and execution of collective agreements that increased contributions to DC schemes in new pension funds, and the exclusion of new public sector employees from DB plans.

We divide our analysis of the development of pension contributions into two sectors: private and public. This is necessary because the public sector has a DB pension arrangement that demands special reference—one that does not include employee's or employer's contributions. Accordingly, the Mandatory Pension Law and the incentives that acted over the years to increase the rates of pension contributions do not pertain to the wages that are included in DB schemes. Furthermore, the exclusion of new public sector employees created a channel—which did not exist in the private sector—to increase the number of employees who contribute (along with their employers) to their pensions. We identified public sector employers on the basis of wage cuts that were invoked in this sector in certain years over the past two decades and reported to the Tax Authority on a separate line and with a negative sign.[14] The perceptible and protracted increase in pension contributions as a percent of wage in both the public and the private sectors during the period investigated is shown in Figure 3.

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[13] The file contains no data on employers' contributions over the tax-exempt ceiling. The wage ceiling for tax-exempt contributions was four times the national average wage until 2015 and was lowered to 2.5 times in 2016. The extent of wage payments that exceeded the ceiling, for which we lack information on pension contributions, was 5.5 percent of total wage payments in 2006. After the ceiling was lowered, the extent of wage payments for which we have no information about contributions climbed to 10 percent of total wage payments. Due to the 4.5 percentage point increase between 2006 and 2019 in wage payments for which we lack this information, the actual increase in pension contributions may be slightly greater than that noted in this study.

[14] Our reference here is to the Encouragement-of-Growth Agreement that resulted in a wage cut in the public sector in 2003–2005, an agreement reducing convalescent pay in the public sector in 2009, and a wage cut for civil servants in 2013 and 2014, enshrined in law and also recorded as a wage cut in employers' reports to the Tax Authority. We define an employer (identified by its corporate taxpayer number) as "public" if it cut employees' wages in accordance with these reductions in at least one of these years. A similar identification of the public sector in the Tax Authority's file of wage data was carried out, for example, by Brender (2011).

Figure 3 | Total Pension Contributions (Employer and Employee) as a Share of Total Wage Payments to Employees, 2006–2019

* The pension-contribution data for 2007 and 2008 are upward-biased and are therefore not shown here. According to the data in the file, employees' and employers' pension contributions in excess of 15 percent of employees' gross wages were made on 13 percent of total wages in 2007 and 15 percent in 2008, compared with less than 1 percent of wages for which such large contributions appeared in the other years.

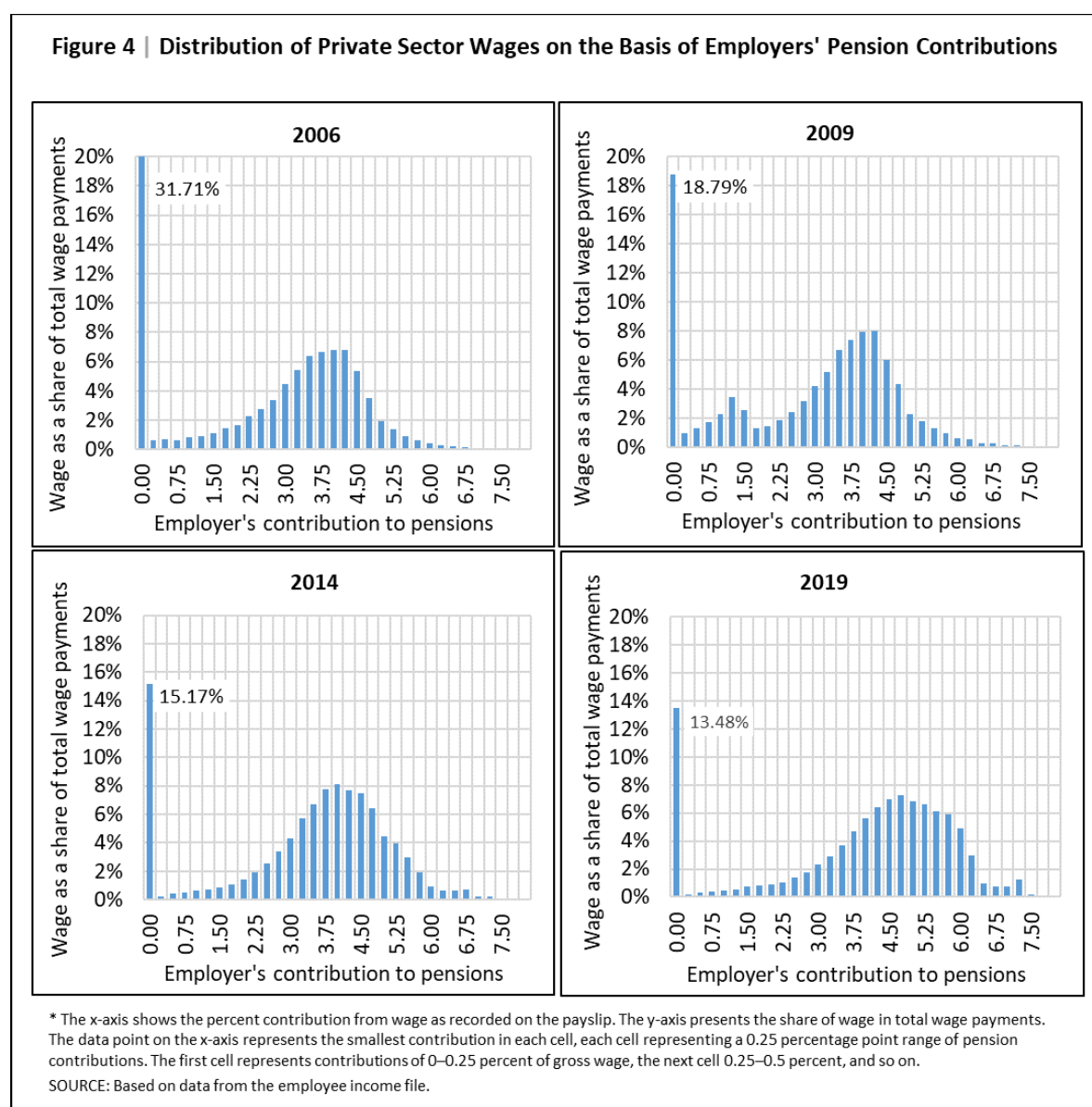SOURCE: Based on data from the employee income file.

3.2 Analysis of the impact of the reforms on the development of private sector pension contributions

Figure 4 presents the distribution of total private sector wage payments in 2006, 2009, 2014, and 2019 on the basis of the percentage of employers' provident fund and pension contributions from individuals' gross wages (calculated on the basis of payslips).[15] The contributions from wages in 2006 preceded the introduction of the mandatory pension arrangement. In 2009, they were in the first stages of the arrangement, and in 2019 contributions based on the arrangement had reached the ceiling that exists today (and that was set back in 2017).[16]

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[15] The figure shows the distribution of wages according to employers' contributions instead to employers' and employees' contributions because this better reflects the effects of the mandatory pension arrangement and the employer–employee agreements. In certain cases, employees may voluntarily contribute larger sums than those mandated by the arrangements or the agreements, sometimes even without any employer contribution whatsoever. In 2006, for example, employee contributions without employer contributions were made on 2 percent of wages.

[16] The pension contribution data in the file for 2007 and 2008 are not consistent with those for the other years and are therefore not presented here. Gordon and Dressler (2024), analyzing pension savings in *Haredi* (ultra-Orthodox) society, offer a similar assessment when noting that the pension contribution data for 2008 are of inadequate quality. They do not discuss years preceding 2008.

The figure shows that in 2009, after the mandatory pension arrangement went into effect, the extent of wage payments for which employers did not make pension contributions decreased sharply, as expected from the arrangement. It is also evident that there was an increase in two domains relative to the distribution in 2006: one in low contributions (not-zero)—a domain that reflects wages affected by the mandatory pension arrangement in which contributions increased commensurate with the requisite minimum on the basis of the staggered implementation of the arrangement[17], and the other in the higher contribution rates.

Figure 4 | Distribution of Private Sector Wages on the Basis of Employers' Pension Contributions

* The x-axis shows the percent contribution from wage as recorded on the payslip. The y-axis presents the share of wage in total wage payments. The data point on the x-axis represents the smallest contribution in each cell, each cell representing a 0.25 percentage point range of pension contributions. The first cell represents contributions of 0–0.25 percent of gross wage, the next cell 0.25–0.5 percent, and so on.
SOURCE: Based on data from the employee income file.

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[17] The compulsory minimum employer contribution in 2009 was 1.66 percent of the determining wage. Determining wage as a share of the total wage is not constant. Therefore, a distribution exists in the pension contribution as a percentage of total wage payments even among those who comply with the mandatory pension arrangement directive.

To estimate the impact of the mandatory pension arrangement on pension contributions, we first need to determine the level of pension contributions on account of wages for which the contributions under this arrangement were imposed—namely, a wage for which the employer did not make contributions in 2006 (before the arrangement went into effect). To do this, we tracked employers' pension contributions for employees who stayed with the same employer from 2005 on and whose employers did not make pension contributions for them in 2006. Figure 5 presents the wage distribution of this group on the basis of employers' contributions in 2009–2012. The figure shows that for some wages there were contributions within the minimum range required under the mandatory pension arrangement (a minimum that has gone up over the years) and for others the contributions were larger.[18]

Examining the level of contribution from gross wages (among employees who worked continually for one employer) in the vicinity of the minimum mandated by the arrangement, we find that the wages for which contributions were made ranged from 73 to 75 percent of gross wages (Table 2). This rate resembles the accepted share of gross wages for which pension contributions are made countrywide (the "determining wage").

Table 2 | Pension contributions, after the mandatory pension arrangement went into effect, of employees who worked continually for one employer since 2005, whose employers made no provident fund or pension contribution for them in 2006

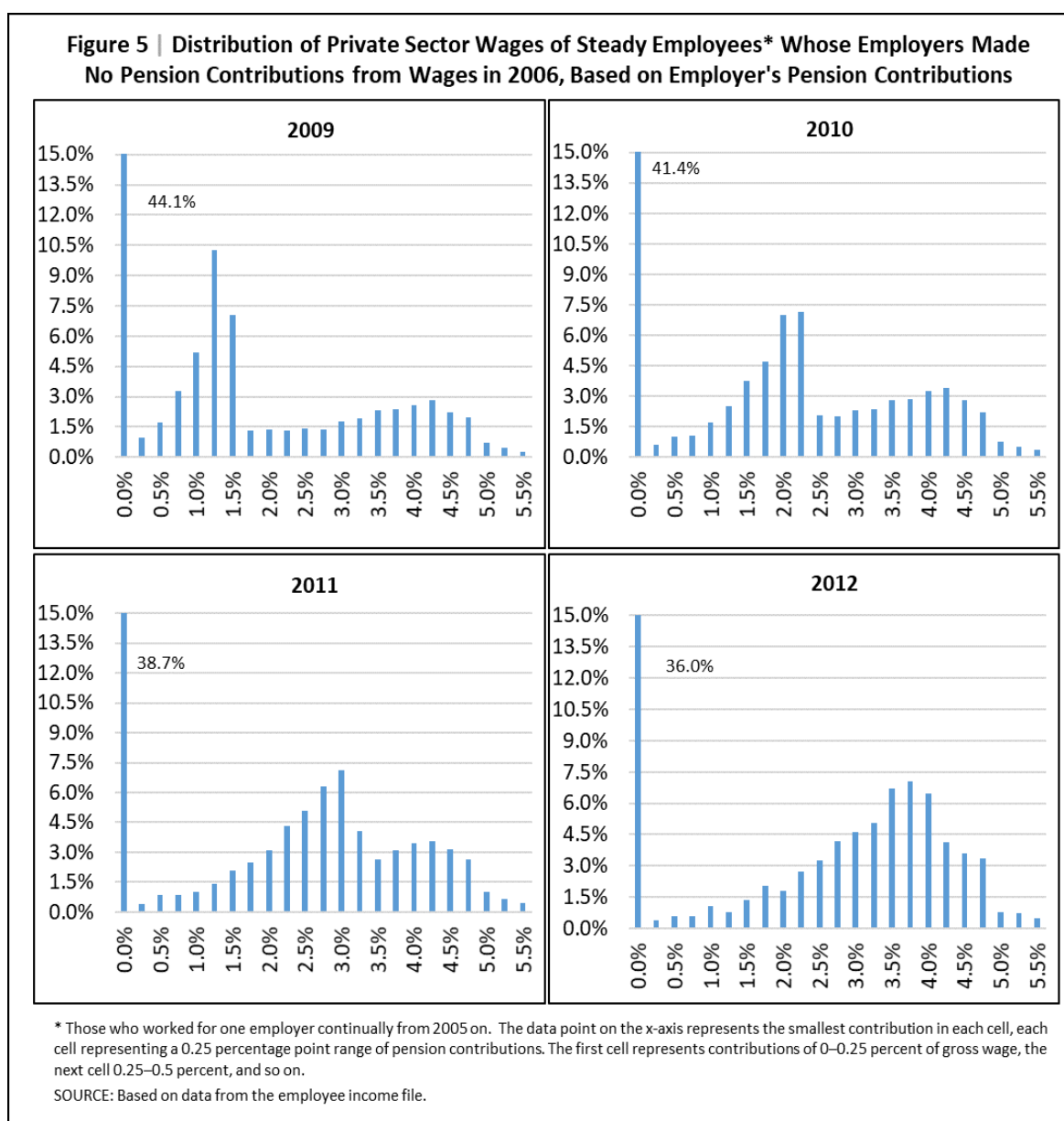|	Pension contributions as a percentage of gross wages, around the minimum mandated by the mandatory pension arrangement*,**	Mandatory pension contributions as a percentage of the "determining wage" according to the mandatory pension arrangement**	Determining wage as a percentage of the gross wage derived from pension contributions
	(1)	(2)	(1)/(2)=(3)
2009	1.25	1.66	75
2010	1.84	2.5	74
2011	2.42	3.33	73

* "Around the minimum" in accordance with the minimum established by the expansion order to the collective agreement: employers' contributions at 0.25–1.66 percent of gross wages in 2009, 0.25–2.5 percent of gross wages in 2010, and 0.25–3.33 percent of gross wage in 2011.
** Employer's contributions.
SOURCE: Based on data from the employee income file.

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[18] As stated, the minimum in the arrangements and accords is defined as a percentage of the determining wage. Given that the determining wage is not well defined in the accords, its share of the total wage may vary.

Assuming that the ratio of the determining wage to the gross wage remains similar today, we would expect pension contributions in 2019 on account of the mandatory pension arrangement to approximate 9.3 percent of the gross wage[19]—a rate that resembles what is actually observed in total wage payments today (Table 4).

Figure 5 | Distribution of Private Sector Wages of Steady Employees* Whose Employers Made No Pension Contributions from Wages in 2006, Based on Employer's Pension Contributions

* Those who worked for one employer continually from 2005 on. The data point on the x-axis represents the smallest contribution in each cell, each cell representing a 0.25 percentage point range of pension contributions. The first cell represents contributions of 0–0.25 percent of gross wage, the next cell 0.25–0.5 percent, and so on.

SOURCE: Based on data from the employee income file.

To estimate the long-term development of contributions from wages that were pensionable even before the mandatory pension rollout, we tracked the pension contributions of steady employees who made such contributions before the arrangement

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[19] From 12.5 percent—the minimum contribution from the determining wage under the mandatory pension arrangement—up to the ceiling, multiplied by 74 percent, the share of the determining wage in the gross wage.

went into effect. Figure 6 presents the average pension contribution (weighted by gross wage) made on account of these employees as a percentage of the gross wage and as a percentage of the "determining wage," and Figure 7 shows the distribution of these employees' wages. Figure 6 shows a mild increase in pension contributions over the years up to 2015, a steep upturn in 2016 and 2017, and stability afterwards. The figure underscores the importance of the 2016 framework agreement between the Coordinating Bureau of Economic Organizations and the Histadrut, which raised pension contributions from the 11.5 percent minimum established in the expansion order (which was in effect until this accord) to 12.5 percent as determined in this accord, and which was extended to the entire economy by a new expansion order (Table 3).

Table 3 | Mandatory pension rates: minimum contributions from the determining wage (up to a ceiling) set in expansion orders
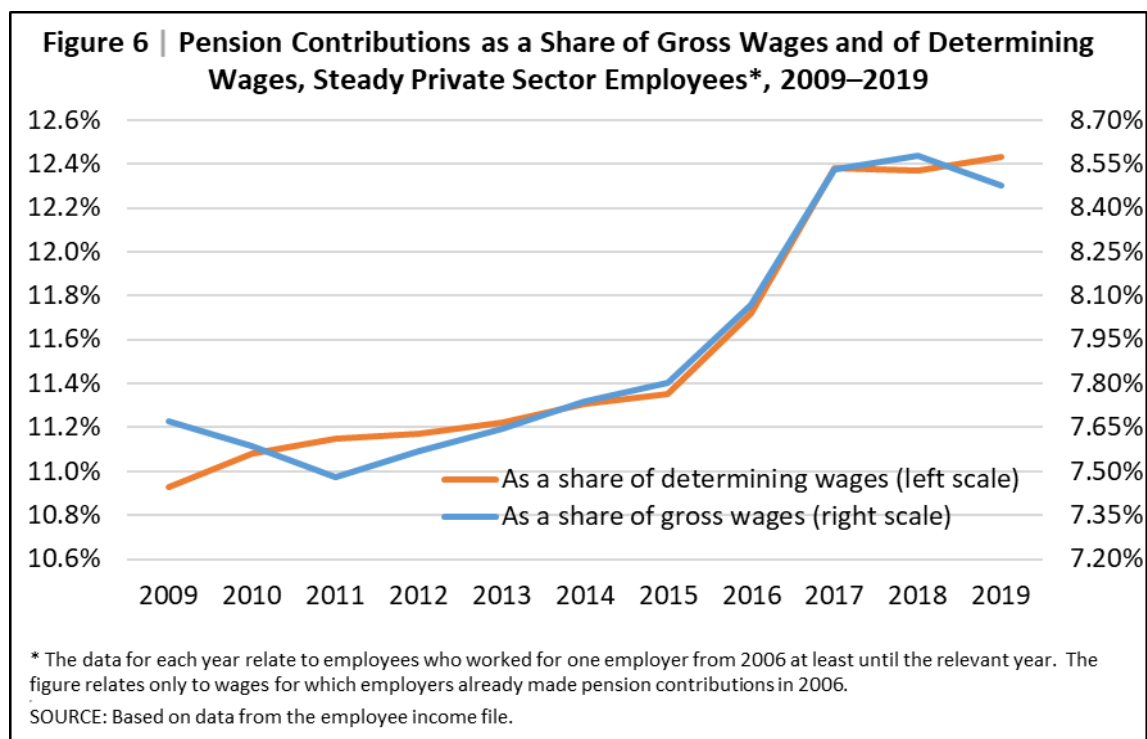(percent)

	Employee	Employer	Total
2008	0.833	0.833	1.67
2009	1.66	1.66	3.32
2010	2.5	2.5	5
2011	3.33	3.33	6.66
2012	4.16	4.16	8.32
2013	5	5	10
2014	5.5	6	11.5
2015	5.5	6	11.5
2016	5.75*	6.25*	12.0*
2017 to date	6	6.5	12.5

* From July 2016 on.

The minimum contributions for 2008–2013 were set under an expansion order to the collective agreement signed in July 2007; those for 2014 and 2015 were determined in an expansion order to the collective agreement signed in March 2011; and those for 2016 to the present were established in an expansion order to the collective agreement signed in April 2016.

Thus, the figures demonstrate that it was the framework accords (and the expansion orders that followed them), whether they were imposed on employees or whether the employees had an interest in them, that fueled the increase in pension contributions over the years. Employees may have taken an interest in accords that increase their rates of pension contributions because they realized that unless they contributed more, their

benefits would be much smaller than they desire.[20] Also contributing to this outcome were tax incentives[21] and subsidization of the yield on "earmarked" bonds[22]—a subsidy that grew as the spread between the yield on these instruments and that on tradable government bonds widened. The figures also show that the contribution rates of steady employees did not visibly creep upward beyond those set forth in the accords—possibly because these accords obviated the need for such creep.
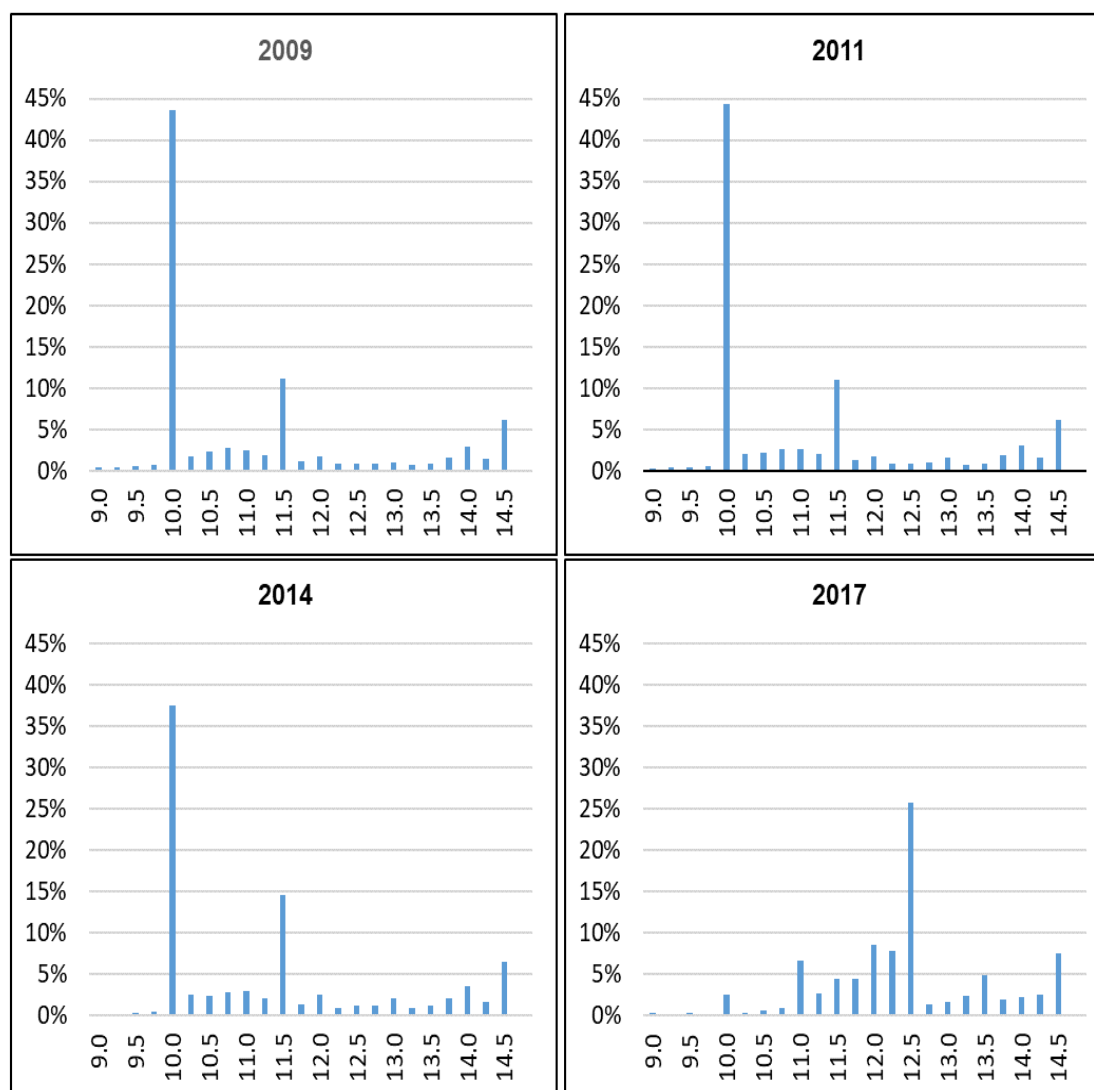
Figure 6 | Pension Contributions as a Share of Gross Wages and of Determining Wages, Steady Private Sector Employees*, 2009–2019

* The data for each year relate to employees who worked for one employer from 2006 at least until the relevant year. The figure relates only to wages for which employers already made pension contributions in 2006.
SOURCE: Based on data from the employee income file.

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[20] This realization was substantiated in simulations by scholars and various participants in the market, including the Bank of Israel in its *Annual Report* for 2013 (see also, for example, Menahem Carmi and Spivak, 2018), and in the fact that the old funds were in deficit, meaning that contributions to them did not suffice to fund a replacement rate of 70 percent of the determining wage. Notably, recent studies find replacement rates of more than 70 percent among young savers after the contribution rates were raised. (See, for example, Assif and Kril, 2020, and Kril, 2016.) Even these studies, however, emphasize that there is much uncertainty surrounding the expected replacement rate, which may prove to be lower ex post. Brender (2011) claims that for the group of employees with low earning power, the replacement rates derived from the mandatory pension will be too high in any event.

[21] The broadening of the capital gains tax base in 2002 (and increases in the tax rate over the years) made saving via the pension funds, which are exempt from this tax, more attractive than it had been when the tax did not exist.

[22] These bonds were issued to the pension funds at the level of 30 percent of the funds' assets. The spread between their yield and the market yield on tradable government bonds widened steadily during the reviewed period (2006–2019) and, as it did, so did their implicit subsidization. Abramson and Sarel (2015) estimate the implicit subsidization of the earmarked bonds at NIS 3 billion in 2015 and the total tax benefits in the pension system that year at NIS 13.9 billion.

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Figure 7 | Distribution of Private Sector Wages, by Contributions (Employer and Employee) as a Share of Determining Wage: of Steady Employees* Whose Employers Already Made Pension Contributions in 2006

* The x-axis shows the percent contribution from the determining wage as recorded on the payslip. The y-axis presents the share of gross wages in total wage payments. The data point on the x-axis represents the smallest contribution in each cell.

SOURCE: Based on data from the employee income file.

The pension contributions of private sector employees and employers increased by 0.77 percent of GDP between 2006 and 2019 (Table 5). Below we parse this increase into two main components: (1) the direct contribution of the introduction of mandatory pension—pension contributions that began after the mandatory pension reform went into effect in 2008 on wages for which employers had not contributed to pension before the arrangement and today are made at the level specified in the reform; and (2) the contribution of the long-term increase in the percent rate of the pension contribution, due to a combination of collective agreements that increased the pension contributions,

expansion orders that raised the mandatory minimum for pension contributions (within the framework of the mandatory pension arrangement), and additional factors that gave employees a greater interest in increasing the contributions[23], including tax incentives and subsidization of yield against the background of the closure of old pension funds to new members and referral of these members to new funds. The calculation of the apportionment of these effects rests on the assumption that the pace of increase in pensionable wages over the years resembled the pace of increase in wages for which contributions had not been made. Accordingly, the weight of the wages for which pension contributions were not made (preceding the mandatory pension arrangement) in total wage payments in the private sector would have remained constant had the arrangement not gone into effect. Another component (3) is the increase in pension contributions in GDP terms originating in the increase in the share of wages in GDP during the reviewed period. This component is small and its role in driving the upturn in private sector contributions between 2006 and 2019 is a mere 0.09 percent of GDP.

(1)		(2)		(3)		
Increase in pension contributions on account of wages for which contributions began as part of the mandatory pension arrangement (percentage of GDP)	+	Increase in pension contributions originating in upturn in contribution rates over the years (percentage of GDP)	+	Increase in contributions due to the increase in the wages as a share of GDP (percentage of GDP)	=	Increase in private sector pension contributions between 2006 and 2019 (percentage of GDP)

The portion of the effect of the mandatory pension arrangement on contributions from wages from which contributions had not been made before the arrangement (Component 1) is the product of the share of wages affected by the arrangement from its outset multiplied by the contribution rate required in 2019 according to the mandatory pension arrangement. By multiplying the outcome by wages as a share of GDP, the increase in pension contributions reflected in terms of wages is adjusted to GDP terms.

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[23] An additional small increase originated in an upturn in contributions imposed on members of old pension funds between 2003 and 2007.

The effect of the increase in pension contributions from wages from which contributions had already been made prior to the mandatory pension arrangement (Component 2) is calculated by multiplying the share of wages for which pension contributions were made in 2006 by the increase in the average contribution rate (on wages for which contributions were made prior to the arrangement) between 2006 and 2019. Multiplying this outcome by wages as a share of GDP converts this increase into GDP terms.

As for the portion directly affected by the mandatory pension arrangement, Table 4 (Part A) shows that wages for which no provident fund or pension contributions were made accounted for 32 percent of total private sector wage payments in 2006. These wages did not confer pension entitlements until the mandatory pension reform went into effect. In 2019, pension contributions were not made on 13 percent of private sector wages. By inference, 20 percent of wage payments were directly affected by the mandatory pension reform. In our estimation, 9.3 percent of gross wages were contributed on account of this portion of wages in 2019—12.5 percent of the determining wage (the contribution required by the mandatory pension arrangement) multiplied by 74 percent—the ratio of the determining wage to the gross wage in these contributions, in accordance with the findings concerning employers' contributions in the first years of the arrangement (Table 2). Notably, this level of contributions closely approximates the average share of pension contributions in wages countrywide.

Table 4 | Data and estimates for calculation of upward effects on the increase in pension contributions of the mandatory pension reform, the closure of the public sector DB pension arrangement to new members, and the increase in the rate of pension contributions among employees

Part A			
Year		Private sector (weight in total private sector wage payments)	Public sector (weight in total public sector wage payments)
2006	Share of nonpensionable wage	32	6
2006	Share of pensionable wage	68	63
2006	Share of pensionable wage, public sector DB	—	31
2019	Share of nonpensionable wage	13	1
2019	Share of pensionable wage	87	82
2019	Share of pensionable wage, public sector DB	—	17

Part B			
Year		Private sector (contributions as a share of total private sector wage payments)	Public sector (contributions as a share of total public sector wage payments)
2006	Pension contributions of pension eligibles	7.5	10.1
2006	Pension contributions of public sector DB pension eligibles	—	2.6
2019	Pension contributions of pension eligibles*	9.3	11.9
2019	Pension contributions of public sector DB pension eligibles	—	3.4

* As explained, we assume that the average contribution rate in 2019 is the same for wages for which contributions were made before the mandatory pension reform went into effect and for wages for which contributions began following the reform.

SOURCE: Based on data from the employee income file.

The outcomes shown in Table 5 indicate that the direct upward effect of mandatory pension on the increase in pension contributions is 0.40 percent of GDP—about half of the total upturn in private sector contributions. Another positive effect of the pension contributions originates in the increase in contributions from wages for which provident fund and pension contributions were made before the mandatory pension arrangement went into effect. Some of this increase was imposed on employees and employers as a

result of the increase in contributions required by the mandatory pension arrangement, while another portion was consensual. Altogether, this portion accounted for 0.30 percent of GDP of the increase in pension contributions between 2006 and 2019. Private sector wages as a share of GDP grew during those years from 22.5 percent to 24.1 percent, and thus added another small amount to the increase in contributions as a share of GDP.

Table 5 | Determinants of the increase of pension contributions of private sector and public sector employees in 2006–2019, by reform, percentage of GDP

	Private sector*	Public sector	Total*
Total increase in pension contributions	0.77	0.27	1.04
Portion of increase in pension contributions traceable to the mandatory pension arrangement regarding wages without pension contributions before the arrangement	0.4	0.11	0.41
Portion of increase in pension contributions traceable to increase in contribution rates for wages from which contributions were made before the mandatory pension rollout	0.3	0.11	0.41
Portion of increase in pension contributions directly traceable to discontinuation of the public sector DB arrangement	—	0.13	0.01
Upward effect of the increase in pension contributions of public sector DB employees	—	0.01	0.01
Upward effect of increase in wages as a share of GDP**	0.09	-0.03	0.06

* The column does not tally perfectly due to rounding and due to omission of a 0.01 percent of GDP negative effect originating in the contraction of voluntary contributions of employees whose employers did not make pension contributions for them.

** Private sector (gross) wage payments increased by 1.7 percent of GDP between 2006 and 2019—from 22.5 percent to 24.1 percent. This increase in wages as a share of GDP had a positive effect on pension contributions in percent-of-GDP terms. The corresponding rate in the public sector slipped by 0.4 percent of GDP—from 10.3 percent in 2006 to 9.9 percent in 2019, having a negative effect on the increase in pension contributions as a percent of GDP.
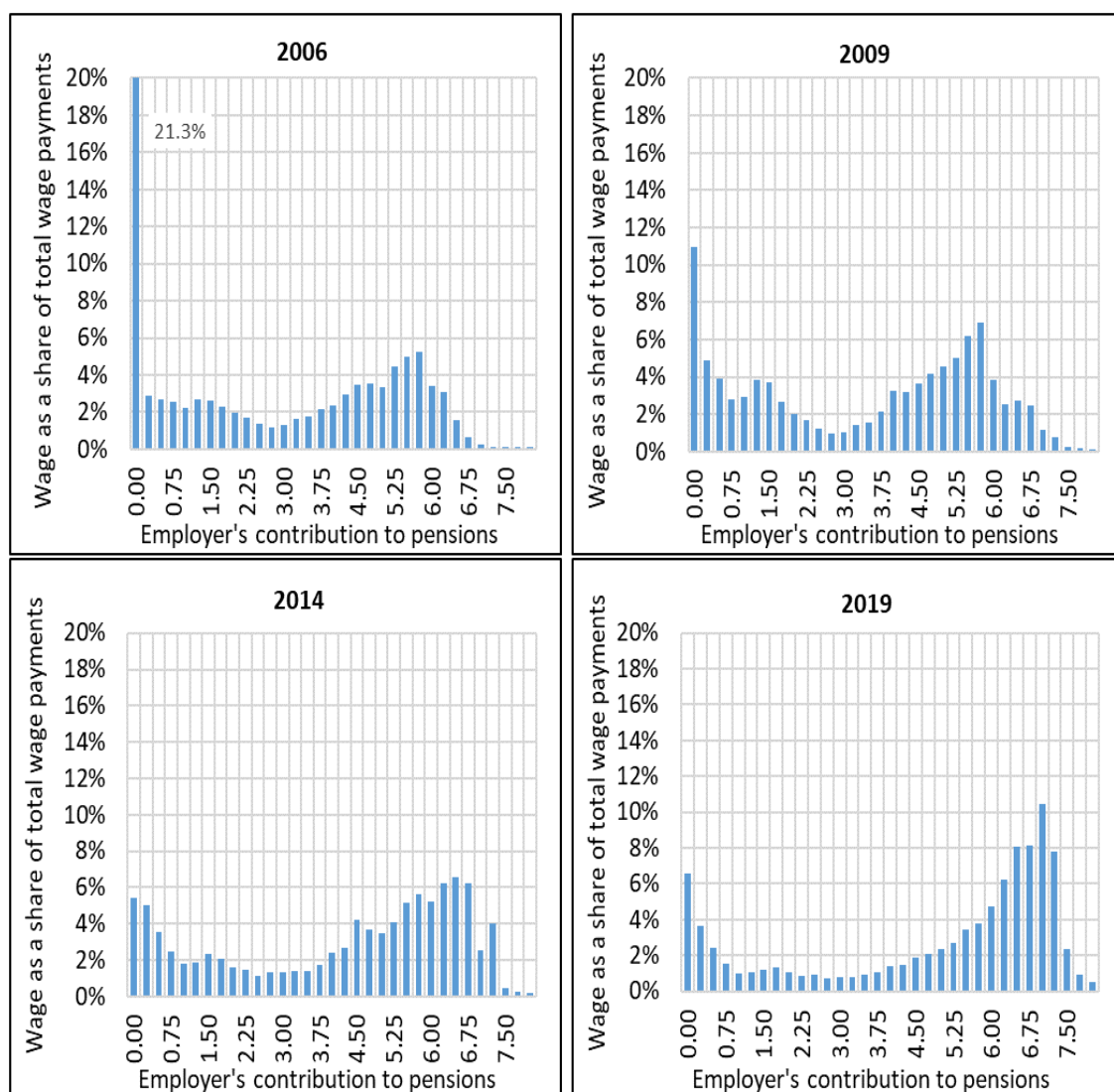
SOURCE: Based on data from the employee income file.

3.3 Analysis of the effects of the reforms on the development of public sector pension contributions

To identify the effects of the various pension system reforms on the increase in pension contributions from public sector wage payments, particularly the effect of discontinuing the DB pension arrangement for new members as distinct from that of introducing mandatory pension, it is necessary to identify the extent of public sector wages paid under DB pension terms and the extent of wages paid to employees in this sector who had no pension arrangement before mandatory pension was introduced.

Figure 8 shows the perceptible decrease in the extent of public sector wages for which employers made no contribution to pension or provident funds. Below, we show that this reflects the introduction of mandatory pension, the retirement of workers who received DB pensions and their replacement with DC workers, and the onset of pension contributions for employees who had been in DB plans. We also observe the increase in contribution rates over time under public sector wage agreements, bringing the mode of employees' contributions in 2019 to 7 percent of gross wages.

Figure 8 | Distribution of Public Sector Wages by Employers' Pension Contribution Rates

* The x-axis shows the percent contribution from wage as recorded on the payslip. The y-axis presents the share of wage in total wage payments. The data point on the x-axis represents the smallest contribution in each cell, each cell representing a 0.25 percentage point range of pension contributions. The first cell represents contributions of 0–0.25 percent of gross wage, the next cell 0.25–0.5 percent, and so on.

SOURCE: Based on data from the employee income file.

Our data file does not allow simple identification of a wage on the basis of the pension arrangement that it confers and, specifically, wages paid under DB arrangements. Accordingly, we will estimate the extent of wages paid to employees in DB pension plans on the basis of the following combination:

(a) The level of pension contributions—Along with not having to make contributions from their wages under the DB pension schemes, employees who have DB arrangements are entitled to contributions on account of wages that are not

included in the DB scheme.[24] The size of these contributions depends on the portion of wages that the DB scheme does not cover. Overall, however, it is probably small (relative to contributions of employees in DC plans or old pension funds). We use the findings of Assif and Kril (2020) to estimate the portion of wages insured in a DC arrangement of workers who participate in DB pension plans. According to Assif and Kril, the fraction of wages insured in DB is smallest among physicians at slightly more than 50 percent. It follows that the largest share insured in DC plans among workers covered by DB arrangements approximates 30 percent.[25]

(b) The pace of decrease in wage payments that come with small pension contributions—We would expect the share of wages in the DB arrangement, which, as stated, entails small pension contributions, to decline slowly, reflecting the gradual retirement over the years of long-standing employees in this arrangement and their replacement with new ones who are covered by DC pension plans. A swift decline in wages without pension contributions after the mandatory pension arrangement went into effect would reflect wages that had no pension arrangement and that pension contributions on their account began after the mandatory pension rollout.

(c) Contributions to advanced training funds—We assume, on the basis of what we see in the private sector, that wages from which contributions to an advanced training fund are made also confer pension entitlements. Table 6 presents the distribution of private sector wages in 2006 parsed by the withholding of contributions to an advanced training fund and contributions to provident funds and/or pension. The Table shows that, in effect, there is no wage for which

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[24] In the accord that set forth the transition to DC pensions, for example, it was agreed that employers and employees would make contributions to savings on the part of the wage not insured through the DB mechanism.

[25] According to Assif and Kril (2020), whose findings relate to workers on DB pensions who retired in 2016, the determining wage for physicians' pensions was only 53 percent of the average wage in the year preceding retirement and was the lowest among civil service employees eligible for DB pensions. Given that around 15 percent of wages is reimbursement of expenses, the smallest share covered by DC arrangements of workers who participate in DB arrangements would approximate 30 percent of wages.

contributions to advanced training funds are made without the existence of pension entitlements. Some 96 percent of wages from which contributions to training funds are made also have employer's contributions to a provident fund or pension plan. By implication, public sector workers who make contributions to advanced training funds have some kind of pension arrangement. If there are no contributions whatsoever to a provident fund/pension arrangement, or if they are relatively small as described above, we will classify them as belonging to a DB scheme. If the contributions are large, we will place them in the DC class (or those with entitlements in old pension funds). We will classify employees with no contributions to a training fund and no employer's provident fund or pension contributions as employees who joined a pension arrangement only after the mandatory pension reform went into effect.

Table 6 | Distribution of private sector wage payments, parsed by contributions to pension savings and advanced training funds, percent, 2006

	Contributed to training funds	Did not contribute to training funds
Employer contributes to provident fund or pension arrangement	40.1	28.1
Employer does not contribute to provident fund or pension arrangement	1.5	30.2

SOURCE: Based on data from the employee income file.

Figure 9 presents the weight of wages from which pension savings contributions are made only on a small fraction of the wage—contributions that are consistent with the public sector framework agreements concerning an insured member's wage (the "determining wage") of up to 30 percent of the employee's gross wage—for 2006–2019. The Figure shows that the weight of these wages in the total public sector payroll has been declining slowly and steadily over the years. The trendline, drawn on the basis of the weight of wages presented in the Figure for 2010–2019, explains 98 percent of the variance in the development of this metric over the years and yields an estimate of the weight of these

wages in 2006, which is effectively identical to the actual weight of these wages.[26] Despite the mandatory pension rollout, we see no rapid decrease in the weight of this wage after the rollout or after the minimum contributions in the arrangement crossed the bound of the contributions that, we assume, may have been made on account of wages that are, in part, enshrined in the DB arrangement. In our view, it follows that our identification of a wage in a DB pension arrangement on the basis of the rule that we spelled out above is a good one.[27] Invoking this rule, we find that wages in DB arrangements as a share of the total public sector payroll fell from 30.9 percent in 2006 to 17.2 percent in 2019—a decrease of 13.7 percentage points (45 percent) in the weight of the wages of workers who have DB pension plans.
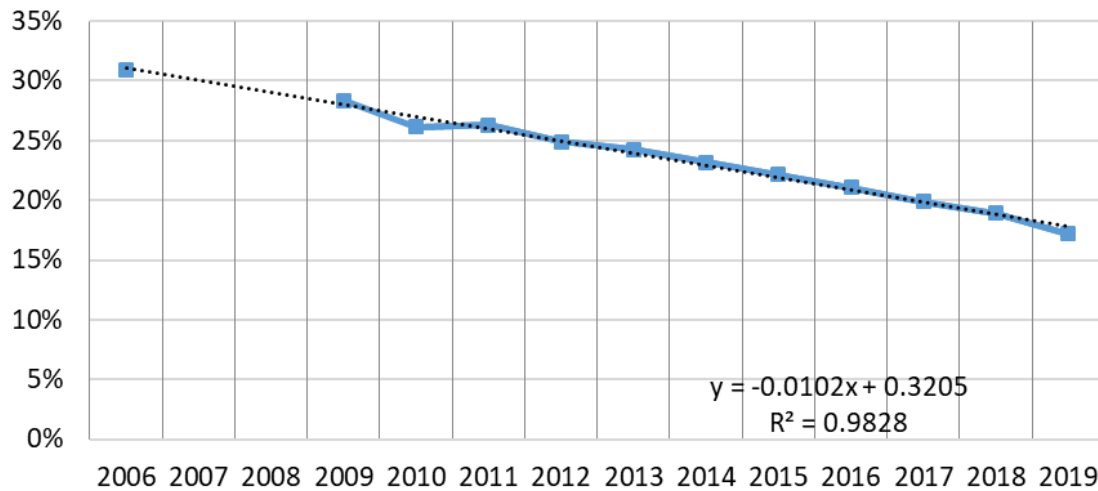
Our confidence in the 45 percent downturn in the weight of wages in DB pension arrangements between 2006 and 2019 as a good estimate is reinforced by the concurrent decrease, at a similar rate, in the number of state employees, teaching personnel, police officers, and members of the Prisons Service who were entitled to DB pensions, as shown in government financial statements released by the Office of the Accountant General (Figure 10).

Figure 11 presents the weight of wages with no employers' contributions to pension savings and no contributions to training funds in 2006–2019. The rapid decrease in the weight of these wages after the mandatory pension arrangement went into effect (2006–2009) and its settling at a low level toward the end of the reviewed period (close to one percent of the total public sector payroll) are consistent with our assessment that workers with such wages had no pension arrangement before the mandatory one went into effect. After the latter event, public sector employers began to make pension contributions for these employees.

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[26] From 2010 onward only, may one presume that the minimum contributions in the mandatory pension arrangement exceed pension contributions from the wages of employees in DB plans. As stated, DB-insured employees make certain contributions to pension on wage components that are not part of the determining wage for DB pension. These contributions are small relative to gross wage.

[27] Setting a bound of 40 percent of the accepted contribution under the framework accords to identify wages included in a DB arrangement has no material effect on the outcomes.
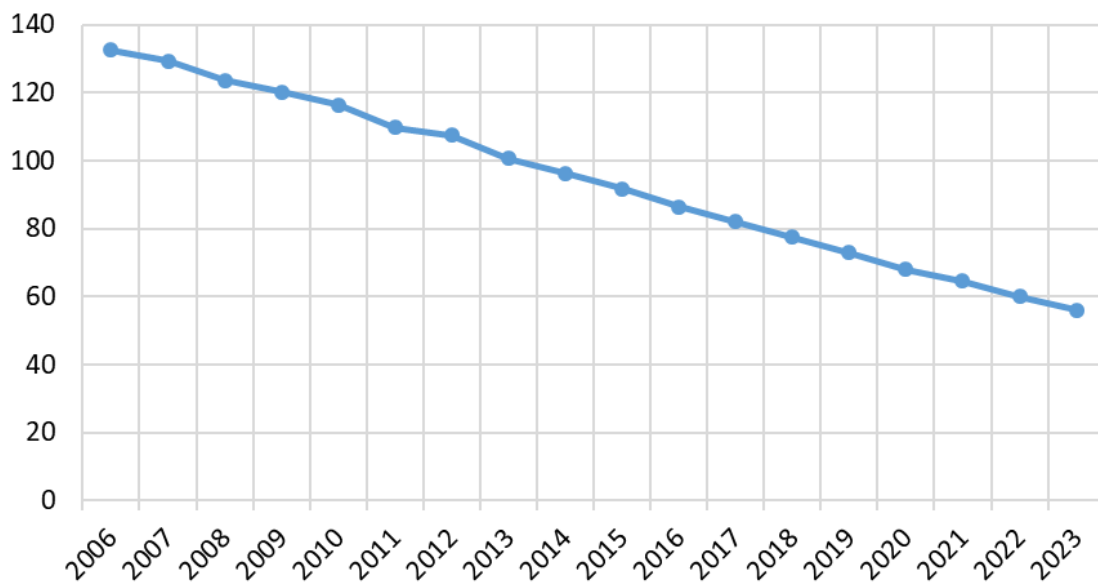
Figure 9 | Wages with Training Fund Contributions and Employers Contributions to Pension Savings in Accordance with Public Sector Framework Accords*, as a Share of Total Public Sector Payroll, 2006–2019
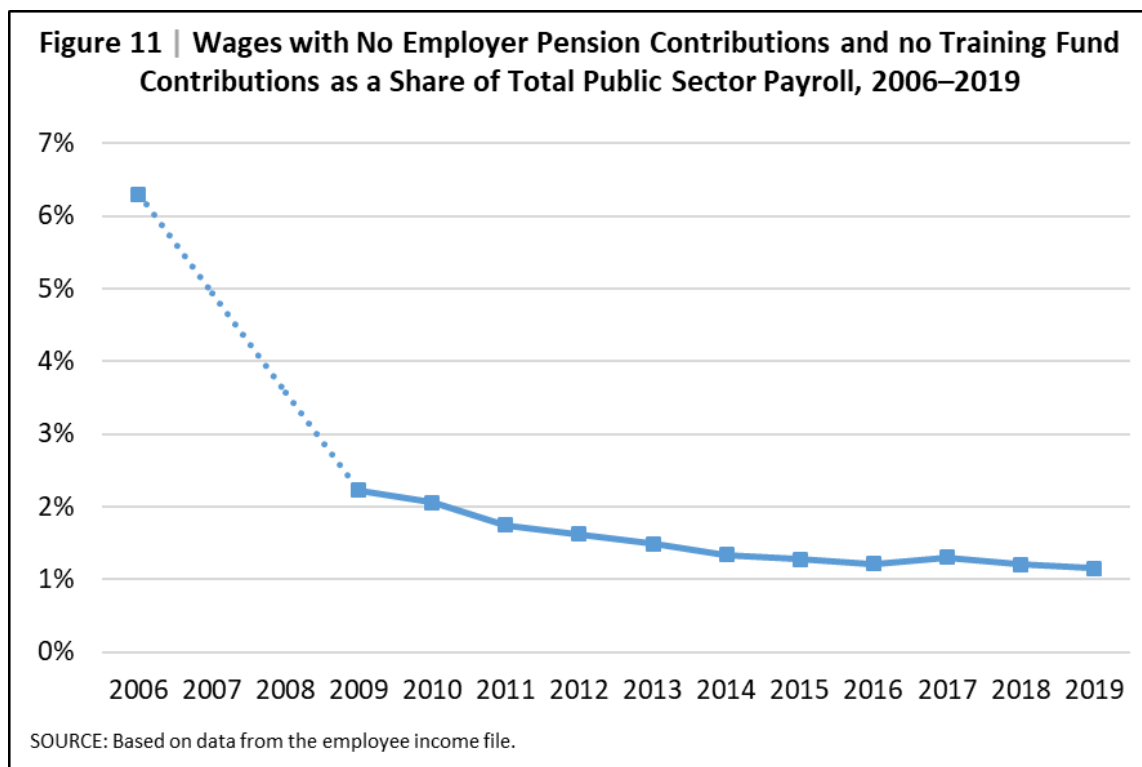

$y = -0.0102x + 0.3205$
$R^2 = 0.9828$

* Determining wage set at 30% of employee's gross wage. The employer's contribution to pension savings under public sector framework accords was 6 percent until 2010, 6.5 percent in 2011–2012, 7 percent in 2013–2014, and 7.5 percent from July 2015 on.

SOURCE: Based on data from the employee income file.

Figure 10 | Civil Service, Teaching, Police, and Prisons Service Employees Eligible for DB Pensions, 2006–2023 (thousand)

SOURCE: Based on data from government financial statements and Ministry of Finance Accountant General's Office.

Figure 11 | Wages with No Employer Pension Contributions and no Training Fund Contributions as a Share of Total Public Sector Payroll, 2006–2019

SOURCE: Based on data from the employee income file.

The apportionment of the upward effect of the various pension system reforms—the introduction of mandatory pension, closing DB arrangements to new employees, and the increase in the rates of pension contributions in wages—to the growth of total pension contributions in the public sector is calculated here in a manner similar to that performed for the private sector in the previous section. The main data for 2006 and 2019 that are needed for this purpose are wages in DB as a share of the total public sector payroll, and, as in the private sector, the share of wages with no pension arrangements in the total public sector payroll, the extent of pension contributions of employees in DC arrangements (and old pension funds), and the weight of public sector wages in GDP. These data were presented above in Parts A and B of Table 4. The results are shown in Table 5.

The reforms increased public sector pension contributions by 0.27 percent of GDP. About half of the increase is due to the closing of the DB pension arrangement to new members. The mandatory pension rollout contributed only about one-fifth of the increase—a much smaller share than that of the mandatory pension in increasing contributions in the private sector.

4. The effect of the increase in pension contributions on total national savings

We now discuss the effect of the increase in pension contributions on national savings. Two questions arise in this context. First, how is the burden of the contributions apportioned between employers and employees? This question is important for understanding the effect on national aggregate savings because employers' response to the increase in their contributions may be different in nature from that of their employees. The second and key question is how employees responded to the increase in pension contributions. Did they cut back on their consumption, thereby increasing total savings? Or did they reduce other savings, leaving the increase in contributions with no effect on total savings?

4.1 Apportionment of the burden of the increase in pension contributions between employers and employees

The de jure apportionment of the burden of pension contributions between employers and employees is more-or-less equal. The de facto apportionment, however, does not necessarily align with the one established in the collective agreements or the expansion orders by which the mandatory pension is set. For example, employers may roll the additional expenditure on pension contributions onto employees by slowing the pace of wage increases or even lowering gross wages. In such a case, the discussion of the impact of the additional pension contributions on national savings is basically one of how employees respond to the reduction of their liquid disposable income (due to the increase in their contributions and the lowering of their gross wages because their employers transfer the burden of their own contributions to them). Do they cut back their consumption and/or increase their labor input (namely, save more)? Or do they offset their forced pension savings by reducing other savings?

If the burden of the increase in pension contributions is handed to the employers, the question about the effect of the increase on national savings becomes more complex. In this case, it concerns how the employers will respond. Where the employer is private, will the firm take a blow to its earnings, become more efficient, or pass the added cost on to consumers by raising prices? When the employer is public, will the public sector fund

these contributions by pruning other expenditures and/or raising taxes, or will it choose to increase its debt?

The question of apportioning the burden between employers and employees has been intensively examined in the literature in the context of labor taxation. Theoretically, if we construe mandatory contributions as a tax burden, then in the classical model we would expect the burden to be apportioned between employers and employees commensurate with labor demand and supply elasticities (see, for example, Hamermesh, 1993). Conventional wisdom posits that demand elasticity far exceeds supply elasticity in this case and that, therefore, most of the burden under the classical approach will be foisted on labor. If we add that this is not actually a tax but an income that the employee will see in the distant future, then one may say that the employee will agree that the employer should be assigned an even smaller share. In the matching model, in which the added value of employing a worker is divided between the worker and the employer, the cost of compulsory contributions will be apportioned between the two commensurate with each side's bargaining power. Even in this case, however, we should remember that workers may not regard the contribution as a tax and would consent to absorbing a relatively large share of this requirement at their expense for this reason.

Ultimately, the apportionment of the pension contribution burden between employers and employees is an empirical question. However, Hamermesh (1993), referencing fifteen strongly influential studies on the topic from the 1970s and 1980s (and one from 1990), concludes that the range of estimates from the empirical research is so broad and so sensitive to various factors that the studies have little to say about the apportionment of the burden between employers and employees. According to his approach, in view of the literature that finds labor elasticity much lower on the supply side than on the demand side, it should be assumed that most of the tax burden on labor falls on employees in the long run. Melguizo and Gonzalez-Paramo (2013), examining fifty-two empirical studies on the effect of labor taxes on the apportionment of the burden between employers and employees, find that between two-thirds and 90 percent of the burden is borne by the latter in the long term. Brender and Pulitzer (2018), examining the impact of changes in income tax on tax collection in Israel, find that in the medium term employees enjoy two-

thirds of the reduction in personal income tax, viz., they will shoulder two-thirds of the burden of direct taxation of labor.

Given the foregoing conclusions from studies that deal with apportioning the burden between employees and employers in the event of a tax, in our case, which relates to employees' deferred income and not to a tax, employees would presumably be willing (or be forced) to bear the entire burden, or almost all of it, of the increase in contributions. Bank of Israel (2015), looking into the apportionment of the pension contribution burden between employees and employers in the mandatory pension arrangement, reaches a similar conclusion. The situation among minimum wage employees is, admittedly, different. Their employers cannot pass on the burden of their contributions to these employees (whose wages they cannot reduce). Therefore, in this case it would be correct to assume that the burden between employees and employers is apportioned in the de jure manner. Overall, however, private sector employers' share of the burden of increased contributions appears to be small. Furthermore, it is very hard to assess how they respond to this burden and, in turn, to judge the effect of their response on savings. With these considerations in mind, we will disregard the effect of this small component on savings.

As for public sector employers, the apportionment of the burden between them and employees under the new arrangements, or under existing arrangements in which pension contributions increased, appears to resemble the de jure apportionment.[28] This assessment is based largely on the absence of disparity in public sector collective agreements in wage increases between employees whose pension contributions began following the pension system reforms and other employees. There is no difference, for example, in the gross wage tables between employees in DB schemes and those in DC ones. Even for employees whose public sector employers did not make pension contributions and began to do so following the mandatory pension rollout, we know of no arrangement that reduces their gross wage relative to the rest of the public sector labor force. The fact that the DC scheme is considered less beneficent than the DB one, and the existence of concern that the historic level of contributions would suffice only for a small

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[28] If employees were to assume the entire contribution burden, the calculation of the effect on savings would be simpler and we would not have to ask how the government funds the increase in wage expenditure.

pension, encouraged employees in DC pension plans to demand compensation in the form of an increase in contributions, and the public sector employers to assent to this. The tax incentives given to all workers countrywide who make pension contributions are further evidence of the government's willingness to bear the burden of increasing retirement savings.

The budgetary source of the public sector employers' contributions effectively determines the direct effect of their contributions on national savings. In Israel, the public sector employers' contributions appear to have been funded by reducing other government expenditures. Accordingly, the increase in contributions had no impact on public savings.[29] Given that the contraction of government spending focused on items that unambiguously constitute public goods, its effect on total national savings depends solely on the extent to which households offset the increase in their pension savings.[30]

4.2 The effect of the increase in pension contributions on employees' savings—do employees save more or do they offset from other savings?

The main question, as stated, is how employees respond to an increase in their pension contributions. Do they increase their savings by the full sum of the upturn or do they offset some (or all) of it by reducing other savings, allowing their total savings to grow less than the increase in contributions?[31]

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[29] In the more distant future, total government spending (and, in turn, individuals' savings) is also affected because as a permanent increase in government spending takes place due to the increase in contributions for active employees, government spending on pension payments for DB-plan pensioners falls gradually as the numbers of these pensioners steadily decline. These future effects are beyond the scope of this study, which focuses on the effect of the reforms on savings during the period specified.

[30] In the first two decades of the twenty-first century, the government cut spending on unambiguously public goods by more than 2 percent of GDP. Presumably, then, the increase in spending on pension contributions (on account of the transition to DC and the mandatory pension rollout) was funded by reducing these public expenditures. These public goods (such as defense spending) are unique in that individuals cannot compensate for a reduction in their supply by increasing their personal spending (in contrast, for example, to spending on education or healthcare). Accordingly, the cutback in public spending on these goods is unlikely to affect individuals' savings through this channel. Insofar as the government funds future increases in spending on pension contributions by reducing public savings, spending less on services that are not strictly public goods, or by raising taxes, households' savings may be affected (beyond the offset discussed here) and so, accordingly, would be total national savings.

[31] Employees may also respond by increasing their labor input, as found, for example, by Frish (2021–2022), who deals with the effect of the mandatory pension reform on the consumption and employment of workers who began to make pension contributions due to the reform. In such a case, the added contributions signify an increase in savings even though consumption may not decline.

Economic theory does not answer this question unequivocally. Blanchard and Fischer (1989) proposed a theoretical framework for analysis of the offset question on the basis of the overlapping generations model. They show that, given the existence of perfect markets and classical assumptions, individuals respond to the introduction of a defined contribution pension (or an increase in the rate of contributions to such a pension) by reducing other savings in an equal amount (full offset), resulting in no effect on overall savings. This happens only if the level of the contribution established does not exceed the total saving rate that individuals would choose had the pension arrangement not been introduced. In the real world, however, many factors may be at work that are inconsistent with the classical assumptions and may make the offset of pension savings incomplete. Several examples follow. (1) Given liquidity constraints, some individuals might have chosen a lower saving rate than that dictated by the pension arrangement. In this case, the introduction of pension saving would increase the saving rate and the impact of the move would depend on the distribution of the severity of the liquidity constraint across the population. (2) The model assumes that individuals save solely for retirement and, accordingly, have no savings that would help them to smooth consumption during their working years (nonpension savings). (3) Pension savings are also an imperfect substitute for other savings due to limitations on the ability to withdraw them before retirement age. (4) The model assumes identical rates of return on pension savings and other savings. In practice, however, they may differ. (5) Different kinds of savings may be subject to different tax rates. (6) Behavioral characteristics such as individuals' shortsightedness, passivity in regard to the contributions imposed on them (see discussion below), or bounded rationality may also affect the offset rate. The implication of all of these is that the offset rate is fundamentally an empirical question that depends, *inter alia,* on the characteristics of the population and the institutional arrangements in effect.

Notably, Lavi and Spivak (1996) looked directly, at the macro level, at the connection between contributions to pension funds (and to other institutional savings) and total savings in Israel in 1971–1994. They found that about half of the changes in institutional saving contributions are offset by changes in noninstitutional private savings. In another test that they performed in the same study, on data from a 1979 expenditure survey (a

cross-sectional test), using differences in private savings among various population groups, they found a similar offset coefficient.

Unlike Lavi and Spivak, we estimate the effects of changes in pension contributions on total savings by summing up the effect of these changes considering each reform investigated here. We do so by looking at the reason for the increase in contributions (termination of DB pension arrangements, the introduction of mandatory pension, and the changeover to DC pension schemes, with its implications), as elaborated on above, and considering the offset rates among the population group that was affected by this reform.

Thus, we proceed as follows: First, we review the findings from the literature on the offset rates and how they vary with savers' age and income. On the basis of these findings, we present the offset coefficient that we assume for each of eighteen age/income cells. Next, we apply this matrix of coefficients to the distribution of wage payments in accordance with these eighteen age/income cells of each group (specified by the reform/the reason for increase in contributions), and obtain a total offset coefficient for each reform/reason for the increase in contributions. The combination of the increase in contributions due to the reform, presented above, and the offset rate that corresponds to this reform, yields the net upward effect of the reform on the national savings rate. Summing up these effects across the full set of reforms discussed yields the total effect of the reforms on national saving.

4.2.1 Offset rates—estimates from the literature

Many factors may influence individuals' response to an increase in their pension contributions, including their age, income level, and the reason for the increase in contributions (such as a decline in foreseen pension wealth). The discussion below is based on the literature that asks how changes in a household's pension wealth (or its pension savings contributions) affect its nonpension wealth or influence changes in its savings. We will address the effect of pension wealth on households' motivation to save and the impact of mandatory saving on households' motivation to revise their nonpension saving. The reforms in Israel usually combine several effects of different types. Collective agreements that increase pension contributions, for example, require workers to save more for their pensions, usually because their expected pension allowance has been revised downward.

Estimating the connection between pension wealth and savings is a major challenge for empirical research for several reasons. First, data constraints usually force researchers to make assumptions in order to calculate pension wealth, weakening the estimated connection between pension wealth and savings. Second, unobserved variables, particularly the extent of individuals' saving preference, may skew simple estimates that fail to take account of the potential effect of these variables on the outcomes. Additionally, the theoretical effect of various variables on the connection between pension wealth and private savings (or nonpension wealth) is vague and not necessarily linear. The impact of age on the pension wealth/savings nexus, for example, depends on multiple assumptions. Uncertainty about pension wealth and the liquidity constraint of the population affected may also affect the estimated linkage. Despite these problems in estimating the connection between pension wealth and savings, the literature offers multiple studies that estimate the connection. The estimates vary widely for reasons including differences in research methods, the macroeconomic background that made the study possible, and the type of estimate. An estimate made following a reform that required individuals to enroll in a certain pension system, for example, may differ from an estimate following changes in pension wealth due to changes in savers' assured entitlements. Likewise, an estimate relating to the effect of pension wealth on annual savings (flow) would be different from one addressing the effect of pension wealth on nonpension wealth (stock).

Even though early studies in this field found a weak relation between pension wealth and nonpension wealth or national savings, the existence of a connection between the two seems undisputed. This appears to be the case at least since Feldstein's (1974) influential article, which provided a macro level presentation of the decrease in US national savings that resulted from the introduction of Social Security (which increased individuals' visible pension wealth) there. Gale (1998) added a theoretical tier to the explanation of the low estimates by claiming that a household may use a 1 US dollar increase in pension wealth within the framework of the "lifecycle" model for years of consumption. Accordingly, a relatively low estimated synchronous relation between changes in pension wealth and changes in consumption does not indicate that individuals do not regard private savings and pension savings as substitutive. Gale (1998) himself, estimating the relation between

pension wealth and personal nonpension wealth using data from the 1983 Survey of Consumer Finances, found that it falls in the vicinity of -0.82, but his estimate relates to the relation across the entire lifecycle and, therefore, is higher than estimates that look into the same nexus in a given year. An additional test by Gale shows that the correlation is stronger among a population that is relatively well educated and better able to offset pension savings (i.e., lacking a liquidity constraint).

Attanasio and Brugiavini (2003) use a 1992 reform in Italy's social insurance to identify the connection between a change in the pension wealth that the public sector promises to give and the level of private savings. The reform had various components, foremost making the system less generous and, in particular, narrowing the option of early retirement and obtaining a benefit from the public sector at an early age. They found a strong relation—between -0.3 and -0.7—between pension wealth (promised by the public sector) and the household saving rate, and also found that the offset rate rises perceptibly after age forty relative to younger households.

Attanasio and Rohwedder (2003) used three key reforms in the UK public pension system in the 1970s that affected pension wealth to test the connection between pension wealth and other private savings. One reform introduced compulsory Tier 2 saving for employed persons who had not made such saving before.[32] Thus, it increased the pension wealth of those newly enrolled. In the other reforms, the method used to index the Tier 1 allowance was revised in a way that created variance in changes in pension wealth parsed by age. Investigating the Tier 2 reform that was imposed on workers, Attanasio and Rohwedder found a strong relation differentiated by age: -0.55 among those aged 32–42 and -0.75 among those aged 54–65. No such relation was found among young workers, for whom the compulsory savings became household savings in full. Attanasio and Rohwedder note that the liquidity constraint that acts upon young people and those of relatively low income may explain why the relation varies among population groups. Reforms affecting Tier 1 pension coverage were not found to have an effect on private savings.

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[32] Attanasio and Rohwedder emphasize that employed persons had no choice about pension savings in the years studied. The reform determined only that saving via the public system would begin for employed persons who had had no pension savings until then.

Chetty et al. (2014) examined the effects of changes in pension savings contributions and government subsidization of pension savings on total private savings in Denmark in 1995–2009. They found that 85 percent of the population is indifferent to changes in pension savings contributions (when they change employers) and do not respond to changes in mandatory savings by offsetting other savings. In particular, for every Danish krone of increase in pension contributions, only slightly more than 20 ore (cents) are offset by a decrease in other savings, and most of the population does not offset the increase in savings at all. Chetty et al. obtained a similar outcome when they tested a reform that increased mandatory contributions. The increase in savings was hardly offset by cutting back on other savings, even among the population that had no liquidity constraint.

Mastrogiacomo et al. (2023), investigating the effect of pension wealth on the extent of private assets (net of pension wealth) in the Netherlands in 2007–2010, found that one additional euro in pension wealth, amassed largely via compulsory arrangements on workers, reduces the level of private assets by 37 euro cents on average. Notably, the level of workers' contributions in this case was imposed on them in accordance with their workplace. Thus, in this study, too, the estimate of the relation between pension wealth and nonpension wealth was influenced by the mandatory nature of this saving. The authors emphasized differences among income and age groups and, in particular, the higher substitution rate between pension and nonpension wealth among households with above-median income and a lower offset rate among those younger than age 45.

Van Santen (2019) also examined the effect of pension wealth on private savings in the Netherlands and arrived at a similar estimate of the substitution rate between the savings types—a 32 euro cent decrease in private savings for each euro increase in pension savings. He based his study on survey data for 2006–2011, with which he used individuals' uncertainty about the benefit they will receive at retirement age to detect the impact of the substitution.

Englehardt and Kumar (2011) probed the connection between pension wealth and nonpension wealth among those aged 51–61 in the US. They found that an increase of 1 US dollar in pension wealth at a given income level narrows nonpension wealth by 53–67 cents on average among this age cohort. High-income earners (above the 75th percentile)

led this outcome, whereas those of low and medium income (despite advanced age) showed no significant relation between pension wealth and nonpension wealth. Notably, even though the impact of the institutional arrangement was not conspicuous in this study, it did exist because the level of pension wealth was contingent upon the arrangement.

Alessie et al. (2013) examined the relation between pension wealth and nonpension wealth among older adults (50+) in European countries. Among the total sample, the relation was estimated within a range of -0.47 to -0.61. In this study, too, the estimated coefficient was higher among the strong (highly educated) population (-0.83) than among the weaker (poorly educated) population (-0.22).

Friedberg et al. (2024) looked into the effect of a policy change at an American university—forcing employees to contribute more along the regular pension saving track—on the extent of voluntary pension saving by the same employees (an offset between two alternative pension tracks). The average response of voluntary contributions to an increase in mandatory contributions was found to be weak (an average offset rate of 30 percent). This outcome traces not only to employees who did not save on the voluntary track but also to the conduct of many who reduced their voluntary contributions by a much smaller rate than the increase in mandatory saving that they were forced to make. The low offset rate stands out more among younger workers (under age forty) than among older ones (above that age).

Frish (2024) examined private consumption in Israel as a function of wage income and its changes. He found, among other things, that households that had no pension arrangement reduced their consumption by 21 percent after retirement age, whereas those that had a pension setup maintained a stable level of consumption after retirement age. By implication, households do not fully offset pension saving from other saving, given that a full offset would probably manifest in similar consumption behavior after retirement age between households that have pension arrangements and those that do not.

Summing up the literature on the relation between pension wealth/pension savings and nonpension wealth/private savings, the following may be said:

1. There is a substitution effect between pension savings and nonpension/private savings. Households tend to partly offset changes in pension savings by revising their private savings. The estimates in the literature on the downsizing of private savings in response to a NIS 1 increase in pension wealth usually range from NIS 0.3 to NIS 0.7. The estimates of the offset between pension wealth and private savings are higher (in absolute terms) among high-income/high-education households, usually greater than 0.5, than among low-income/low-education households that have liquidity constraints, which is usually smaller than 0.5. Individuals' age also affects the nexus of pension wealth and private savings. The older individuals are, the more they tend to respond by making a bigger cutback in their private savings against an increase in pension wealth. Some studies found that the substitution between pension wealth and private savings among young households is not significantly different than 0. Among older households, however, it may reach 0.8 and, in certain cases, is not significantly different than 1 (full substitution).

2. Many households manage their savings passively and do not respond to decisions that others make for them. This explains the only partial substitution that the literature finds between institutional pension savings and other savings, even among households that have the ability to fully offset savings that an external player forces them to make.

3. In studies of mandated increases in pension savings (i.e., the estimates they generate are based on a reform imposed on workers), a relatively low offset coefficient is usually found. However, it is hard to determine the extent to which households' tendency to offset a mandated change in savings is different from an offset against some other exogenous change in pension wealth (e.g., a decline in the capital market).

Thus far, we have not related to the effect of the risk to the level of pension wealth on the level of nonpension savings. A risk to pension wealth (or to the expected size of the monthly benefit) may mitigate the offset of private nonpension savings against an increase in pension contributions.[33] Two key reforms in Israel's pension system—the transition in the public sector from DB to DC with new pension funds, and from pension savings with old pension funds to DC pension arrangements with new funds—handed the risks concerning the size of the pension benefits to individuals. For example, while under the unfunded pension in the public sector and old pension fund arrangements (essentially DB in both cases) savers' rights were assured under a formula contingent upon the number of years worked and the determining wage—both relatively certain factors—with the new (DC) funds, the benefit depends on factors that are much less certain. Specifically, the new pension funds' yield over the years of saving has an enormous effect on the individual's future benefit, as does expected life expectancy at point of retirement. It was apparently the uncertainty that surrounds these parameters that brought on the increase in pension contributions and, from this standpoint, individuals have little motivation to offset this increase in savings. Since we cannot estimate the strength of the increase in uncertainty about the expected benefit in the transition from the old arrangements to the new ones, we content ourselves by saying that the increase in uncertainty about pension size following Israel's pension reforms supports an offset coefficient that is low (relative to the increase in contributions). Accordingly, our estimate of the increase in savings as a result of the pension system reforms, resting on offset coefficients from the literature, is probably a lower bound.

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[33] As stated, Van Santen (2019) emphasizes that an increase in uncertainty about one's expected monthly pension income raises total household savings significantly.

Table 7 | Findings of papers relating to the offset rate of other savings against an increase in pension contributions or pension wealth

Paper	Country	Event/population examined	Offset rate
Attanasio & Brugiavini (2003)	Italy	Decrease in pension wealth ensured by public sector	0.3–0.7
			Offset rate rises steeply after age 40
Attanasio & Rohwedder (2003)	UK	Tier 2 saving made mandatory for those lacking it	0 for those younger than 32
			0.55 for those aged 32–42
			0.75 for those aged 54–64
		Change in method of Tier 1 pension indexation	0
Chetty et al. (2014)	Denmark	Subsidization of pension saving (voluntary-active)	0.99
		Passive imposedincrease in pension contributions (when changing employers)	0.2
Mastrogiacomo et al. (2023)	Netherlands	Mandatory arrangements for wage-earners	0.37—offset rate rises with income; lower offset rate among those under age 45.
Van Santen (2019)	Netherlands	Effect of expected pension income (not pension contribution rate) on household's other savings (survey data)	0.32—no difference in offset rate between those aged 50+ and those younger; higher offset rate among those of low income.
Englehardt & Kumar (2011)	US	Age 51–61	0.53–0.67—most offsetting done by high-income households (75th percentile up); low- and medium-income—no significant offsetting
Alessie et al. (2013)	13 European countries	Multinational survey, 50+ age group	0.47–0.61
			Well-educated population—offset coefficient 0.83
			Poorly educated population—offset coefficient 0.22
Friedberg et al. (2024)	US	New hires at a public university	0.3
			(offset between two pension saving tracks); offset rate lower among young people

4.2.2 Offset rates parsed by age and income—our working assumptions

On the basis of the findings in the literature reviewed above, we assume an offset rate for each of the eighteen age/income cells drawn in Table 8. The finding shared by most of the studies is an especially low offset rate—verging on zero—among young people and

low-income (liquidity-constrained) individuals, that rises with age and income, and verges on 1 among older adults and those of high income. Our assumptions as to the offset coefficients of the various population groups parsed by age and income, specified in the table, correspond to these findings. In particular, we assume that people with especially low incomes face such an acute liquidity constraint that they cannot offset forced savings even in advanced age. In contrast, we assume a 0.9 offset coefficient for older adults with high income.

We emphasize that these offset coefficients are typical of reforms that forced workers to change their contribution rate or set the contribution rate as the default for all employees of a given employer (e.g., in a collective agreement). This characteristic is shared by the reforms examined in the papers reviewed above. It is distinct from the response of workers to reforms that incentivize them to save at a higher rate and require them to take action in order to realize the benefits.

By applying these offset coefficients to the population groups in accordance with the various reforms, we obtain an offset coefficient for each reform that reflects the age and income distribution of the population group affected by the reform. The tables in the appendix show the income and age distribution of each population group.

Table 8 | Assumed offset coefficients* by age and income groups**

Income Age	Up to half the median	0.5x median to median	Median to 1.5x median	1.5x median to 2x median	2x median to 3x median	More than 3x median
Up to 34	0	0	0.1	0.2	0.3	0.4
35–49	0	0	0.2	0.35	0.5	0.65
50 +	0	0.1	0.3	0.5	0.7	0.9

* The rate at which individuals offset an increase in pension contributions by reducing other private savings.

** Household per-capita wage income (standardized using the Central Bureau of Statistics equivalence scale).

4.3 Offset coefficients for the various reforms

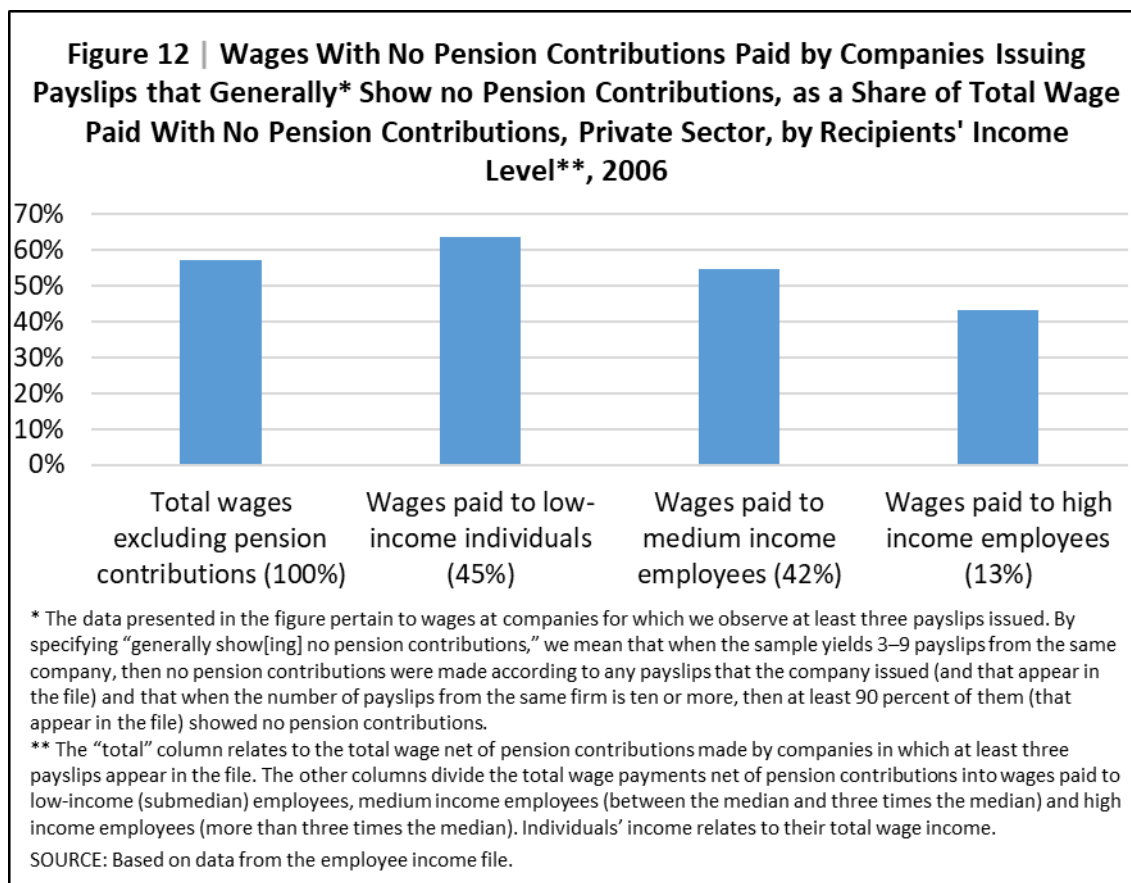We now parse changes in savings by the five reforms:

1. Mandatory pension contributions, private sector.

2. Increase in pension contributions, private sector, as a result of the transition to the new funds, collective agreements, expansion orders, and tax benefits.

3. Mandatory pension contributions, public sector.

4. Public sector—transition from DB to DC.

5. Increase in pension contributions, public sector, as a result of the transition to the new funds, collective agreements, and tax benefits.

4.3.1 Mandatory pension contributions in the private sector

The following two characteristics of workers affected by the introduction of mandatory pension have a downward effect on the rate at which they offset the pension savings imposed on them. (a) The share of employees who have liquidity constraints and cannot offset the forced savings is especially high due to their relatively low income. As Appendix Table 2 shows, the total wage paid to households that have submedian wage per standard person is 44 percent (compared with 18 percent for the population at large), and another third is paid to households with wage per standard person between the median and twice the median. (b) These employees are relatively young—48 percent are aged 34 or below, compared with 29 percent in the population at large. The combination of low income and young age with the offset coefficient table presented above leaves this group with a small offset coefficient—0.22.

To reinforce our assessment that the employees in question are not likely to respond to compulsory contributions by reducing other savings—not individuals who willingly choose not to make pension contributions—we note that nearly 60 percent of the wages for which no pension contributions were made in 2006 were paid by companies that customarily did not make pension contributions for their employees (Figure 12). In this sense, one may expect the employees to treat the reform passively. In this context, Chetty et al. (2014) and, more recently, Cribb and Emmerson (2020) showed that most of the population is passive to external entities' decisions on their pension contributions. Chetty et al. also showed that workers whose contribution rate is dictated by their employers generally have an especially low 0.22 offset rate, matching that obtained for the group discussed here.

4.3.2 Increase in private sector pension contributions—wages from which contributions were made even before the mandatory pension arrangement

The average rate of contributions (employee + employer), weighted by level of income shown on payslips of employees for whom pension contributions were made, was 7.5 percent of gross wages in 2006 and climbed to 9.3 percent in 2019.[34] The long-term increase in employees' pension contributions is largely the outcome of collective agreements and the expansion orders that accompanied them. Accordingly, one may consider it a default on the individual's part.

Most of the wages for which pension contributions were made in 2006 was paid to relatively high-income households. Around two-thirds of the wage accrued to households with income more than twice the median income per standard person (Appendix Table 3), compared to 56 percent for the population at large. Nearly half of the wage in this group was paid to middle-aged workers (35–49) and the rest was divided equally between those younger and those older. As a result, the offset coefficient of this group is relatively high—0.49.

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[34] The data for 2009 include the payslips of individuals who began to make pension contributions as a result of the mandatory pension arrangement. In our estimation, their effect on the average is small because their contribution rate in 2019 also approximated the national average.

4.3.3 Mandatory pension contributions in the public sector

Most public sector employees affected by the mandatory pension reform were, on average, young and had low income. Thus, 46 percent of the wages paid in 2006 to public sector employees for whom no pension or training fund contributions were made—the group that, in our assessment, began to make contributions following the mandatory pension rollout—was paid to households with income below the median per standard person. This is compared to 18 percent in the population at large. Furthermore, 45 percent of the wages were paid to young workers (under age 34), compared to 30 percentin the population at large.

By applying the offset coefficients to the wage and age distribution in this group, we obtain a low 0.24 offset coefficient, not far from that found for the corresponding group in the private sector. This rate aligns with estimates from the literature regarding situations of forced savings among low-income individuals.

4.3.4 Public sector—the transition from DB to DC

With the termination of the DB arrangement, new employees were left without a pension unless they joined a DC scheme. Accordingly, these employees consider the new pension contributions essential savings that replace the previous arrangement and probably, generally speaking, they do not offset this saving by reducing other saving.[35]

Public sector employees (who are not on DB plans) currently contribute to their pensions at a 14.5 percent rate. We distinguish between (1) the main pension base—a contribution of 12.5 percent of the determining wage—which replaced the DB arrangement, and (2) the additional 2 percent, paid mainly in the public sector, that amounts to an increase in pension savings.[36]

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[35] Here we do not relate to changes in precautionary savings. Some employees on DB plans may save for pension for reasons of prudence (in addition to the DB pension assured to them) due to concern that, under certain conditions, some future government would reduce their pensions. In our judgement, however, the transition to DC does not reduce precautionary savings because new employees insured on a DC basis face greater risks than do those on DB plans, including yield risks and the risk of an unforeseen increase in life expectancy.

[36] The collective agreement that, at the present writing, determines the level of pension contributions in public-sector workers under DC plans was concluded in 2013. According to this agreement, the employer's and the employee's pension contributions stand at 7.5 percent and 7.0 percent of the determining wage, respectively, for a total of 14.5 percent.

In regard to Component (1), as stated, we assume zero offset. As for Component (2) we derive the offset coefficient from the income and age distribution of the affected population, as we did for the other reforms. Employees who replaced those in DB pension schemes are among the strongest in the public sector. We assume that their income and age characteristics resemble those of public sector employees who had had pension arrangements (DB or DC) even before the mandatory pension arrangement was applied. Accordingly, the offset coefficient in respect of Component (2) is 0.52. Weighting the two components, we obtain a total offset coefficient of 0.07 for employees who replaced those on DB.

4.3.5 Increase in pension contributions—other public sector employees

Two additional groups of public sector employees increased their pension saving contributions. The main one is composed of workers who already participated in DC pension arrangements in 2006. They generally have high incomes and are older than the employee population countrywide (Appendix Table 6). Accordingly, a relatively high offset coefficient is obtained for them—0.53.

The second group comprises employees under DB arrangements who insure part of their income through a DC mechanism. This group benefited from an increase in pension saving contributions under the agreements that accompanied the termination of DB pension arrangements for new employees and the transition to DC. The pension contributions of this group of employees are relatively small for two reasons. First, the number of employees benefiting from DB pension is steadily falling, and second, only a small portion of their wages is insured through DC mechanisms (because it includes only the part of wage that is not covered by DB and that is not given as reimbursement of expenses). Due to the small size of these employees' total pension contributions, the total effect of the increase in their contributions to the total increase in pension saving contributions is negligible. The offset coefficient obtained for this group, via the methodology that we used for the other groups, is 0.51, and reflects relatively high income. In our assessment, the offset coefficient of this group is actually higher still, for two reasons: (1) The increase in contributions for employees in DB arrangements was largely a benefit that they received for their consent to the termination of the DB arrangement for new employees,

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and not due to the need to increase their pension savings, unlike the increase in pension contributions for other employees; (2) One of the considerations behind increasing pension contributions across the rest of the economy was the increased uncertainty about the expected pension. This consideration is of secondary importance for workers who have DB setups due to the certainty that this arrangement provides. As Van Santen (2019) shows, a decrease in uncertainty will lead to a higher estimated offset coefficient. Because the scale of this group's pension contribution is so low, however, its offset coefficient is not very important.

4.4 Summary of findings

Table 9 sums up the results of the study. Column (1) presents the increase in pension contributions originating in each of the reforms, as we calculated in Section 3. Column (2) shows the offset coefficients for each reform, as calculated in Section 4. By multiplying these factors, we obtain the net effect of each reform on the increase in households' total savings (Column (3)).

Altogether, the reforms added 0.7 percent of GDP to households' savings between 2006 and 2019. Half of the increase was due to the introduction of mandatory pensions, largely because it led to an increase in private sector contributions. The major impact of mandatory pensions reflected both its large effect on the scale of pension contributions (0.46 percent of GDP) and these employees' low offset rates. The perceptible increase in the scale of contributions is due to the volume of the wages that were affected by the introduction of mandatory pension—14 percent of total wage payments countrywide— and the considerable upward effect of the mandatory pension reform on the share of contribution in wage from zero to today's level. The other reforms increased this rate by a much smaller extent. The low offset rates reflect the low income level and relative youth of the employees whom the reform affected.

The increase in the contribution rates of employees (in the private and public sectors) who had made pension contributions even before mandatory pension was introduced, as a share of total contributions (0.41 percent of GDP), was only slightly smaller than that caused by the mandatory pension arrangement. However, the upward effect of the increased contribution rates on total savings was much weaker than that made by the

mandatory pension reform due to the differences in the offset coefficients. The termination of DB schemes for new employees in the public sector had a 0.13 percent of GDP (gross) upward effect on the increase in pension contributions. True to the nature of the arrangement that did away with the DB setup and mandated the creation of pension savings funds, the gross effects are hardly offset and their net upward impact on the increase in savings was 0.12 percent of GDP.

Table 9 | The growth of household savings due to the increase in pension contributions

		Increase in pension contributions (percentage of GDP)	Savings offset coefficient	Total effect on savings (percentage of GDP)
Upward effect of the increase in pension contributions directly due to the mandatory pension reform	**Total**	**0.46**		**0.35**
	Private sector	0.4	0.22	0.31
	Public sector	0.06	0.24	0.05
Upward effect of the increase in pension contributions originating in increased contribution rates from wage for which contributions were made before the mandatory pension reform (in old or new funds)	**Total**	**0.41**		**0.2**
	Private sector	0.3	0.49	0.15
	Public sector	0.11	0.53	0.05
Upward effect of the increase in pension contributions directly due to termination of the public sector DB arrangement	Public sector	**0.13**	0.07	**0.12**
Upward effect of the increase in contributions of employees enrolled in the public sector DB plans	Public sector	**0.01**	0.51	**0.01**
Total (net of increase in wages as a share		**1.01**		**0.68**

SOURCE: Based on data from the employee income file.

5. Conclusion

In this study, we quantified the effect of major reforms in Israel's pension system on the savings rate. A quantification such as this, focusing on the macroeconomic side, has been absent thus far in the discussion over the implications of these reforms.

The reforms that we examined had both direct and indirect upward effects on employees' pension contributions. Based on administrative wage files, we estimated the effect of each of these reforms on total pension contributions between 2006 and 2019.

According to our estimates, the direct upward effect of the introduction of mandatory pension (which refers only to wages for which employers had not contributed to provident funds or pension before the reform) was the largest of all the reforms—about half of the total increase in pension contributions.. This finding demonstrates the macroeconomic importance of mandatory pension beyond its micro impact on the households that were affected by it. The direct effect of the mandatory pension arrangement does not take into account the arrangement's impact on increasing the contribution rates from wages for which contributions had already been made before the reform.

The second-most important determinant is the increase in contribution rates, which, in our judgement, reflects mainly the transition to new pension funds, reducing the expected allowance and transferring the risks to savers. These risks are associated, inter alia, with economic developments that affect the funds' yields and demographic factors such as the increase in life expectancy. The institutional arrangement set out by the new pension funds created a connection, which had not existed at the old funds, between the level of members' contributions and their future benefits, thus encouraging them to contribute more. The collective agreements and the expansion orders that accompanied them integrated employees' wish to increase their pension savings with the policy of imposing this increase on the entire employee population.

The transition from DB to DC in the public sector had relatively little upward effect on total contributions, partly because our analysis begins about a decade after the transition went into effect. Its impact on public sector employees' contributions, however, was key and was twice as large as that of the mandatory pension reform in this sector.

We used estimates from the literature and an analysis of the income and age distribution of the population group affected by each reform to estimate how the increase in pension contribution rates due to each of the reforms affected nonpension savings. The differences in the offset rates due to each reform reflect the differences in the characteristics of the population groups that were affected by them and also, in certain cases, the characteristics of the reform itself. On the basis of these assumptions, we estimate the net collective upward effect of the reforms on households' savings at 0.7 percent of GDP. This is probably an understatement of the total effect of the reforms on the increase in the savings rate because we were forced to estimate it only from 2006 onward, whereas the transition to the new pension funds and from DB to DC in the public sector began earlier.

The increase in savings partly reflects the offset coefficients that we found with respect to the various reforms. Two levels of offset coefficients are observable. The first is a small coefficient (0.2) relating to population groups that had had no pension arrangement of any kind before they were required to join one. These populations are typically young and have low incomes. In our study, they began to save for pension when mandatory pension was introduced. The second is a higher offset rate (0.5) relating to population groups that had already made pension arrangements and merely had to contribute at higher rates due to the reforms. This coefficient is consistent with the findings of Lavi and Spivak (1996), who estimated the connection between the increase in pension savings and total national savings at a time when no reforms requiring large population groups to join pension arrangements had been introduced. They, too, found that half of the increase in pension savings was offset by a decrease in other savings.

These offset ratios may change in the future, for example, as the population ages or as pension savings accumulate among population groups that did not amass sizable savings in the initial period of mandatory pension. An additional increase in the statutory contribution rates may also push the offset rates up. This study focused on estimating the effect of the reforms on total savings during the reviewed period. Using it to project the impact of the reforms on a future increase in savings should be done cautiously.

The increase in Israel's savings rate in recent decades is a macroeconomic phenomenon of immense importance that has not yet been studied adequately. Although this study fills some of the gap in this regard, further work is needed to understand the full set of processes that acted to boost the savings rate. In particular, future work should examine whether government policy in additional fields also abetted the increase in savings. Such an analysis may shed light on the extent to which the increase in the savings rate is permanent (at least until government policy changes) and reflects the optimal development of the economy.
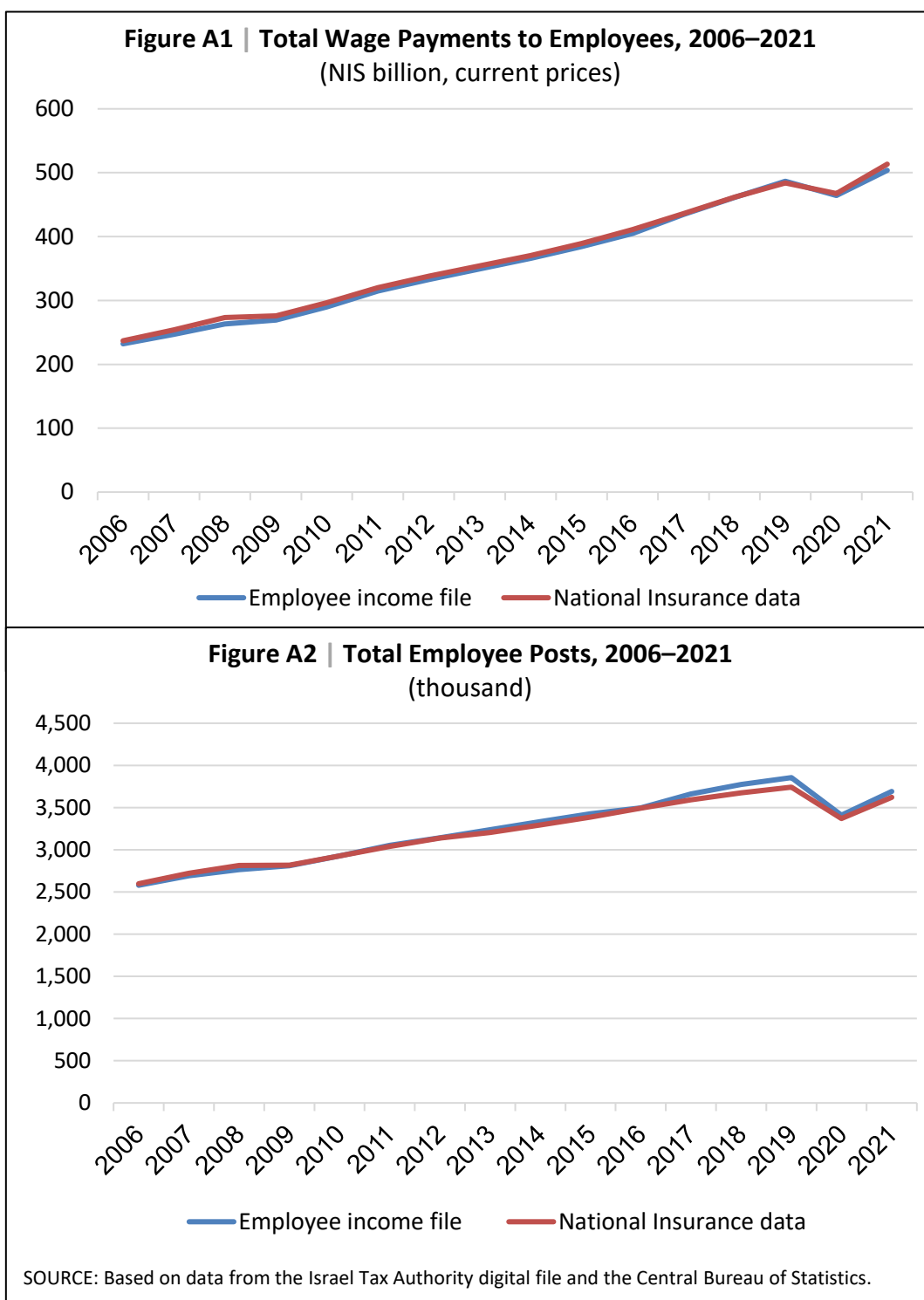
References

Abramson, S., and M. Sarel (2015). "Pension Savings Tax Bbenefits", Kohelet Forum, Position Paper 13 [in Hebrew].

Achdut, L., and A. Spivak (2010). "The Pension System in Israel after Fifteen Years of Reforms", *Policy Studies 8,* The Economics and Society Program, The Van Leer Jerusalem Institute. www.vanleer.org.il/en/publication/pension-system-israel-after-15-years-reforms [in Hebrew].

Alessie, R., V. Angelini, and P. Van Santen (2013). "Pension Wealth and Household Savings in Europe: Evidence from SHARELIFE", *European Economic Review*, 63, 308–328.

Assif, S., and Z. Kril, Z. (2020). "Generation Gaps in Pension Levels of Public Sector Workers", in Ministry of Finance, *Report on Wage Expenditures in the Civil Service and the Defense Agencies for 2018*, 184–201 [in Hebrew].

Attanasio, O.P. and A. Brugiavini (2003). "Social Security and Households' Saving", *The Quarterly Journal of Economics*, 118(3): 1075–1119.

Attanasio, O.P. and S. Rohwedder (2003). "Pension Wealth and Household Saving: Evidence from Pension Reforms in the United Kingdom", *American Economic Review*, 93(5): 1499–1521.

Bahar, V. and L. Leiderman (2021). "From Deficits to Surpluses: Israel's Current Account Reversal", in Avi Ben-Bassat, Reuben Gronau, and Asaf Zussman (eds.) *The Israeli Economy, 1995–2017— Lights and Shadows in a Market Economy*, Cambridge: Cambridge University Press.

Bank of Israel (2015). "Implementation of Mandatory Pension Saving and its Effect on Wages", *Recent Economic Developments, 139*: 33–40.

Bank of Israel (2017). "The Balance of Payments: Fundamental Factors Underlying Israel's Current Account Surplus", *Bank of Israel Annual Report* 2016*,* Chapter 7: 207–227.

Bank of Israel (2019). "Welfare and Social Policy Issues", *Bank of Israel Annual Report* 2018: 221–251.

Ben-Bassat, A. (2020). *The Revolution in Israel's Capital Market: 1985–2018.* Jerusalem: Magnes Press, the Hebrew University of Jerusalem [in Hebrew].

Blanchard, O. and S. Fischer (1989). *Lectures on Macroeconomics.* Cambridge, MA, MIT Press.

Brender, A. (2011). "Implications of Mandatory Pension for the Return on Labor", *Economic Quarterly* 58(1/2): 91–120 [in Hebrew].

Brender, A. and E. Pulitzer (2018). "The Effect of Changes in Tax Rates on Tax Revenues in Israel", *Economic Quarterly* 62(1/2): 85–126.

Chetty, R., J.N. Friedman, S. Leth-Petersen, T.H. Nielsen, and T. Olsen (2014). "Active vs. Passive Decisions and Crowd-Out in Retirement Savings Accounts: Evidence from Denmark", *The Quarterly Journal of Economics*, 129(3): 1141–1219.

Cribb, J. and C. Emmerson (2020). "What Happens to Workplace Pension Saving when Employers are Obliged to Enroll Employees Automatically?", *International Tax and Public Finance*, 27: 664–693.

Dressler, E., and G. Gordon (2024). "Pension Saving in Haredi Society", Israel Democracy Institute, unpublished [in Hebrew].

Engelhardt, G.V. and A. Kumar (2011). "Pensions and Household Wealth Accumulation", *Journal of Human Resources*, 46(1): 203–236.

Feldstein, M. (1974). "Social Security, Induced Retirement, and Aggregate Capital Accumulation", *Journal of Political Economy*, 82(5): 905–926.

Friedberg, L., A. Leive, and W. Cai (2024). "Does Mandatory Retirement Saving Crowd Out Voluntary Retirement Saving?" *Journal of Economic Behavior & Organization*, 225: 20–36.

Frish, R. (2021/2022). "The Impact of the Compulsory Pension Law on Private Consumption and the Savings Rate", *Economic Quarterly,* 65/66: 105–129 [in Hebrew].

Frish, R. (2024). "Consumption and the Permanent Income of Households.", *Research in Economics,* 78(4): 101011

Gale, W.G. (1998). "The Effects of Pensions on Household Wealth: A Reevaluation of Theory and Evidence", *Journal of Political Economy*, 106(4): 706–723.

Gronau, R. and A. Spivak (2020). "The Reforms in the Israeli Pension System 1995–2015. in *The Israeli Economy, 1995–2017— Lights and Shadows in a Market Economy*, Avi Ben-Bassat, Reuben Gronau, and Asaf Zussman (eds.). Cambridge: Cambridge University Press.

Hamermesh, D. (1993). *Labor Demand.* Princeton: Princeton University Press.

Kril, Z. (2016). "What is the Expected Standard of Living on Pension for Today's Young Savers?" Discussion Paper, The Chief Economist's Division, Ministry of Finance [in Hebrew].

Lavi, Y. and A. Spivak (1996). "The Impact of Pension Schemes on Saving in Israel", *Economic Quarterly* 43(2): 202–235 [in Hebrew].

Mastrogiacomo, M., R. Dillingh, and Y. Li (2023). "The Displacement Effect of Compulsory Pension Savings on Private Savings. Evidence from the Netherlands, Using Pension Funds Supervisory Data", *The Journal of the Economics of Ageing*, 26: 100473.

Mazar, Y. and Y. Friedman (2014). "The Transition to a Defined-Contribution Track in the Public Sector in Israel: Its Implications for Income Across the Life-Cycle of New Employees". Unpublished [in Hebrew].

Melguizo, A. and J.M. González-Páramo (2013). "Who Bears Labour Taxes and Social Contributions? A Meta-Analysis Approach", *SERIEs*, 4: 247–271.

Menahem-Carmi, S. and A. Spivak (2018). "The New Pension Funds: Examination of the Replacement Rate and the Behavior of the Insured", Ben-Gurion University of the Negev, The Pensions, Insurance and Financial Literacy Research Center [in Hebrew].

Ministry of Finance (various years). *The Government of Israel: Financial Statements.* Office of the Accountant General [in Hebrew].

Van Santen, P. (2019). "Uncertain Pension Income and Household Saving", *Review of Income and Wealth*, 65(4): 908–929.

Yosef, R. and A. Spivak (2008). "The New Pension World: After the Big Bang of 2003", *Policy Studies* 5. The Van Leer Jerusalem Institute [in Hebrew].

Zeira, J. (2021). *The Israeli Economy: A Story of Success and Costs.* Princeton: Princeton University Press.

Appendix: Comparison of Wage Data and Employee Posts in the Research File with National Insurance Wage Data

Figure A1 | Total Wage Payments to Employees, 2006–2021
(NIS billion, current prices)

— Employee income file   — National Insurance data

Figure A2 | Total Employee Posts, 2006–2021
(thousand)

— Employee income file   — National Insurance data

SOURCE: Based on data from the Israel Tax Authority digital file and the Central Bureau of Statistics.

Table A.1 | Distribution of wage parsed by age and per capita household wage income, all payslips countrywide, 2006, percent

Income Age	Up to half the median	0.5x median to median	Median to 1.5x median	1.5x median to 2x median	2x median to 3x median	More than 3x median	Total
Up to 34	2.8	5.3	5.6	4.3	5	6.4	29.4
35–49	2.1	4.6	5.4	5.3	7.9	14	39.4
50 +	0.8	1.9	2.5	2.9	5.2	17.7	31.1
Total	5.8	11.8	13.6	12.5	18.2	38.2	100

Table A.2 | Distribution of wage parsed by age and per capita household wage income, private sector, payslips without employer's contribution to provident fund or pension*, 2006, percent
(Private sector population affected by the mandatory pension reform)

Income Age	Up to half the median	0.5x median to median	Median to 1.5x median	1.5x median to 2x median	2x median to 3x median	More than 3x median	Total
Up to 34	9.5	14.6	12.1	5.7	3.9	2.1	47.9
35–49	6.3	6.9	5.2	3.2	2.9	5	29.4
50 +	2.5	3.9	3.3	2.4	2.8	7.4	22.4
Total	18.5	25.5	20.6	11.4	9.5	14.5	100

* Employers' contributions below 0.25 percent of gross wage.

Table A.3 | Distribution of wage parsed by age and per capita household wage income, private sector, payslips with employer's contribution to provident fund or pension*, 2006, percent
(Private sector population affected by the increase in pension contribution rates)

Income Age	Up to half the median	0.5x median to median	Median to 1.5x median	1.5x median to 2x median	2x median to 3x median	More than 3x median	Total
Up to 34	0.4	2.3	4	4.4	6.4	10.6	28.1
35–49	0.7	3.5	5.2	5.7	9.2	20	44.3
50 +	0.2	1.1	2.1	2.6	4.7	16.9	27.6
Total	1.3	7	11.3	12.6	20.3	47.5	100

* Employees' contributions above 0.25 percent of gross wage.

Table A.4 | Distribution of wage parsed by age and per capita household wage income, public sector, payslips without employer's contribution to provident fund or pension and without employer's contribution to training fund, 2006, percent

(Public sector population affected by the mandatory pension reform)

Age \ Income	Up to half the median	0.5x median to median	Median to 1.5x median	1.5x median to 2x median	2x median to 3x median	More than 3x median	Total
Up to 34	12.3	12.6	9.3	5	3.9	2.2	45.3
35–49	5.7	5.5	4.1	3	3.3	3.7	25.3
50 +	4.8	4.4	3.5	2.7	4.1	9.7	29.3
Total	22.9	22.6	16.8	10.7	11.3	15.8	100

Table A.5 | Distribution of wage parsed by age and per capita household wage income, public sector, payslips with small* employer's contribution to provident fund or pension and employer's contribution to training fund, 2006, percent

(DB pension recipients affected by the increase in DC contribution rates)

Age \ Income	Up to half the median	0.5x median to median	Median to 1.5x median	1.5x median to 2x median	2x median to 3x median	More than 3x median	Total
Up to 34	0.6	1.8	2.3	2.4	2.5	1.2	10.8
35–49	1.1	6.7	7.9	7.9	10.8	10.7	45.1
50 +	0.2	2.1	3.5	4.7	8.6	25.2	44.2
Total	1.9	10.6	13.6	15	21.9	37.1	100

* Employer's contributions below 1.8 percent of gross wage, which may reflect employer's contribution of 6 percent (aligning with employer's contribution in wage accords) on a wage that constitutes up to 30 percent of gross wage. This contribution may pertain to employees on DB pensions who receive contributions to a DC fund for the portion of wage not covered by DB and that does not constitute reimbursement of expenses.

Table A.6 | Distribution of wage parsed by age and per capita household wage income, public sector, payslips with employer's contribution to provident fund or pension exceeding 1.8 percent of gross wage*, 2006, percent

(Public sector population insured with old or new pension funds, affected by the increase in contribution rates)

Age \ Income	Up to half the median	0.5x median to median	Median to 1.5x median	1.5x median to 2x median	2x median to 3x median	More than 3x median	Total
Up to 34	1.1	2.7	3.6	3.4	4.6	4.2	19.7
35–49	1.1	3.6	5.1	5.7	9.5	12.5	37.6
50 +	0.3	1.2	2.1	3.2	7.7	28.1	42.6
Total	2.5	7.6	10.9	12.4	21.9	44.9	100

* Contribution at a level that aligns with wage insured with an old pension fund or a DC pension fund.