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THE WELFARE AND LABOR MARKET EFFECTS OF
MANDATORY PENSION SAVINGS:
EVIDENCE FROM ISRAELI CASE

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The Welfare and Labor Market Effects of Mandatory Pension Savings: Evidence from the Israeli Case

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- Preliminary version -

Abstract

Many studies show that workers make poor decisions about pension savings. Policy responses to these failures include social security retirement arrangements, tax benefits for pension savings and, in some countries, also mandatory private savings towards retirement. This study examines the response of Israeli employees to the introduction of mandatory pension contributions, and the medium-term labor market effects of the arrangement, using a randomly selected panel of 300,000 employees. The first year of the arrangement, when enforcement was lax and compliance partial, provides a window to identify employee preferences, before compliance became almost universal. We find that in this year both the probability of beginning to save and the tendency to contribute at rates above the required minimum were positively correlated with how (un)beneficial the required pension savings were for the employee. We also show that 5 years after the arrangement was initiated wages of its target population were reduced by nearly the full amount of the increase in employers' contributions. These outcomes indicate a rational and informed response of the employees and that such arrangements require careful and detailed examination of their consequences for the affected population.

Key words: Mandatory pensions, Pension contribution, Tax incidence, Rational behavior, Smoothing lifetime income.

JEL Classification: H55, J32, K31, J58

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1. Introduction

Following Kotlikoff (1987), the economic literature provides a number of justifications for government intervention in retirement savings and for imposing mandatory pensions (see Section 2 below): (a) shortsightedness of workers, who fail to understand the need to save for retirement or err in the calculation of their required level of savings; (b) high transaction costs in joining a pension savings plan and deciding on its size, which lead to workers' passivity even when they understand the need to save; (c) abuse of government income support systems, which guarantee workers a reasonable level of retirement income and lead to reduced pension savings. On the basis of these claims, two main types of government intervention are common in developed economies: (a) national insurance systems that collect mandatory payments from workers in exchange for pensions and typically include a significant component of progressive redistribution of income; (b) imposition of mandatory pension saving on workers, carried out through non-government savings institutions. In both systems it is common to split the contributions between employees and their employers. Systems of the first type exist in almost all OECD countries while the latter exist in ten.¹ In addition, pension savings is the default in the UK and New Zealand where uninterested workers must actively ask to stop contributing.

Table 1: Contribution rates according to the mandatory pension arrangement

Beginning from	Employer Contributions	Employee Contributions	Total Contribution
1.1.2008	1.67	0.83	2.50
1.1.2009	3.34	1.66	5.00
1.1.2010	5.00	2.50	7.50
1.1.2011	6.67	3.33	10.00
1.1.2012	8.34	4.16	12.50
1.1.2013	10.00	5.00	15.00
1.1.2014	12.00	5.50	17.50

Israel introduced a mandatory pension arrangement at the beginning of 2008. It requires every worker to contribute 17.5 percent of wages to pension savings, which are designated for the payment of a monthly pension upon retirement. The arrangement had

¹ Australia, Hungary, Iceland, Israel, Mexico, Norway, Poland, Slovakia, Sweden and Switzerland (OECD, 2009).

been implemented gradually (Table 1), such that the full contribution rates came into effect from 2014. The obligation to contribute to pension savings applies to wages up to the level of the average wage in the economy and since about 70 percent of workers earn less than the average, for them the obligation to contribute applies to the entire wage. One-third of the contribution to pension savings is deducted from the worker's wage and two-thirds are paid directly by the employer.

While there are many justifications for government intervention in individuals' lifetime income allocation, such interventions also raise non-trivial theoretical and empirical issues, especially when governments choose to intervene through a variety of policy instruments (Scholtz et al., 2006). It is therefore critical that such interventions are measured and account for the particular circumstances and needs of the most affected populations. Otherwise such a policy may end-up hurting more workers than it helps (Martin and Whitehouse, 2008). In the case of Israel, Brender (2010) found that, given the existing government intervention through the National Insurance Institute (NII) and tax benefits, the mandatory pension arrangement may adversely affect a large proportion of low-earning workers. This is because the lifetime wage profiles of many low-earning employees are flat, and the NII pensions provide them a reasonable replacement rate. Accordingly, additional pension savings reduce their incomes in years when their family's disposable income (per standard individual) is relatively low and increases it in periods when it is high. The degree to which working years' income is reduced depends on the magnitude in which employer's contributions translate into a decline in wages. In addition, the arrangement reduces the total lifetime benefits provided by the State for retirement savings to large groups of low-earning workers relative to both higher-income earners and individuals who do not work at all. Since the pension saving rate required by the arrangement is non-trivial it has the potential to significantly reduce the welfare of low-earning workers as well as their employment.

One argument in favor of the mandatory pension arrangement is that most of the contribution is borne by employers. This argument is based upon three components: 1) the legal requirement that about two thirds of the total cost shall be paid by the employer; 2) the notion that many of the employees affected by the arrangement earn low wages, so their employers may not shift the tax (contribution) incidence to them due to the legal minimum wage; 3) that employment at the low end of the labor market is not very sensitive to wages and labor cost in Israel (Brender and Strawczynski, 2006) and in general (Schmitt, 2013; Neumark et al., 2014). However, the effectiveness of

minimum wage enforcement in Israel is questionable, especially due to the complexities of its calculation, so the actual split of the contribution incidence merits an empirical examination.

While Brender's (2010) criticism was based on simulations and econometric analyses relating to the pre-arrangement period, the current research examines how workers and employers reacted when the arrangement went into effect. Using administrative panel data from the Tax Authority for a representative sample of 10 percent of the employees in the economy it examines the degree of compliance with the mandatory pension arrangement during its first year, among employees who had worked in both 2007 and 2008 and had not contributed to pension savings in 2007. This was done to determine whether compliance with the arrangement is correlated with the desirability of pension savings for the worker and in order to "exploit" the period in which enforcement was still lax so the "tastes" of savers and their employers can be identified,² before compliance became almost full.³

While compliance may be associated with the characteristics that make pension savings more desirable to the employee, it may be argued that these characteristics are associated with a general tendency for law obedience rather than a response to the mandatory pension. To account for that possibility we examine the savings rates for those who began saving only after the arrangement went into effect. If the relevant characteristics reflect law obedience they are likely to be associated with a tendency to contribute at the legally required rate. If they reflect potentially larger benefits from contributing by employees that were led "to do the right thing" after avoiding savings due to e.g., high transaction costs and passivity - they should be associated with a greater tendency to contribute at above-minimum rates.

The main results of the paper are that in 2008 there was a large degree of heterogeneity both in compliance and in saving rates; both are positively correlated with the characteristics which determine whether pension savings are worthwhile for the employee. This behavior indicates that the mandatory pension arrangement is perceived as a burden for large groups of workers - those that the a-priori analysis identified as the

² The enforcement mechanism of the arrangement was not specified when it was introduced. The perception was that employees will have to sue in the labor courts when employers fail to comply, but little attention was given to the possibility of employee non-compliance. Later procedures accorded a greater supervisory role to the Labor Ministry.

³ By 2012, 84% of the employees that did not contribute in 2007 began contributing at an equal proportion to that of the employees that did contribute in 2007. The remaining proportion of non-contributors predominantly includes exempt employees.

potential losers from it. We also find that in 2012 - 5 years after the arrangement went into effect the relative wages of the affected employees were reduced by almost the full amount of the required employer contribution. Hence, the full contribution incidence was borne by the employees.

Section 2 presents arguments used to justify government intervention to require pension contributions and potential effects on employee behavior of the introduction of the mandatory arrangement in Israel. Section 3 describes the legal and institutional framework of retirement saving in Israel and Section 4 presents the methodology and database. Section 5 examines the characteristics of the workers who did not contribute to pension savings prior to the arrangement, the rates of compliance with the arrangement and the characteristics of workers and employers that did not comply. Section 6 analyzes the pension saving rates for those who began saving following the introduction of the arrangement and examines the connection between these rates and whether saving towards a pension is beneficial for these employees. Section 7 examines the effects of the arrangement on the medium-term labor market outcomes of the target population and Section 8 concludes.

2. Justifications for mandatory pension savings and their potential effects in Israel

The common way to accumulate sufficient saving towards retirement in developed economies is pension arrangements based on the workers' income and/or savings during their working years. These arrangements allow individuals to smooth lifetime consumption while insuring the post-retirement income against changes in life expectancy.⁴ The first layer of the pension system typically consists of a social insurance system that ensures a minimal income for the elderly, alongside the right to basic government-provided health and welfare services. Nonetheless, in many countries, including Israel, some of these rights are conditional on the individual not having sufficient income from independent sources, creating an incentive for low income earners to avoid saving in order not to lose their eligibility for benefits (Hubbard et al., 1995). At the same time, governments provide tax benefits on pension savings during the working years to encourage the accumulation of independent sources of income and mitigate market failures.

⁴ Insuring life expectancy and its pricing are among the main factors that determine the value of pension benefits and a source of possible failures in the pension market (Finkelstein and Poterba, 2002, 2004).

Choosing the desired level and path of savings from the point of view of utility and consumption smoothing, while accounting for the structure of retirement and tax benefits provided by the State, creates a complex set of considerations. A significant component in the funds available to retirees consists of the yields accumulated on their savings, which depend on how early savings begin; therefore there is an advantage in initiating pension deductions at a young age. On the other hand, pension savings are intended to "smooth income and consumption" over the individual's lifetime and if the worker's income rises over his lifetime then he should contribute less in his younger years and save more later, when income is higher. In addition, there are periods in which a worker has a greater need for current income, such as during the childrearing years or when a mortgage has to be repaid.⁵ Tax benefits for pension savings also constitute an important consideration in the timing of contributions. Thus, it is worthwhile to avoid pension-savings when the worker does not have any tax liability and to increase the saving rate when tax benefits can be exploited.⁶ All these factors are of course subordinate to the question of the optimal size of retirement savings beyond the pension promised by the State. Therefore, the answer to the questions of whether and how much to save towards a pension in each period depends on the parameters of the tax and social insurance systems in each country⁷ and on the worker's income trajectory, family status and other parameters.

In view of the complexity of the calculations, it has been claimed (Kotlikoff, 1987) that workers may not save enough for retirement due to shortsightedness regarding their needs during retirement, which is likely to reflect "erroneous" discount rates or a lack of information regarding future needs.⁸ A similar claim is that young workers are passive with respect to their pension savings and their behavior is characterized by inertia (see, for example, Beshears et al., 2006 and Choi et al., 2004), even if they are aware of the need to save for retirement. According to this claim, their

⁵ Without tax benefits, it is not usually worthwhile for the worker to save for a defined contribution pension and at the same time borrow to finance current consumption.

⁶ For example, assuming an average annual net yield of 3.5 percent on pension savings and a 35 percent tax credit (as in Israel), the deferral of saving by nine years⁶ with the accompanying loss in yield⁶ is equivalent to the tax benefit. Hence, it is reasonable for a worker who is below the tax threshold and expects to be above it in a few years, to delay saving.

⁷ Diamond (2009) points to the need to take into account the interactions between the tax and pension systems.

⁸ Hamermesh (1984) found that the consumption of white couples at the beginning of the retirement period is 14 percent higher than their income. Banks et al. (1998) reported a drop in consumption following retirement in contrast to what is expected according to the consumption-smoothing approach. They attribute this drop to insufficient saving.

passivity is a result of both behavioral considerations⁹ and the fact that pension saving schemes are complex products whose transaction costs for entering and exiting over one's working life are high (Lusardi, 2000). Consequently, workers discover only at a relatively late stage in their lives that they have not saved enough for retirement; at this late stage it is difficult to correct the error since accumulating sufficient savings starting from that stage in life implies a significant reduction in their current standard of living. Based on these claims, a government intervention requiring saving for retirement will improve welfare. This claim is supported by the findings that pension savings are particularly low when the head of a household has a low level of schooling (Bernheim and Scholz, 1993) and that the drop in consumption after retirement is particularly large among households that did not save for this period (Bernheim et al., 2001). Another claim is that workers intentionally save less for their pensions in order to exploit government benefits on retirement and therefore government intervention is justified in order to prevent abuse of this type.¹⁰

In contrast to these arguments, mandatory savings may also lead to "too much" savings by various types of employees and to sub-optimal lifetime distribution of disposable income (e.g. with respect to balancing pension savings with child upbringing costs or mortgage payments), especially if individuals are rational and possess the required information (Martin and Whitehouse, 2008). One of the indications for rationality and pro-activity is whether employees respond to changes in incentives in the expected directions. Additionally, if mandated savings are intended to prevent employees from exploiting the income support system upon retirement, this decision should be based on an examination of the combined effects of the pension tax benefits and the social security system on the lifetime income distribution among individuals. Although the desired level of intervention in income distribution is primarily a matter of social and political preferences, it is important to examine whether the utilization of the income support system by low-income employees results in them receiving overall larger retirement benefits than other workers.

Brender (2010) examined the incentives for pension saving in Israel based on the characteristics of workers and their families. He found that between one-quarter and

⁹ For example, Lusardi (2000) found that retirement was perceived as an unpleasant future event and therefore workers prefer to ignore it.

¹⁰ The findings in the US regarding the effect of income-dependent savings programs on the savings of target populations are mixed. Gruber and Yelowitz (1999) found that health insurance has a significant negative effect on saving while Hurst and Ziliak (2006) found only a small effect for the food stamp and AFDC programs.

one-third of Israeli employees are characterized by a low starting wage, a wage profile that does not converge to the average wage during their working years, as well as by having a spouse that does not work for most of his/her lifetime. For *these* workers pension savings result in a financial loss, since the amount of the pension is offset with the income supplement for which they are eligible. It was also found that saving for retirement will hamper their ability to smooth income over their lifetime, primarily because the old age social security pensions are similar in size to their net wage prior to retirement, while during much of the period in which they save their family income per standard individual is much lower than it would be after retirement. The differences between workers who saved for retirement and those who did not were consistent with the incentives identified in simulations (as in the findings of Scholz et al., 2006 for the US) and it was found that workers reacted as expected to changes in the pension system during the last decade, given the structure of incentives. These findings cast doubt on the need for mandatory pension savings (beyond the mandatory payments to the NII) and raise the concern that such an obligation will hurt low-earning workers which constitute more than 70 percent of the non-saving employees ó the target group for the arrangement.¹¹ This is especially the case if these employees would eventually have to pay the full cost of the increased contributions since their wages will be reduced by the cost to the employers. Nonetheless, as mentioned, these analyses were prospective and need to be tested in order to determine whether the behavior of workers following the introduction of the arrangement was consistent with these evaluations.

3. The legal and institutional background in Israel and its implications for private pension saving incentives

Starting from the mid-90s, the pension system in Israel went through a series of major reforms.¹² The terms offered by veteran pension funds were downgraded for existing savers and they were closed to new members (this was a precondition for the provision of government grants to cover the funds actuarial deficits). The terms of new pension

¹¹ The benefits that low-earning workers receive through the National Insurance system when they do not save for retirement are similar in size to those received by higher-earning workers saving for retirement, through the tax system. This conclusion is reached even though the positive correlation between the level of income during the working years and life expectancy (Cutler et al., 2006), which increases the value of pensions to high-earning workers in comparison to lower-earning ones, is ignored. Accordingly, mandatory pension savings, that reduce the government lifetime benefits for low-income employees, would result in these employees receiving lower benefits than other groups.

¹² Achdut and Spivak (2010) present a detailed survey of the structure of the pension system in Israel and the reforms it has undergone.

funds were gradually downgraded, so that the pensions they offer are derived directly from the savings accumulated in the fund and the yield on them ("defined contribution"). In addition, public sector employees are directed now to the new pension funds. As a result of these changes, pension savings no longer provide an excess return to workers who are not members of the veteran funds or who are not eligible for a budget-funded pension, relative to an individual who does not save towards a pension.¹³

Even though the financial institutions no longer offer high subsidized yields, the tax benefits provided for pension savings essentially produce such yields. The benefits include three components: (a) Deposits by employers into a pension fund or credit to a budget-funded pension, up to an amount of 7.5 percent of the insured wage, are exempt from taxation for the worker and are exempt from NII contributions. This exemption applies to wages of up to four times the average wage (a wage level exceeded by less than 5% of all employees). (b) Employee contributions from the part of their wage for which the employer also contributed provide the worker with a tax credit of 35 percent. This credit is paid for deposits of up to 7 percent of the insured wage, up to the level of the average wage.¹⁴ (c) Upon retirement, the pension is taxed as regular wage income and an additional exemption was applicable in the amount of 35 percent of the pension payment, up to a level (of the exemption, not of the pension payment) of about 30 percent of the average wage.¹⁵ Pensioners are also eligible for an additional credit point (NIS 215 per month) if their spouse is not working and has no pension. However, the benefits at the time of the contribution are relevant only for workers whose wage exceeds the tax threshold (about 45 percent of employees earn less than the tax threshold).¹⁶ The benefits when drawing a pension are relevant to only about one-fifth of the workers, whose wage was particularly high during their working years. As noted above, a significant portion of low-earning workers experience limited upward wage mobility (relative to the national average wage) throughout their working life.¹⁷ In the

¹³ Pension funds are still eligible to receive designated government bonds that pay an annual real return of 4.8 percent in order to cover 30 percent of their assets; however, taking into consideration administrative costs, the yields to a fund member do not exceed on average the long-term risk-adjusted yields in the capital market. The provident funds, where much of retirement savings are managed, are not eligible to receive designated bonds.

¹⁴ Similar regulations existed for workers whose employers do not contribute to pension savings.

¹⁵ New legislation from 2011 gradually increases this exemption up to 67 percent of the pension payment by 2025, including an initial increase to 43.5 percent beginning in 2012.

¹⁶ In addition, there is a 25 percent tax exemption on interest and capital gains for pension savings in the case of indexed assets (on the real yields) and 15 percent on non-indexed assets (on the nominal yield). The value of this exemption is much smaller than the value of the tax benefits for pension contributions.

¹⁷ The gross minimum wage for a full-time employee is fixed at 47.5 percent of the average wage.

wage and tax dataset used in the current study (see the description below) about two-thirds of the workers that earned below the tax threshold in 2000 and were working in 2010 did not reach the tax threshold in 2010 either. When account is taken of those who did not work at all in 2010, about three-fourths of the workers who did not pay taxes in 2000 were not able to utilize the tax benefits in 2010 either.

Individuals who do not gain from a subsidy on savings or tax benefits may still wish to save for a pension in order to smooth their lifetime income. One common measure of this is the ratio of retirement income to the individual's wage during his late working years (the replacement rate). Since every citizen is eligible for an old age pension from the NII, additional pension savings by low-earning workers is needed only if the size of the state old age pensions does not allow them to maintain a level of income in retirement that is similar to what they earned during their working years. The state old age pension consists of three components¹⁸:

- a. The basic grant: a fixed monthly sum of about 17.5 percent of the average wage in the economy for a single individual and 26.3 percent for a couple.
- b. An addition of 2 percent for every year in which a worker contributed to NII, beyond the first ten years, up to 50 percent of the basic grant. Two working spouses are eligible for an old age pension on the basis of the sum of their rights as individuals, which is larger than their eligibility as a couple.
- c. The income supplement program, which is means-tested, provides a minimum income equal to 32 percent of the average wage for individuals and 48 percent for couples. Eligibility is not affected by pensions that total up to 13 percent of the average wage for individuals and 20.5 percent for couples.¹⁹ For recipients of higher pensions the state old age pension is offset against the pension at a rate of 60 percent, until it is reduced to the level of the basic grant, including the addition for years of contribution.²⁰ The amount of the basic grant and the addition for years of contribution in the case of couples where both spouses worked for most of their adult life regardless of their wage level and whether they worked part-time or fulltime exceeds the income ceiling for the income supplement payment and therefore they are not subject to the offset of their occupational pension against the

¹⁸ For comparison: the minimum wage is 47.5 percent of the average wage.

¹⁹ Individuals over the age of 80 receive an addition both to their basic old age pension and to the income supplement.

²⁰ Hubbard et al. (1995) showed that offsetting the social benefits of workers against the wealth they have accumulated can have a significant negative effect on the accumulation of wealth.

old age pension. The NII old age pension is also not considered as income in the calculation of tax liability and therefore does not affect the marginal tax rate imposed on the pension payment.

The full old age pension exceeds the wage of low-earning workers in the economy (which, as noted above, remains flat over time for a large number of employees). For example, the size of the old age pension for a couple, including the income supplement, is higher than the minimum wage.²¹ Therefore, an individual who is the sole income earner and earns a low wage more or less maintains his standard of living upon retirement and has no significant advantage in saving towards a pension. Furthermore, accounting for the fact that during some of his working years he also had to support his children (90 percent of Israeli employees have children during their working years), it is likely that the standardized household income during those years was significantly lower than on retirement. In addition, workers whose wages are below the tax threshold and who save for their pension over a significant period may be *öfined*, as mentioned above, by having their income supplement reduced. On the other hand, for high-earning workers, particularly those who are above the tax threshold, pension savings are desirable since otherwise their income during retirement will be significantly less than during their working years and also because they will thus enjoy the tax benefits. For two working spouses saving is worthwhile, even if both earn less than the tax threshold, in order to avoid a drop in their income after retirement. In this case, their state old age pension will also not be offset against their pension since the offset is not carried out against the basic grant or the addition for years of contribution.

The characteristics of employment and the range of wages in Israel, together with the tax incentives and the structure of the NII pensions, create a spectrum of pension saving behaviors that vary according to the characteristics of each individual and household (Table 2). The analysis shows that low-earning employees will tend to avoid saving for retirement, both due the inertia of their wage and - if their wage is temporarily low - because they will prefer to defer their contributions to years in which it will exceed the tax threshold and they will have higher disposable income. On the other hand, workers at an intermediate wage level or above will prefer to save for retirement. Married workers, in particular those whose spouses also work, are expected to save more than singles and those whose spouse does not work. Parents of young

²¹ About 80 percent of workers are married when they reach the age of retirement.

children are expected to save less than those without children. In addition, there may be differences in the rate of pension contributions also among those who save for their pensions. In particular, workers at intermediate/low wage levels are likely to prefer saving at lower rates than those required by the mandatory pension arrangement since the retirement savings at those rates together with the NII pensions will provide them with a reasonable replacement rate on retirement. The characteristics that influence the preference to save for a pension are discussed further in Sections 5 and 6 below.

Table 2: Personal Characteristics Affecting the Decision to Begin to Contribute

Characteristic	Cause for behavioral effect	Effect
Low wage	Sufficient replacement rate through old-age allowances No tax benefits on withdrawal	(-) (-)
Wage below the tax threshold	No tax benefits at the time of contribution	(-)
Married woman	Insufficient replacement rate through old-age allowances as spouse is likely to work, even if he does not work currently.	(+)
Working spouse	Insufficient replacement rate through old-age allowances. No offset of allowances against pension.	(+)
Spouse contributing to pension	Additional contribution is unlikely to be offset against the old-age income supplement	(+)
Female	Even if currently unmarried, expected to have a working spouse later in her career.	(+)
Children	Consumption smoothing liquidity.	(-)
Older age	Insufficient accumulation to overcome the pension offset against the old-age income supplement	(-)
Arab	Unlikely to have a working spouse, especially if currently single or has a non-working spouse	(-)

4. Methodology and the database

According to the mandatory pension arrangement, which went into effect at the beginning of 2008, employees who worked for the same employer at least nine months should have begun to contribute from their wage towards a pension. This means that individuals who worked in 2007 and did not switch employer in 2008 were required to contribute. This also applies to individuals who worked for the same employer for a period of nine months or more in 2008, even if this is not the same employer they worked for in 2007. The required contribution rate was still quite low in 2008: 0.83 percent from the worker and another 1.67 percent directly from the employer.

The fact that the arrangement was applied uniformly to all workers who did not save towards a pension in 2007 makes it possible to test whether the response of workers to the introduction of the arrangement was consistent with the of incentives created by the institutional structure of retirement savings, NII pensions and tax benefits. In particular, since the arrangement is likely to adversely affect low-earning workers, we want to examine whether these workers behaved accordingly or whether the arrangement motivated them to begin saving towards retirement, as would be expected if their lack of pension saving was due to passivity and shortsightedness.

The behavior of workers is examined in two stages: The first attempts to determine whether as a result of the introduction of the arrangement workers who had not saved toward their pension in 2007 began to do so in 2008 and whether the differences between workers in the tendency to begin saving were consistent with the nature of the incentives, as related to their characteristics. The examination is based on probit regressions in which the binary dependent variable is whether workers who did not contribute to their pension in 2007 and continued to work in 2008 started to contribute in 2008 (Logit estimation yielded very similar results). Since the mandatory pension contribution also applied to the employer, the decision whether to contribute is also dependent on the employer's willingness to cooperate with the workers in non-compliance, a decision that will likely vary according to the employer's characteristics. Accordingly, the analysis also controls for these characteristics.²²

The second question is whether workers that started to contribute in 2008 did so at the minimal rates specified in the arrangement or at the higher rates to which the arrangement will converge in coming years. Since the arrangement made pension contributions mandatory, it is likely that many workers who were not interested in this level of saving, but who nevertheless decided to comply with the arrangement, contributed according to the minimal rates in order to minimize the damage, particularly at lower income levels.²³ On the other hand, the theories that attribute the lack of pension saving to passivity and high transaction costs, predict that those who start saving will do so at rates that are compatible with the long term needs. This is particularly the case since the fees charged by the pension funds are negatively

²² In line with the relatively low contribution rate in 2008, we do not observe in the data a significant change in the proportion of workers who switched employers between 2007 and 2008. As noted above, in later years, when enforcement became clearer, the vast majority of employees and employers began to contribute.

²³ This is because for these workers saving is not desirable even if their pension payments increase to a level above the point where they fully offset the National Insurance income supplement.

correlated with the size of the savings. As in the examination of the decision to begin saving, the study looks at whether initial low saving rates are correlated with the characteristics that lead to pension saving being less desirable.

The link between the pension saving rate and workers' characteristics, which determine whether pension saving is worthwhile for them, were tested using a probit regression in which the dependent binary variable is "whether the worker that began to contribute contributed not more than 0.83 percent of his wage". This test directly determines who among the workers that began saving following the introduction of the arrangement did so at the minimal rates specified by the law and highlights the correlation between the tendency to contribute at such low rates and the characteristics that make saving less desirable.²⁴

The statistical and econometric analyses are based on a random sample of 10 percent of the employees in Israel, i.e. about 300,000 individuals. The database includes employers' reports to the Tax Authority regarding the salaries of their workers, the various deductions made, credit points, the number of months worked, etc. The file is in the form of a panel for the years 2000-2012 and includes the worker's employer (for years in which the worker had several employers the data on each employer appears separately and they have been consolidated), such that it is possible to know whether the worker switched employer during the year or between years.²⁵ Using data from the Tax Authority and the Population Registry, the spouses of all the married workers were identified and their full tax returns were also obtained in order to determine whether they were working, the level of their income and whether they contributed to their pension. In addition, the Population Registry was used to identify the ages of a worker's children and his place of residence, a variable that makes it possible to identify the vast majority of Arab workers.

5. Compliance with the requirement to contribute toward pension savings

In 2007, about 950 thousand employees (about 38 percent of the total) did not contribute to pension savings from their wages.²⁶ There are major differences in the characteristics of employees who contributed and those who did not and they are

²⁴ Similar OLS equations, in which the dependent variable was the contribution rate, yielded qualitatively similar results.

²⁵ The identification of the employers is accomplished through the deduction file number. There is a small percentage of cases in which the deduction file number changed from one year to the next, without an actual change in employer, and they are counted as a change in employer.

²⁶ Men aged 22-67 and women aged 21-62 who worked for at least four months.

consistent with what is predicted by the analysis of pension saving incentives (Table 2).²⁷ Eighty five percent of those who did not save for pension earned less than the median wage (Table 3) and about 70 percent did not reach the tax threshold. In contrast, only about 2 percent belonged to the top quintile. The table shows that employment without a pension arrangement was to a large extent a phenomenon of the private sector, particularly among small employers. A more in-depth examination of the data shows that among workers below the tax threshold, the wages of the minority who contributed to pension savings were also much higher than those of workers who did not.²⁸

Table 3:
Characteristics of workers who did not contribute to pension savings in 2007

	Contributed to pension savings	Did not contribute to pensions savings
	(percent of the group in the column) ¹	
Income below the median	28.8	85.2
Belongs to the top Quintile	31.0	1.8
Private sector	65.8	92.2
Married	72.1	49.2
Spouse contributes to a pension arrangement	41.7	17.1
Under the age of 30	17.8	41.2
Not liable for tax	28.4	70.8
Employer with less than 100 employees	29.2	67.5
Lives in an Arab town or village	6.6	13.6

¹ Relates to men aged 22-67 and women aged 21-62 who have worked for at least 4 months.

Among workers that did not contribute in 2007, about 815 thousand also worked in 2008; they constituted the main target population of the arrangement.²⁹ Of them, 51 percent began to contribute, which is much higher than in previous years. For example, only 18 percent of the 930 thousand workers that had not contributed in 2006 started to contribute in 2007. In addition, the percentage of workers with the same employer who stopped contributing declined, though by a small magnitude: from 4 percent in 2007 to 3 percent in 2008. The increase in the proportion that began contributing is evidence of the major effect that the mandatory pension arrangement had on saving patterns. Still, a large percentage of workers did not comply. Of the workers that did not begin contributing, only one-third switched employer in 2008 and worked less than nine

²⁷ Throughout the article, workers are defined as having contributed to pension savings whether they contributed directly or alongside their employer.

²⁸ The database does not contain information on hours worked.

²⁹ Since in 2008 the arrangement applied only to workers who had been employed for at least nine months with the same employer, those who started to work after March 2008 were still exempt, even if they were employed for the whole period by the same employer.

months with the new employer, which would potentially provide a legal reason for them not starting to contribute.³⁰

There is a clear relationship between a worker's income level and the tendency to comply with the arrangement. The compliance rate among workers in the lowest quintile who did not contribute in 2007 was 38 percent, while in the fourth quintile it reached 68 percent.³¹ The low rate of compliance among small employers and their workers is evident in Figure 1, as is the monotonic increase in the rate of compliance according to size of employer. This compliance may be the result of intermediate and large-sized employers having maintained active pension arrangements for some of their workers prior to the mandatory pension arrangement going into effect and therefore they were not required for any major organizational effort to bring in additional workers.³² Compliance is likely to also reflect their ability and that of their workers' union, to attain better pension arrangements, as well as their potentially higher risk in not complying.³³ Accordingly, the empirical analysis of the tendency to begin to contribute needs to control for employer size. This is true in particular since employer size is also correlated with the wage level and other characteristics that determine whether saving is worthwhile for the worker.

Table 4 presents the differences in the proportions of workers that started to save according to several additional characteristics. The data emphasize the difference between the public and private sectors, between the Jewish and Arab populations and between men and women. The direction of the differences between the groups for all these characteristics is similar to that of the differences in the proportion of savers among all workers prior to the arrangement. Nonetheless, since there is a high correlation between the various characteristics, it is necessary to analyze the differences using equations that identify the separate effects of each characteristic on the probability of a worker starting to contribute to pension savings.

³⁰ Since this relates to continuously employed workers, the requirement to contribute also applied to some of those individuals who worked less than nine months or that switched employer between the years.

³¹ As shown in Table 3, only a negligible number of workers in the top quintile did not contribute in 2007. Apparently some of them had alternative pension arrangements as self-employed.

³² In 2007 about 30 percent of all mid-sized and large employers employed both a significant proportion of employees that contributed to pension (20-80 percent) and a significant proportion that did not. The dataset does not allow identifying this proportion for small employers.

³³ The legislation did not differentiate between employers, but it was reasonable to assume at the time that enforcement would begin with the larger employers due to their higher visibility,

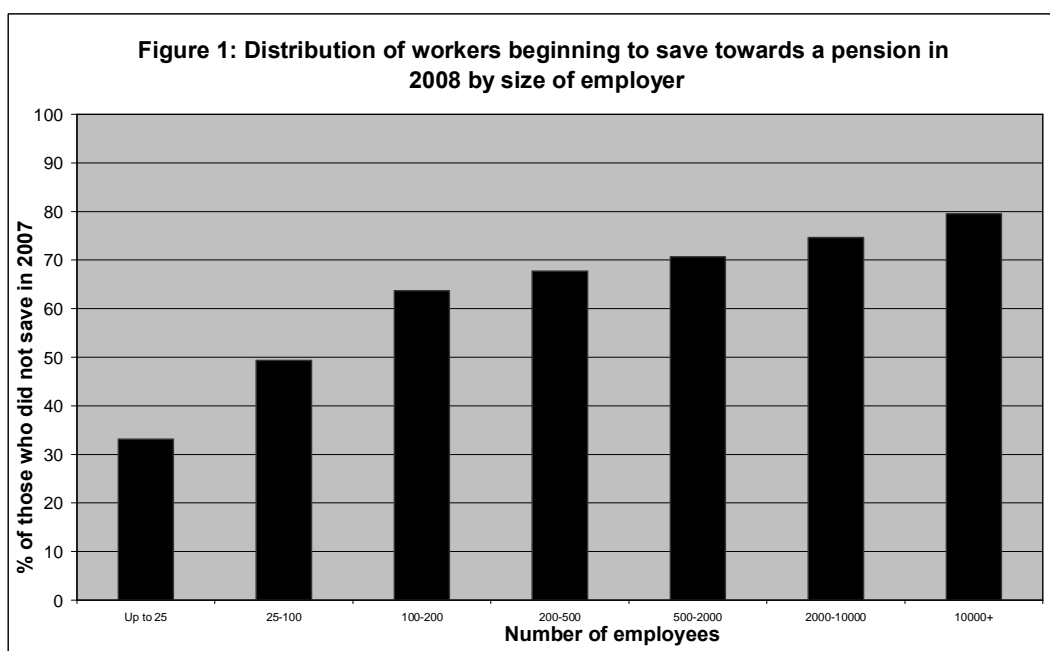


Table 4: Workers who started to contribute in 2008 according to various characteristics

(as percents of the workers in the category that did not contribute to pension savings in 2007)

Men	44.0
Women	59.5
Public sector	74.5
Private sector	49.3
Resides in an Arab town	33.8
Resides in a Jewish town	54.0
Immigrated after 1989	60.8
Native Israeli	48.6
Spouse contributes to pension savings*	62.3
Spouse does not contribute to pension savings*	54.3

* Of those who have a working spouse.

Table 5 presents the results of a probit equation which examines the probability of a worker who had not contributed in 2007 (and continued to work in 2008) starting to do so in 2008. The equation was estimated for 78,618 employees included in the sample that had worked in both years, were below the retirement age and had worked for at least 4 months with non-negligible earnings. The dependent variable in these equations is a binary variable that takes the value 1 if the worker started to contribute in 2008. The reported coefficients are the marginal effect of each variable.

Table 5: Factors correlated with the decision to start contributing to pension savings: 2007/8 compared to 2006/7¹

	Marginal effect between 2007 and 2008	z		Marginal effect between 2006 and 2007	z	
Individual characteristics:						
Gender (0 ó men, 1 ó women)	0.1159	18.40	*	0.0120	2.99	*
Resides in an Arab town (binary variable)	-0.1333	-21.44	*	-0.0487	-11.71	*
Age	0.0128	8.08	*	0.0031	2.95	*
Age squared	-0.0002	-9.58	*	-0.0001	-5.12	*
Married man (binary variable)	-0.0097	-1.25		-0.0078	-1.56	
Married woman (binary variable)	0.0719	8.90	*	0.0242	4.47	*
Divorced/widowed man (binary variable)	-0.0113	-0.89		0.0118	1.39	
Divorced/widowed woman (binary variable)	0.0555	5.21	*	0.0049	0.70	
Number of children aged 0-3	-0.0162	-4.02	*	-0.0091	-3.36	*
Number of children aged 4-8	-0.0211	-6.04	*	-0.0135	-5.72	*
Number of children aged 9-18	-0.0195	-7.79	*	-0.0093	-5.34	*
Number of children aged 19-25	-0.0096	-2.60	**	-0.0036	-1.40	
Immigrated to Israel after 1989 (binary variable)	0.1579	7.80	*	-0.0104	-0.81	
Immigrated to Israel after 1989*potential working years	-0.0033	-6.30	*	0.0001	0.23	
Income and employment characteristics:						
Annual income (in 10,000s of NIS)	0.0046	6.10	*	0.0188	34.83	*
Annual income squared (in 10,000s of NIS)	-0.0001	-11.63	*	-0.0002	-30.20	*
Annual income >48,000 (binary variable)	0.1254	21.59	*	0.0777	19.63	*
Exceeds the tax threshold (binary variable)	0.0223	4.23	*	0.0070	2.03	**
Number of jobs during the year	-0.0346	-17.29	*	0.0080	6.55	*
Number of months worked during the year	0.0485	36.48	*	0.0071	6.94	*
Spouse characteristics:						
Age of spouse	-0.0025	-11.00	*	-0.0018	-13.16	*
Does spouse work? (binary variable)	0.1032	13.56	*	0.0851	19.20	*
Does spouse contribute to pension savings? (binary variable)	0.0996	13.80	*	0.0409	8.73	*
Annual income of spouse (in 10,000 of NIS)	-0.0027	-7.10	*	0.0001	0.43	
Employer characteristics:						
Size of employer (number of employees)	0.0001	13.44	*	0.0000	19.50	*
Up to 15 workers (binary variable)	-0.3692	-73.44	*	-0.1325	-43.10	*
15-30 workers (binary variable)	-0.2903	-47.93	*	-0.1043	-30.26	*
30-50 workers (binary variable)	-0.2039	-36.60	*	-0.0799	-25.15	*
Switched employer between the two years (binary variable)	-0.2419	-16.60	*	-0.0172	-1.83	***
Switched employer*worked less than 9 months (binary variable)	-0.0426	-3.91	*	0.0272	3.49	**
Switched employer*age	0.0008	2.06	*	0.0006	2.29	**
Employed in the public sector (binary var.)	0.1234	15.04	*	0.0590	12.08	*
Switched employer*annual wage (in 10,000s NIS)	0.0175	18.16	*	0.0009	14.00	*
Constant (the equation coefficient)	-1.1825	-13.90	*	-1.6112	-15.27	*
Number of observations	78,618			78,801		
Pseudo R squared	0.2022			0.1730		

¹ A panel of workers who worked at least 4 months in 2008. Men aged 22-66 and women aged 22-61 in 2008, with annual income of at least NIS 3,000 who did not contribute to pension savings in 2007. The probability of workers who did work and did not contribute in 2006 and worked in 2007 was estimated in a similar way.

(*) significant at the 1% level; (**) significant at the 5% level; and (***) significant at the 10% level.

The characteristics associated with a legal exemption from the pension saving requirement had a negative (as expected) and large effect on the probability of starting

to save.³⁴ The chance that a worker who switched employer between the years would start contributing is lower by 24 percentage points than that of a parallel worker that did not switch employer. The probability declined by another four percentage points if such a worker also worked less than nine months in 2008. In addition, there is a strong positive correlation between the decision to begin contributing in 2008 and the number of months worked during the year and a negative correlation with the worker's number of employers in 2008. The negative effect of switching employer on the probability of starting to save declines with the worker's age and increases with salary. Nonetheless, very few workers who did not save for their pension in 2007 had a sufficiently high wage in order to switch the sign of the overall effect of "switching employer" to positive.³⁵

The demographic characteristics of workers who began contributing in 2008 differ significantly from those of workers who continued not to contribute and are consistent with the incentives highlighted in Table 2. The probability of women to begin contributing to their pension is higher by 12 percentage points than that of men, which is consistent with the structure of incentives. In addition, women tend to prefer working for employers that comply with the labor laws, since these laws, such as those related to maternity benefits, may be more important for women. These employers are likely to also comply with the rules for pension contributions.³⁶ As expected, the difference between the genders is even more pronounced when we look at the effect of an individual being married on whether he/she starts contributing. Among married women this effect is seven percentage points higher than for single women and among divorced and widowed women the difference is six percentage points. In contrast, the marital status of men has no effect on compliance, if the wife does not work. The number of children in a family has a negative influence on the tendency to start contributing without any significant difference between fathers and mothers.

³⁴ In the relevant population, i.e. workers that did not contribute to pension savings, switching employer was a common occurrence; more than one-third of these workers switched employer between 2007 and 2008 (which is nearly identical to the percentage who switched between 2006 and 2007). Nonetheless, we also estimated equations without employer characteristics; the coefficients of the other variables were not significantly affected by this omission.

³⁵ The effect is equal to the sum of the coefficient of the variable "switching employer" and the product of the coefficient of the interaction of "switching employer multiplied by annual wage" and the worker's annual wage.

³⁶ This is in addition to the effects of the employer's number of workers and being in the private or public sectors, which are observable and controlled for in the equation.

The age of a worker has a relatively large though not monotonic effect. Up to age 35, the age effect is positive, but it changes sign at higher ages. For example, the probability that a 55-year old worker who did not save for his pension in 2007 will start doing so in 2008 was seven percentage points lower than the corresponding probability for a 35-year old. This difference reflects the decline in the likelihood of accumulating significant pension savings with the age at which the worker starts to save. In addition, it is likely that older workers who have not yet saved for their pension have a low expectation that their future wage will increase significantly (which would make pension saving potentially worthwhile) in comparison to young workers. Among the Arab population, the probability of starting to contribute to pension savings was 13 percentage points lower than among the Jewish population, reflecting the lower probabilities for both a future rise in salary (see Table 7 below) and for having a working spouse.

The employee's income level had a significant influence on the probability of starting to save in 2008. The effect of income on its own is positive and statistically significant at all the relevant levels, although its magnitude is not large. For example, the probability of a worker whose monthly income is NIS 7,000 to begin contributing is higher by 0.75 percentage point than for a worker whose monthly income is NIS 5,000. In contrast, there is a large effect of the wage being above the tax threshold: it raises the probability of complying with the arrangement by 15 percentage points (the sum of the coefficients of $\ln(\text{income above NIS } 48,000)$ and $\ln(\text{above the tax threshold})$). This result reflects the major importance of tax benefits in determining whether saving for a pension is beneficial and their corresponding effect on the behavior of workers. The fact that workers below the tax threshold tended not to save towards a pension also demonstrates the willingness of many employers to cooperate with the worker for their mutual benefit.³⁷

The spouse's employment status has a large effect on determining whether contributing to pension savings is desirable. Working spouses, particularly those continuously employed, will be eligible for the full tenure supplement to the NII old age pensions and therefore their private pension will not be offset from their state old-age pension. In addition, the NII pensions do not fully substitute the income of a household

³⁷ Even when workers are not liable for income tax, reporting pension contributions - if they are paid - is beneficial for them and their employers; otherwise, the employer's contributions will be liable for NII contributions. An employer that does not report pension contributions to the tax authority will not be able to deduct them as an expense and therefore it is preferable for him to fully report them.

in which both spouses work so such a couple needs to save towards their pension in order to achieve a reasonable replacement rate. The data confirm these considerations: the tendency of a worker with a working spouse to start contributing was 10 percentage points larger than if his spouse did not work and it increased with the spouse's income. In addition, the tendency of a worker to start contributing was 10 percentage points larger when the spouse was also contributing to pension savings.

Since the obligation to contribute applies both to the worker and the employer, the worker can avoid doing so only with the employer's cooperation. The employer has a clear interest in avoiding the costs of the arrangement; thereby also satisfying the worker's preference not to contribute (regardless of the division of the arrangement's overall cost between employer and employee). However, the employer is exposed to legal risks for not complying with the arrangement and therefore it is unclear that he will agree to cooperate with the employee or that he himself would initiate non-compliance. The analysis shows a clear difference between employers. Thus, in the public sector where in any case there are only a few workers without a pension arrangement the probability of workers without a pension arrangement to start saving is 12 percentage points higher than the corresponding probability in the private sector.³⁸ In addition, there are significant (and non-linear) differences between employers according to size. The tendency not to start contributing is particularly large among workers employed by small employers. There is a gap of 37 percentage points between employers of up to 15 workers and employers of 100 workers.³⁹ In contrast, the difference between employers of 100 workers and employers of 200 workers is only 0.6 percentage points. In other words, non-compliance with the arrangement was particularly common among small employers and their workers.

The right side of Table 3 presents the results of a parallel equation for the characteristics of workers who did not save towards a pension in 2006 and started to do so in 2007, before the arrangement went into effect. The results indicate that most of the personal characteristics that determine whether saving is desirable also had a significant effect on the decision to save in 2007. However, the marginal effect of most of the relevant characteristics increased substantially in 2008, indicating greater selectivity. It

³⁸ This difference is not necessarily related to the mandatory pension arrangement but also to the accepted rules in the public sector according to which workers that have reached a particular tenure threshold in the public sector start to contribute to pension savings.

³⁹ The sum of the coefficient of "up to 15 workers" and the product of the coefficient of "size of employer" and the difference in number of workers.

appears that while in the past there was variation in the behavior of workers for whom saving towards a pension was only marginally beneficial, the arrangement induced these individuals to begin saving. In contrast, individuals for whom saving towards a pension was clearly not desirable tended not to save in 2008.

The largest differences in the behavior of workers and employers between 2007 and 2008 are reflected in the variables that may capture differences in the tendency to comply ó gender and employer size. While in 2007, the probability of women to start saving was higher than that of men by one percentage point, the difference in 2008 was 12 percentage points. There was also a large change in the effect of working for a small employer. The magnitude of the negative effect of this characteristic grew threefold in every category up to 50 employees. The difference is also large in the variables that are related to the legal requirements of the arrangement. Thus, number of jobs had a positive effect in 2007, which became negative in 2008; the positive effect of number of months worked grew sevenfold; and the effect of switching employer, which was not statistically significant in 2007, became particularly important in 2008. All these differences in the size of the coefficients are statistically significant.

Beyond the effects of the variables that may be associated with compliance and with the legal exemptions of the arrangement, the coefficients of the variables that are associated with contributions desirability have also increased by an order of magnitude. The effect of a woman being married grew from 2 to 7 percentage points (in addition to the general gender gap). The difference between Jews and Arabs grew from 5 to 13 percentage points and the effects of age, income, spousal income and spousal pension contribution all grew significantly.⁴⁰

Another way of examining the changes in the effect of the various characteristics on the decision of workers to begin contributing is by constructing a variable to capture the probability of starting to save in 2008 on the basis of the coefficients calculated for 2007. This variable was constructed using the coefficients of the probit equation that appears on the *right side* of Table 3 in order to predict the probability of starting to save in 2008 for each of the workers in the target group. This variable was added to the equation appearing on the *left side* of Table 3 and it was found that despite its large and

⁴⁰ The t statistic for the difference between the coefficients of these variables in the 2007-8 and 2006-7 equations (Clogg et al., 1995) were 11.3 for the Arabs variable and 5.1, 15.3, 6.3 and 6.8 for the other variables, respectively.

statistically significant effect, (a marginal effect of 45 percentage points) all the other variables remained significant.

The large differences between groups of workers in compliance with the mandatory pension arrangement and their correlation with workers' characteristics that are related to whether saving for a pension is beneficial indicate that mandatory pensions are not desirable for a large number of workers. The behavior of these workers indicates that when the requirement to save was later enforced, their welfare was reduced. In addition, it is likely that many other workers began contributing in order to comply with the arrangement or because their employers refused to cooperate in non-compliance. However, it may be argued that the decisions to comply only reflected a tendency for law obedience which is correlated with the characteristics that make pension savings desirable - rather than the desirability of savings. To examine this possibility we analyze in the next section the contribution rates of those who began saving.

6. Pension contribution rates

If many of the workers who began saving for pension in 2008 did so only to comply with the arrangement, even though such savings were not beneficial for them, it can be expected that these workers will contribute at the minimum required rate. On the other hand, if the arrangement led workers to correct past calculation errors, and since someone who is contributing to pension already bears the fixed search and transaction costs of the pension arrangement, it can be expected that those who began saving will do so at rates that are consistent with long-term pension planning. Moreover, if the dominant party in determining the contribution rate is the employer, the rate should not be correlated with individual characteristics such as spousal income and contribution rates, and the number of children. To study this issue, we examine the pension saving rates among workers who did not contribute in 2007 and started to do so in 2008. Specifically we examine whether the characteristics that were found to make pension savings undesirable (e.g., those mentioned in Brender, 2010, or in Table 2) and with a low tendency to begin saving in 2008 are associated with contribution at the mandated rate or above. The former would indicate a dominant role of obedience in the contribution decisions and the latter pension desirability.

The average saving rate among workers who began contributing in 2008 was 1.5 percent of wages, in comparison to 2.6 percent among those who began contributing in

2007 and 4.3 percent among those who contributed in both 2007 and 2008. The employer's contribution gap for new savers was even larger: 2.8 percent on average for those who began contributing in 2008 as opposed to 7.2 percent for those who began in 2007. Moreover, there was low variation among those who started saving in 2007 between workers with different income levels and different characteristics. In contrast, the pension saving rates among workers who began to contribute in 2008 showed a large variation, which is correlated with the characteristics that determine whether saving for a pension is beneficial.

The findings with respect to the contribution rates are consistent with the idea that workers that started to contribute in 2008 can be divided into two groups: 1) those who would have started to save in any case, whether or not the mandatory pension arrangement had been introduced, and did so at rates similar to the average for the entire population (according to the data for previous years, they make up about one-sixth of the target group); and 2) workers who started to save only due to the arrangement and therefore tended to do so at low rates. This group includes about one-third of the target group. The weighted average of the saving rate that can be expected in the case of an individual who starts saving voluntarily (2.6 percent)⁴¹ and the minimum saving rate required by the arrangement (0.83 percent) is close to 1.5 percent.

Table 6 presents an analysis of the characteristics that are associated with an individual beginning to contribute at the rate mandated by the arrangement. Among workers that did not contribute in 2007 and started to do so in 2008, about 60 percent saved at a rate of up to 0.83 percent of their income - the minimum required by the arrangement.⁴² Among workers that started saving in 2008 and who are below the tax threshold, 65 percent saved up to 0.83 percent in contrast to 18 percent of the corresponding group of savers in 2007. In other words, a large proportion of those starting to save towards their pension, and in particular among the lowest-earning groups, did so at the minimum required rates. Furthermore, the proportion of those who saved at minimum rates among all those who started to save in 2008 is very similar to the estimated "addition" of savers due to the arrangement (which, as discussed above, is about two-thirds of those who started to save in 2008).

⁴¹ The average contribution rate for those who started to save in 2007.

⁴² Since parts of the wage are regarded as non-pensionable, the actual contribution rates may be somewhat lower than 0.83 percent and still comply with the arrangement. The results are robust to changes of the benchmark rate to 1 percent or 1.25 percent.

The probit equation presented in Table 6 tests the probability that a worker who started to contribute in 2008 will contribute more than 0.83 percent of his wage. In this analysis, belonging to a group that can legally avoid the requirement to save has a major positive effect. The probability that a worker who switched employer between the two years and worked less than nine months in 2008 will start to contribute at a rate of more than 0.83 percent is higher by about 25 percentage points than that for workers who did not switch employer and worked throughout the year.⁴³ This is a large difference in view of the fact that only 40 percent of the workers who started contributing in 2008 did so at a rate above 0.83 percent; it indicates that workers who willingly started to contribute did so in general at rates above the minimum required by the arrangement. In the public sector, where pension savings after a certain period of employment were the rule even before the arrangement, employees had a higher probability to start saving at above-minimum rates than workers in the private sector.

The results show that the variables which are related to whether pension savings are beneficial, i.e. level of income, being above the tax threshold, a working spouse the spouse's income and the number of children, have the expected signs. In addition, the probability that older workers, for whom it is doubtful that starting to save towards a pension is worthwhile, will save at above minimum rates is lower than for younger workers (the difference between a worker aged 60 and a worker aged 35 is 9 percentage points). We also find that, compared to its large effect on the probability to comply, employer size has only a small (although statistically significant) positive effect on the probability to contribute at above-minimum rates, implying a greater role for individual employee characteristics.⁴⁴ These results indicate that beginning to contribute reflected employee preferences rather than a tendency to obey the law.

The gender coefficient, that had a positive effect on the probability to begin contributing, has a negative sign in the contribution rate equation, This effect seems to be inconsistent with the incentives of women to save, and may reflect women's self-selection of employers that leads to a higher tendency to comply with employment laws.

⁴³ The sum of the coefficients of "switched employer between the two years", its interaction with "worked less than nine months" and "months worked during the year" multiplied by 3 (the difference between 9 and 12 months). In 2007, the effect of this variable on the pension saving rates was not statistically significant and its coefficient was negative.

⁴⁴ The positive effect of the linear "employer size" variable, which may become economically significant for very large employers is consistent with the parallel coefficient in the right column of Table 4 which reflects the common practice that employees of these employers began to contribute (at "usual" rates) after a short tenure period even before the arrangement went into effect.

Table 6: Factors affecting the probability of workers starting to save in 2008¹ to contribute at above-minimum rates:

	Marginal effect between 2007 and 2008		z
Individual characteristics:			
Gender (0 ó men, 1 ó women)	-0.0515	-6.27	*
Age	0.0118	5.74	*
Age squared	-0.0002	-6.56	*
Married man (binary variable)	0.0312	3.31	*
Married woman (binary variable)	0.0294	3.13	*
Divorced/widowed man (binary variable)	0.0448	2.54	*
Divorced/widowed woman (binary variable)	-0.0007	-0.05	
Number of children aged 0-3	-0.0172	-3.76	*
Number of children aged 4-8	-0.0088	-2.71	*
Number of children aged 9-18	-0.0088	-1.85	***
Income and employment characteristics:			
Annual income (in 10,000s NIS)	0.0462	27.76	*
Annual income squared (in 10,000s NIS)	-0.0003	-18.46	*
Annual income >48,000 (binary variable)	0.0715	9.43	*
Wage in 2007 (in 10,000s NIS)	-0.0191	-15.88	*
Number of jobs during the year	0.0105	3.88	*
Number of months worked during the year	0.0247	11.87	*
Spouse characteristics:			
Age of spouse	0.0017	6.49	*
Does spouse work? (binary variable)	0.0757	8.75	*
Annual income of spouse (in 10,000s NIS)	0.0026	5.46	*
Employer characteristics:			
Size of employer (number of employees)	0.0001	17.07	*
Up to 15 employees (binary variable)	0.0073	0.95	
15-30 employees (binary variable)	0.0308	3.38	*
30-50 employees (binary variable)	0.0146	1.96	**
Switched employer between the two years (binary variable)	0.0551	4.80	*
Switched employer*worked less than 9 months (binary variable)	0.1223	6.29	*
Employed in the public sector (binary variable)	0.0820	9.43	*
Switched employer*annual wage (in 10,000s NIS)	0.0095	5.76	*
Constant (the equation coefficient)	-0.4312	-3.66	*
Number of observations	40,800		
Pseudo R squared	0.0929		

¹ A panel of workers who worked for at least 4 months in 2008. Men aged 22-66 and women aged 22-61 in 2008, with annual income of at least NIS 3,000, who did not contribute to pension savings in 2007 and started to do so in 2008.

(*) significant at the 1% level; (**) significant at the 5% level. (***); significant at the 10% level.

7. The labor market effects of mandatory pension savings

One of the arguments in favor of the mandatory pension arrangement is that even though employees may prefer not to save, most of the contribution burden is carried by employers anyway (Table 1), so the negative effect on employees' disposable income is not large. Moreover, it is claimed that since the earnings of many of the relevant employees are close to the legal minimum wage their employers cannot reduce their wages even in the medium-term. In contrast, if the enforcement of minimum wage rules

in Israel is, as often argued, scant at best and, given the complexities of minimum wage calculations in Israel, it may not be relevant to the affected population. Moreover, Brender and Strawczynski (2006) estimate low labor supply elasticity (0.05-0.10) for the bottom part of the wage distribution in the Israeli labor force ⁶ suggesting that if the minimum wage is not binding, most of the pension cost burden will be borne by employees. Since the effect of the arrangement on labor cost (17.5 percent, of which 12 are paid by the employer) is significant, an empirical examination of the labor market outcomes of the arrangement is warranted.

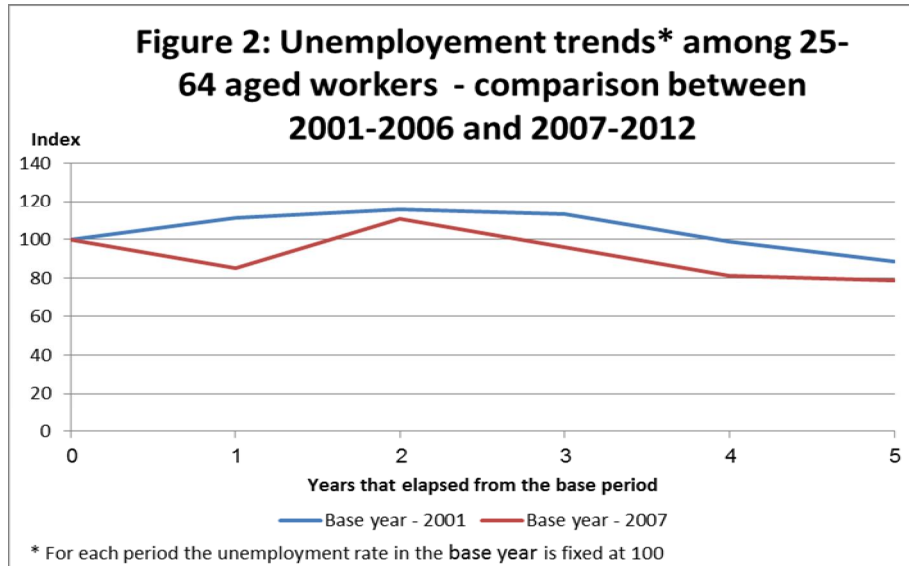
The estimation of the arrangement's effect on wages and employment is based on the tax records panel. We start by constructing a binary variable for each employee in 2007, indicating whether he or she contributed to pension (the control group) or not (the treatment group). Then we construct two outcome variables: 1) the percentage change in the employee's real wage between 2007 and 2012 (the latest year for which we have full data), provided that the employee worked in 2007 and 2012;⁴⁵ 2) a binary variable indicating whether the employee was still working in 2012. We estimate an OLS equation for the first variable and a Probit one for the second (Table 7), controlling for individual and initial employer characteristics⁴⁶, in order to estimate the differential effect of belonging to the treatment group, as reflected in the associated binary variable. The sample consists of all employees that were above the military duty age in 2007, did not reach the retirement age in 2012, earned at least half the monthly minimum wage for a full time employee and no more than the average wage.

The set of control variables we use is not sufficient, however, to fully account for the differences between employees that contributed in 2007 and those who did not. Not contributing to pension may reflect the employee's labor market prospects, beyond those that are indicated by the observable characteristics. This may be particularly relevant with respect to employment when the cyclical position of the economy changes, as those that are not contributing (as well as their employers) are likely to also be those that are less protected from layoffs. To account for this possibility we re-estimated the equations for the period 2001-2006, when the pattern of unemployment in

⁴⁵ The employer's contributions are not included in the reported wages; only as part of total labor cost.

⁴⁶ About 75 percent of those who did not contribute to pension savings in 2007, and 45 percent of those who did, switched employers between 2007 and 2012.

the economy was similar to 2007-2012 (Figure 2), and regard only to the difference in the coefficients between the periods as the treatment effect.⁴⁷



The results indicate a statistically significant and economically large effect of the mandatory pension arrangement, suggesting that 83 percent of the employer costs were reflected in wage reduction and, combined with the employee contributions, 90 percent of the pension contribution incidence were borne by the employees. The coefficient of the binary variable “did not contribute to pension in the base year” in equation 1 indicates that the wages of the employees who did not contribute to pension in 2007 increased by 9.5 percent *less* than those of the employees who did. Between 2001 and 2006 (equation 2) the parallel difference was only 2.5 percent, so the effect associated with the pension arrangement is 7 percent.⁴⁸ The t statistic for the difference between the coefficients is 9.2 ó indicating a statistically significant difference at the 1 percent significance level. Comparing this figure to the employer contribution rate in 2012 ó 8.34 percent (Table 1) ó yields the estimated incidence of 83 percent, which augment the direct employee contribution of 4.16 percent. This result is well within the range reported by Gonzales-Paramo and Melguizo (2009) in their meta-analysis of social-security contributions incidence and by Fuchs et al. (1998)⁴⁹. It is also consistent

⁴⁷ The slightly larger decline in unemployment in 2007-2012 would tend to increase wages more during this period than in 2001-2006, thus reducing the calculated negative difference that we report.

⁴⁸ The results are similar when estimated for 2002-2007 or 2000-2005.

⁴⁹ Similar effects are reported by Coenen et al. (2007).

with the labor supply elasticities for the relevant employees reported by Brender and Strawczynski (2006).⁵⁰

The tax records do not contain data on the industry to which each employer belongs and on employee occupation. Hence we cannot control directly for the possibility that the changes in employee salaries reflect differential developments in their respective industries and occupations. To account for this possibility indirectly we used the Social Survey published annually by the Israeli Central Bureau of Statistics (CBS) which included in the years 2002, 2007 and 2012 questions about pension contributions, occupation and the industry in which the employee was employed. Based on these data we calculated a weighted average change in wages between 2001 and 2006 and between 2007 and 2012, allowing different weights for occupations and industries based on the distribution of the employees that contributed to pension or not. The calculated differences between the two means were minimal and in alternating directions.

Given the low contribution incidence for employers and the small supply elasticities found in the literature, we do not expect the arrangement to have a substantial negative employment effect. Taking the full 12.5 percent contribution rate in 2012 and applying to it the supply elasticity of 0.05-0.10 one would expect a decline in employment of the treated population by 0.6-1.2 percent. Equations 3 and 4 in Table 7 indicate this order of magnitude of the effect, but given its small size it is not statistically discernible between the two periods.

⁵⁰ Brender and Politzer (2014) report a tax incidence of 50% for Israeli income tax rate changes, but these relate predominantly to employees with above median salaries.

Table 7: Factors affecting the change (in percent) of individuals' wages and the probability of leaving employment : 2007-2012 compared to 2001-2006

	Change (in percent) of individuals' wages						Change in the probability of leaving employment					
	coefficient	t		coefficient	t		Marginal effect	z		Marginal effect	z	
	between 2007 and 2012			between 2001 and 2006			between 2007 and 2012			between 2001 and 2006		
Individual characteristics:												
Didn't save for pension in base year	-9.488	-18.48	**	-2.509	-4.46	**	0.189	18.63	**	0.179	17.78	**
Gender (0 ó men, 1 ó women)	-21.348	-29.38	**	-19.395	-23.88	**	0.024	1.7	***	-0.026	-1.77	***
Age	0.326	1.42		-1.228	-4.89	**	0.015	3.4	**	-0.033	-7.2	**
Age squared	-0.016	-6.02	**	0.005	1.83	***	0	1.32		0.0004817	9.44	**
Resides in an Arab town (binary variable)	-55.188	-4.38	**	-108.969	-7.31	**	0.183	0.79		-0.125	-0.49	
Resides in an Arab town*Age	1.211	1.95	***	3.756	5.05	**	-0.016	-1.41		-0.005	-0.36	
Resides in an Arab town*Age squared	-0.007	-0.95		-0.036	-4.01	**	0.0003046	2.31	*	0.000187	1.26	
Married man (binary variable)	-7.489	-9.02	**	-11.589	-11.26	**	0.04	2.51	*	0.123	6.34	**
Married woman (binary variable)	-6.152	-7.12	**	-8.039	-7.49	**	-0.084	-4.94	**	0.053	2.61	**
Divorced/widowed man (binary variable)	-8.417	-5.75	**	-10.801	-6.7	**	0.11	4.15	**	0.131	4.72	**
Divorced/widowed woman (binary variable)	-3.712	-3.38	**	0.868	0.68		-0.121	-5.58	**	-0.038	-1.61	
Number of children aged 0-3	-1.798	-4.54	**	-2.532	-6.08	**	0.012	1.48		-0.024	-3.05	**
Number of children aged 4-8	-3.008	-9	**	-2.743	-7.61	**	-0.027	-4	**	-0.038	-5.37	**
Number of children aged 9-18	-1.486	-6.09	**	-0.407	-1.54		-0.046	-9.37	**	-0.061	-11.95	**
Number of children aged 19-25	-0.942	-2.48	*	-1.455	-3.69	**	-0.025	-3.28	**	-0.01	-1.4	
Immigrated to Israel after 1989 (binary)	-5.705	-10.99	**	-3.707	-6.7	**	-0.018	-1.72	***	-0.106	-10.01	**
Income and employment characteristics:												
Annual income (in 1,000s of NIS)	-5.07	-76.51	**	-2.598	-40.99	**	-0.008	-6.88	**	-0.012	-10.08	**
Annual income (in 1,000s of NIS) squared	0.029	66.28	**	0.013	36.12	**	0.0000228	2.74	**	0.0000511	7.56	**
Annual income < 48,000 (binary variable)	-8.611	-10.61	**	4.898	5.3	**	0.077	4.97	**	0.051	3.09	**
Exceeds the tax threshold (binary variable)	5.652	10.69	**	4.442	7.41	**	-0.003	-0.3		-0.069	-6.24	**
Number of jobs during the year	1.302	5.93	**	1.426	5.63	**	-0.028	-6.56	**	-0.023	-4.99	**
Number of months worked during the year	9.544	61.83	**	5.871	36.83	**	-0.045	-16.2	**	-0.036	-13.21	**
Spouse characteristics:												
Age of spouse	-0.077	-3.44	**	-0.148	-4.89	**	-0.001	-3.32	**	-0.001	-1.7	***
Does the spouse work? (binary variable)	5.053	6.78	**	12.967	11.67	**	-0.04	-2.69	**	-0.136	-6.67	**
Does spouse contribute to pension savings? (binary variable)	2.611	3.88	**	2.126	2.96	**	-0.111	-7.92	**	-0.082	-5.9	**
Annual income of spouse (in 1,000 of NIS)	0.034	10.21	**	0.019	6.91	**	0.001	10.4	**	0.000217	4.38	**
Employer characteristics:												
Number of employees (100s)	0.5	24.99	**	0.0476	3.17	**	-0.0047	-8.18	**	-0.0015	-4.42	**
Up to 10 workers (binary variable)	4.133	6.98	**	-1.695	-2.63	**	0.08	7.15	**	0.081	6.94	**
10-30 workers (binary variable)	1.671	2.73	**	-1.286	-1.98	*	0.04	3.39	**	0.041	3.36	**
30-50 workers (binary variable)	2.103	2.63	**	-3.082	-3.6	**	-0.002	-0.14		0.025	1.58	
Switched employer between the two years (binary variable)	1.996	4.29	**	-3.154	-6.63	**						
Employed in the public sector (binary var.)	15.839	25.75	**	8.574	14.44	**	-0.168	-12.45	**	-0.032	-2.69	**
Constant (the equation coefficient)	135.021	26.39	**	111.871	19.99	**	-0.578	-5.97	**	0.73	7.34	**
Number of observations	116,207						141,609					
Pseudo R squared	0.17						0.0635					
R squared	0.11						0.0562					

The sample includes men that were at the age-range 22-60 in the base years (2001 and 2007) and women that were at the age-range of 21-55. All the employees worked at least 4 months in both the base year and the last year of the sample period (2006 and 2012, respectively) and earned at least NIS 2,000 per-month and no more than NIS 9,000 (in 2012 prices).

*, ** and *** indicate statistical significance at the 1%, 5% and 10% levels, respectively.

8. Conclusion

The mandatory pension arrangement in Israel significantly increased the number of workers contributing from their wages to pension savings: about one-half of the workers who did not contribute in 2007 started to do so in 2008, as compared to only one-sixth in previous years. By 2012, 80 percent of those who did not contribute in 2007 did contribute. This study focuses on the arrangement's initial implementation phase in 2008, when enforcement was lax and unspecified, to learn about employee preferences with respect to the mandated savings. We find a clear connection between how beneficial pension savings are for the worker and compliance with the arrangement. In addition, workers in small firms tended to comply with the arrangement much less than other workers. It appears that closer employer-employee relations in the smallest firms facilitated collusion in non-compliance which may have also been due to, inter-alia, the limited ability of small employers to obtain reasonable terms for their workers from pension insurance institutions. Most of the workers who started saving in 2008 did so at the minimum rates required by the arrangement and the tendency not to contribute more is also correlated with how advantageous pension savings are for the employee.

That some employees wanted to avoid contributing is not evidence per-se that the arrangement is not beneficial. The arguments raised in the literature in favor of government intervention show that individuals may not save even if it is in their benefit. More relevant is the finding that avoidance and saving at the minimum rate are correlated with the ex-ante analytical assessment of how desirable savings are. This indicates that most of those who did not start saving did so rationally.

Among the main variables that affect the tendency to comply with the arrangement and to save at above minimum rates are the level of income, employment of the spouse and whether the spouse saves for a pension. These characteristics are consistent with the analysis of Brender (2010) which found that the mandatory pension arrangement has a particular negative effect on workers whose income is below the tax threshold and those whose spouses do not work. There is a large group of workers whose income remains low for most of their working lives and their spouses do not work. Since the NII pensions provide a reasonable solution for these workers during retirement, saving for retirement is not desirable for them. These workers are the vast majority of the mandatory pension's target group. Also, for workers who are temporarily under the tax threshold, saving for retirement is not beneficial in many cases until their wage rises sufficiently so that they can utilize the tax benefits. This study indicates that *these*

workers view the mandatory pension as a burden that they would like to avoid. For most of the target group the findings do not support the arguments that attribute low pension savings to a lack of retirement planning or the desire to avoid "transaction costs" that are incurred in the choice of a specific pension scheme and in the management of pension contributions. If this were the cause of low (and insufficient) pension savings, it is likely that the introduction of the arrangement would have led to saving at the full rates (those that became mandatory only in 2014), already from the start. Saving at higher rates would also allow savers to receive better terms from pension saving institutions, an important factor in determining the long-term yield on savings (Whitehouse 2000, 2001).

A arguably mitigating factor for the arrangement's undesirability to employees is that most of the contribution is made by the employers. However, when we estimated the effect of the arrangement on the target group's wage growth during the 5 years since the arrangement's initiation we found that more than 80 percent of the employer costs were shifted to the employees, on top of the direct employee contributions. Evaluations of the perceived "lost income" due to excessive pension savings based on the framework of Card and Ransom (2011), suggest that the negative effect of the arrangement on the permanent income of workers for whom it is not desirable is between one-third and 40 percent of the size of the pension contribution – namely 6-7 percent of the employees' income.⁵¹

This study does not claim that pension savings are not desirable, nor does it provide evidence that mandatory savings for retirement lower welfare in general. The claim made here is that *given* the existing system of old age pensions and tax benefits in Israel and in light of the existing employment and demographic characteristics, there is a large group of workers for whom additional saving is not desirable, especially when they carry the full burden of the contributions. Because a large majority of the workers for whom saving towards a pension is desirable already saved in the past, the mandatory pension saving required by the arrangement is effective predominantly for groups that are in fact adversely affected by it.⁵²

⁵¹ According to the analysis of Chetty et al. (2009), this is an underestimate of the subjective reduction in the welfare of a worker who is forced to save for retirement since the worker is far more aware of the undesired mandatory pension contribution than the future benefits from the savings.

⁵² Discussions of the long-term fiscal effects of the arrangement and its equity consequences appear in Bank of Israel (2011) and Brender (2010), respectively.

Since mandatory saving toward retirement through a combination of national insurance and obligatory contribution towards a private pension is used by a large and growing number of countries, the results of this study may extend well beyond the Israeli experience. In particular they indicate a need to carefully examine the consequences of such policies on the population *specifically affected* by them. Such examinations may show that policies tailored to tackle insufficient savings by certain groups of the population may end-up forcing excessive savings by much larger segments of the population.

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