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Evidence from a Pension Reform in Israel

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The labor market impacts of mandated savings: Evidence from a Pension Reform in Israel

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Abstract

A mandated benefit is a legally required employee benefit in any form of non-wage compensation. This policy is attractive for governments because it allows them to provide a good or a service without the need to finance it directly. This paper aims at understanding the labor market impact of mandated pension benefits by studying the effects of a major pension reform that took place in Israel in 2008, which mandated pension benefits to a large fraction of employees who have not received such payments prior to the reform. We use a matched employer-employee panel for the years 2004-2012 that was recently prepared for us by the Central Bureau of Statistics (CBS). The dataset merges information from the population registry and the tax authority. Preliminary results show that the reform mainly affected the situation of employees with low income, located at the two lowest wage quintiles. In addition, women, new immigrants, Jewish, married and younger individuals are more likely to receive pension contributions following the pension reform.

1. Introduction and Related literature

A mandated benefit is a legally required employee benefit in any form of non-wage compensation. This policy is attractive for governments because it allows them to provide a good or a service without the need to finance it directly. Indeed, many developed countries provide mandated benefits in the form of pension, health and disability insurance, and maternity leave. Interest in mandated benefits has increased in the last years given financial constraints of governments. This project aims at understanding the labor market impact of mandated pension benefits by studying the effects of a major pension reform that took place in Israel in 2008.

The theoretical literature (Summers, 1989 and Gruber and Krueger, 1991) predicts that following the introduction of mandated benefits there will be an upward shift in labor supply and a downward shift in labor demand. The new labor market equilibrium, in terms of employment and wages, will depend on the monetary value that workers place on the benefit. Moreover, there are some additional factors that could affect the new equilibrium such as sticky wages, minimum wages, labor regulations, and employment contracts. Therefore, the impact of mandated benefits on the labor market is unknown a priori and calls for an empirical investigation.

The empirical literature on the labor market impact of mandated benefits has mostly focused on mandated benefits in the form of employer-provided health insurance (e.g., Gruber and Krueger, 1990, Baicker and Chandra, 2006, Kolstad and Kowalski, 2014, and Cutler and Madrian 1998). Most of these studies find a strong negative effect on wages with little effect on employment. There are at least two main factors that differentiate the case of mandated health benefits from mandated pensions. First, health benefits impose a 'fixed cost' on the employer (i.e., the premium is unrelated to the worker's wage). Second, it is unclear how workers evaluate health benefits that are essentially a good and not a monetary transfer. Therefore, the conclusions obtained from the health benefit studies do not necessarily apply to the case of mandated pensions.

The link between pension and wages has been primarily studied in the context of payroll taxes. Those studies focus on the labor market implications of payroll taxes that are used to finance Social Security. For example, Gruber (1997) studies the effect of a reduction in payroll taxes on wages following the privatization of the Social Security system in Chile. He finds that the incidence of payroll taxation was fully on wages, with little effect on employment. A key difference between mandated benefits and payroll taxes is that while payroll taxes may be used to finance programs which may benefit workers, they are not directly transferred to them. Therefore, the lessons learnt from this literature do not necessarily apply to the case of mandated pension benefits.

To the best of our knowledge there are no empirical studies that examine the consequences of mandated benefits in the context of a pension plan on the labor market. This limitation of the literature may be related to the fact that even though many countries administer pension systems through employers' mandated benefits, pension *reforms* into such systems are rare. As a result, it has been difficult to find an exogenous source of variation in mandated pension benefits to study their labor market implications.

Our study differs from previous literature on mandated benefits in several important ways. First, to best of our knowledge, there are no studies that have empirically estimated the effects of mandated pension benefits on the labor market. Our research can provide a monetary estimate for workers' valuation of mandated pension benefits. A second distinctive feature of our research is that we can provide a detailed examination of the heterogeneous impacts of mandated pension benefits according to workers and firms characteristics. This has important implications for the welfare analysis of mandated benefits. A third important property of our study is the availability of a unique dataset that includes almost all firms and workers in the Israeli labor market. Previous studies were based on cross-sectional samples of workers or followed only aggregate data from a sample of firms over time. In contrast, we are able to follow the paths of both firms and workers for ten years while controlling for their time-invariant characteristics. In addition, our empirical approach can exploit considerable variation in both the extensive and the intensive margins of pension provision, which is crucial for the identification of the parameters of interest.

2. Institutional Background

In this subsection we briefly summarize the pension reform that took place in Israel in 2008. For a detailed review of the pension system in Israel including past reforms see Ahdut and Spivak (2010). For a comparison between the Israeli pension system and that of other OECD countries see Spivak (2012).

Unlike most of the OECD countries, Israel did not have mandated pension benefits until 2008. *Voluntary* deposits to pension were provided to workers by collective or personal agreements (Kristal et al. 2011; Cohen et al., 2007). According to Brender (2011), in 2007 38% of workers in Israel (about 950,000 workers) did not receive an employer pension benefit.

In 2008 the Israeli government introduced a pension reform, which dictates universal mandatory pension benefits. The reform requires all employers and workers to make a deposit to a pension account that is proportional to the worker's wage. The policy was implemented in stages to allow employers to adjust to the additional costs, starting at a low deposit rate of 2.5% in 2008 and growing linearly to a high of 17.5% in 2014. Under the new pension agreement, an employer is obliged to insure an employee up to the level of the average wage in the economy. But if he wishes to do so, he can insure the employee at a higher level. Moreover, tax benefits for pension savings are granted up to four times the average wage in the economy. The compulsory pension agreement does not apply to workers covered by collective agreements, pension arrangements or personal agreements under which the rates of provision exceed those in the compulsory pension agreement (beneficiary agreements). These workers continued to make provisions at the rates prescribed in the agreements on which they are signed.

Table 1 presents the contribution components by year. The deposits are composed of two thirds that are contributed by the employer and of one third contributed by the worker. These deposits are

saved in a personal savings account for which the worker has some flexibility in choosing the portfolio. If the worker is laid off then he may withdraw the severance payments component of the contributions (about one third). The rest becomes available to the worker only upon retirement.

Brender (2011) studies compliance during the first year of the reform. He finds that about half of the workers who did not contribute to pensions in 2007 started to do so following the reform. Nevertheless, some workers, especially those with lower earnings, did not comply with the law. He shows that both the extensive margin (compliance with the law versus avoiding it) and the intensive margin (minimum deposits versus more generous ones) are correlated with the desirability of pension savings for the employee as predicted in Brender (2010).

3. Data

We use a matched employer-employee panel for the years 2004-2012 that was recently prepared for us by the Central Bureau of Statistics (CBS). The dataset merges information from the population registry and the tax authority. Firms' data includes information on firm size, sector, location, and annual revenues. For the worker, the data includes basic demographic characteristics (date of birth, gender, marital status, number of children, locality of residence) and very detailed information about wages, employment, tax deductions, pension and other fringe benefits (such as saving schemes).

The data cover the entire population of firms (and all their workers) for some sectors and a representative sample of firms (and all their workers) for sectors that included a large number of firms.[1] Altogether our dataset covers the vast majority of workers and firms in the private sector. The data allow us to follow workers over time, even if they move across firms or take additional jobs in other firms and, at the same time, to follow firms over time including all of their workers even in the case of new hires.

Our dataset is superior to what has been used in previous studies, which were based mostly on cross sections or followed a relatively small sample of firms or sectors over time using only firm-level variables.

4. Empirical Strategy

To examine how mandated pension benefits affect labor market outcomes we would ideally like to randomly mandate pension benefits to some isolated markets but not to others. Of course, this type of experiment is not feasible. The closest we can do is to exploit variation in the degree of exposure to mandated benefits by exploiting the fact that some firms provided pension benefits to all or some of their workers before the reform took place. This initial variation at the pre-reform era in the level of pension contributions across firms and within workers at the same firm offers a unique opportunity to apply a quasi-experimental research design and compare outcomes of firms and workers before and

[1] For more details about the variables included in the matched employer-employee dataset see Furman (2007).

after the reform by the extent to which they were affected by the new mandated benefits. Since the reform was gradually implemented, we can examine its dynamic impacts year by year.

The analysis is conducted separately at the firm's and the worker's level. At the worker's level we can compare the change in outcomes over the period of 2004-2012 between workers who received pension benefits before the law was enacted and those who did not. Note that we can track workers for four years before the reform took place and follow them in the post-reform for five years. The following equation can be estimated to study the effects of the reform on workers:

$$(1) \qquad y_{ijt}^{w} = \gamma_i + \delta_j + \tau_t + \sum_{t=2008}^{2012} \alpha_t Treated_i^w * \tau_t + \mu' x_{it} + \varepsilon_{ijt,}$$

where y_{ijt}^{w} is the outcome of worker *i* in firm *j* in year *t;* γ_i is a worker fixed effect; δ_j is a firm fixed effect; τ_t is a time fixed effect. $Treated_i^w$ is an indicator for those workers who did not receive a pension benefit before the reform (and are therefore affected by the reform); x_{it} is a vector of time-varying individual characteristics such as marital status, number of children, age, marginal tax rate and other deductions such as social security. ε_{ijt} is the error term, which we allow to be correlated for the same individual over time. Our main parameters of interest are α_t (*t*=2008-2012), which denote the effect of the reform in year *t* on outcome y_{ijt}^{w}. We can examine the following outcomes: employment, wage, fringe benefits, and number of jobs.

At the firm level, we can exploit variation in the degree of exposure to the reform, both at the extensive and at the intensive margin. In the pre-reform era, some firms provided benefits to all of their workers, others provided to some of their workers, yet others provided to none. In addition, since pension benefits were voluntary before the reform, there was also a high degree of heterogeneity in deposit rates across workers, even within the same firm. This generates significant variation in the degree that the reform affected different firms. We can use the variation in the extensive margin to define the treatment status at the firm level in various ways: (i) as a binary indicator to whether firms provided pension benefits before the reform or not; (ii) as a continuous treatment variable defined as the fraction of workers within the firm that received pension benefits before the reform; (iii) by grouping firms into bins according to that fraction to allow for nonlinear effects. In a similar way, we can define various treatment variables with respect to the intensive margin (i.e., the deposit rate). We can then compare changes in firm outcomes over the period 2004-2012 (before and after the reform) according to these treatment variables by estimating the following equation:

$$(2) \quad y_{jt}^{f} = \delta_j + \tau_t + \sum_{t=2008}^{2012} \beta_t Treated_j^f * \tau_t + \nu_{ijt},$$

where y_{jt}^{f} is the outcome of firm *j* in year *t;* δ_j is a firm fixed effect; τ_t is a time fixed effect. $Treated_j^f$ are the alternative measurements for firm exposure to the reform as explained above; ν_{ijt} is the error term, which we allow to be correlated for the same firm over time. Our main parameters of interest are β_t (*t*=2008-2012), which denote the effect of the reform in year *t* on outcome y_{jt}^{f}. We can examine the following outcomes: firm size, turnover (new hires and separations), average wages, revenue, and

profits.

As detailed in Section 1.C, the theory predicts that the effects of mandated pension benefits will differ along several characteristics of workers and firms. Therefore, an important part of the empirical analysis is to examine the heterogeneous impacts of the reform by estimating equations (1) and (2) for the various subsamples of workers and firms described above. This allows us to identify the parameters of the underlying model such as workers' valuation of the benefit.

Identification of the causal effects of the reform relies on the comparison of workers' and firms' outcomes by the extent to which they were affected by the reform. Admittedly, firms who provided and workers who received pension benefits before the implementation of the pension reform differ from those who did not. We can control for these differences in a number of ways.

First, as shown above, we control for these factors by including worker and firm fixed effects. The inclusion of *worker* fixed effects allows us to control for differences between workers in time preferences, productivity, and all other unobserved worker characteristics that could be related to the likelihood of pension savings and could also affect labor market outcomes. By including firm fixed effects, we are able to control for differences in profitability, management skills, and other unobserved differences between firms.

Second, we refine our treatment and comparison groups by applying matching methods to look for subsamples of comparable workers using the rich set of individual characteristics such as pre-reform income, gender, age, etc. and comparable firms according to location, sector, size, profitability, etc. In addition, we can look for comparable samples according to pre-reform trends in outcomes.

Third, we exploit some of the initial variation in the provision of pension benefits that was due to historical reasons such as collective agreements that existed in the Israeli labor market which cover pension benefits, among other employment conditions. This allows us to compare between individuals with the same occupation who work in different sectors and differ in their pre-reform pension benefit due to specific collective agreements of their sector.

Identification of causal effects relies on the assumption that trends in outcomes between treated and untreated workers and treated and untreated firms would have been equal in the absence of the reform. While we cannot prove that, the fact that we can follow workers and firms for four years before the reform allows us to assess the plausibility of this assumption and if needed select treated and untreated subsamples that follow similar trends in outcomes before the reform. Moreover, the fact that we have multiple outcomes, allows us to match on a specific outcome and check the validity of our identifying assumptions by examining trends of the remaining outcomes.

The equations presented above aim to estimate the impacts of the reform on labor market outcomes. To give an economic interpretation to the effect of the reform we can estimate equations where the main explanatory variable is the pension benefit. Since compliance to the reform was imperfect and, as noted above, many firms provided benefits before the reform, we can apply an instrumental variables strategy to instrument for the pension benefit. Specifically, we can instrument the pension benefit with the interaction between treatment and the post-reform years indicators. We

can also take advantage of the specific regulations of the reform which create some variation in the benefit amount. This allows us to use supplementary sources of exogenous variation to construct additional instruments.

The second stage equations at the worker and firm level for the instrumental variable strategy is:

$$(3) \qquad y_{ijt}^{w} = \gamma_i + \delta_j + \tau_t + \alpha \log(Benefit_{it}) + \mu' x_{it} + \varepsilon_{ijt,}$$

$$(4) \qquad y_{jt}^{f} = \delta_j + \tau_t + \beta \log(Benefit_{it}) + \nu_{ijt},$$

where log(Benefit) is instrumented as described above. The parameters of interest are α and β which denote the elasticities of outcomes with respect to pension benefits. For example, using log(wage) as an outcome in equation (3), we can obtain the elasticity of wages with respect to pension benefits.

5. Working Hypothesis

Main Impact

As surveyed in the scientific background, the theory on the impact of mandated benefits on the labor market predicts that both wages and employment will decline. The extent of these effects depends on the elasticities of both labor supply and demand. There are also some frictions that could affect those equilibrium outcomes such as the minimum wage and labor contracts. Our analysis incorporates these frictions.

Heterogeneous Impacts

The theoretical framework predicts that mandated pension benefits will shift labor supply according to workers' valuation of the benefit. Although we cannot identify separately the labor supply and demand curves, in some cases we may be able to assume that the labor demand shifts equally for all workers so that the observed equilibrium effect can be attributed to the shift in labor supply. To identify the labor supply shifts we can exploit a unique feature of our study that allows us to use workers' observable characteristics as a proxy for their valuation of pension benefits. Specifically, we can evaluate the heterogeneous impact of the reform according to the following workers' characteristics:

- Age. Since the pension benefit becomes liquid to the worker only at retirement, we expect workers of different ages to value the benefit differently: older workers who are closer to retirement will see this deferred income as a more liquid asset than younger workers and are therefore expected to have a stronger upward shift in their labor supply.
- Pre-reform Income. The mandatory pension benefit is tax exempted (up to a ceiling). Therefore, the perceived value of the benefit would increase with the marginal tax rate faced by the worker. In addition, low-income workers have lower savings and therefore are more budget-constrained. For those two reasons we expect that workers with low income (measured at the pre-reform years) will have a lower valuation of the benefit. On the other hand, the existence of a ceiling on the salary that is subject to the tax deduction generates a kink in the benefit function that helps in the

identification of workers' valuation of the benefit.

- Marital status and number of children. We expect married workers with children to be more liquidity constrained and therefore to assign a lower value to the benefit. To assess this hypothesis, we can examine the heterogeneous impact by number of children and income per standardized person.
- Years since immigration. We expect new immigrants to have lower bargaining power in the labor market. Since their labor supply is expected to be less elastic, we expect a stronger wage effect for this group.
- Tenure. Due to wage stickiness, the wage effect is expected to differ between tenured workers and new hires. Wages of new workers are expected to react faster and to a higher extent to the reform.

According to the theory, since mandated benefits create an additional cost to employers, they are expected to decrease their labor demand accordingly. However, we expect the adjustment to vary according to the following parameters:

- Firm size: small firms may have different profits margin and therefore might react differently to the reform. In addition, if firms' ability to shift the pension cost to workers differs by size, then firms' survival/growth rates might vary by size.
- Degree of competitiveness: the ability of firms to pass the additional cost of pension benefits to higher prices depends on its degree of market competition. We therefore expect larger wage effects in more competitive sectors.

In addition to the labor supply and labor demand effects there could be heterogeneity in the equilibrium result according to some parameters. For example:

- Pre-reform Wages. For workers with salaries at or close to the minimum wages, wages cannot fall to fully offset the employers' cost of providing the benefit. As a result, we expect an employment effect among workers with pre-reform wages close to the minimum wage.

6. Results (Preliminary)

We begin by showing that the reform had indeed a significant effect on the provision of pension benefits to workers, and that this effect has increased over time. Table 2 shows the initial variation in the share of workers with pension benefits across firms according to the provision of pension benefits in 2006 (before the reform took place). As seen in the table, there is a strong initial variation in the provision of pension benefits. 20% of firms have a value of 0 indicating that none of their workers received pension benefits before the reform. On the other hand, there are about 47% of firms that provided benefits to almost all of their workers. As explained above, we can use this initial variation in the level of contributions across firms to define the treatment groups at the firm level and compare the evolution of firm outcomes across these different groups of firms over time.

Figure 1 plots the average share of workers with pension benefits by year and by groups of firms. Firms are grouped according to the fraction of workers with pension benefits in year 2006

(before the reform) as described in Table 2. As clearly seen in the figure the pension reform had a significant impact on pension contributions, especially among firms that did not provide pension benefits before the reform. The percentage of workers with pension benefits increases gradually for all firms and converges strongly over time reaching levels of above 70 percent by 2012.[2] Interestingly, even in the first year of the implementation of the reform, there is a sharp increase in the proportion of workers with pension benefits. The evidence presented in Figure 1, shows that there is a clear *"first stage"* for our study. That is, the reform induced a large proportion of firms to start providing pension benefits to their workers. We therefore expect these significant changes to affect the outcome variables of our study.

We stratified the sample according to the conditions before the pension reform: those who received pension contributions from their employers (comparison group), and those who did not (treatment group). Table 3 presents summary statistics for these two groups. We learn from the table that individuals who did not receive benefits before the pension reform are younger, have lower tenure in the firm, and are more likely to be employed in smaller and younger firms that have a lower revenue, relative to those who received pension benefits. One striking feature of the summary statistics is the large difference in wages between the two groups.

Figure 2 shows the share of individuals receiving pension contributions for the treatment and comparison groups over the sample's period. The figure clearly shows a strong compliance with the pension law for the treatment group: the share of individuals receiving pension contributions increased from zero to almost 60 percent in the first year after the reform (2008) and further increased to more than 70 percent in 2012. At the same time the share of individuals in the comparison group receiving pension has not changed.

Figure 3 shows the share of individuals receiving pension according to wage quintiles, defined by their wages in 2006. It is clear from this figure that the reform mainly affected the situation of employees with low income, located at the two lowest wage quintiles. We therefore focus on that population in our study.

To further investigate the characteristics of those who were affected by the pension reform within the treatment group, we estimated a model in which we studied the likelihood of receiving a pension after the reform as a function of pre-reform characteristics. Table 4 reports the results. We see that women, new immigrants, Jewish, married and younger individuals are more likely to receive pension contributions following the pension reform.

We provide additional results based on an analysis we conducted to test the feasibility of our project using data from the Israeli Social Survey. The survey asked detailed questions about pension arrangements in 2002 and 2012. We use information collected in these two rounds of the survey to obtain a general picture of pension contributions before and after the reform. Figure 4 plots the share of workers with pension benefits in 2002 and 2012 by sector. We see that there is a considerable

[2] We do not expect the fraction of workers to reach the level of 100 percent since the law allows to delay contributions in the case of new workers.

variation in the prevalence of pension benefits across sectors before the reform took place. For example, while more than 85 percent of the workers in the *electricity and water supply* sector received pension benefits in 2002, only 49 percent did so in the *agriculture* sector and 45 percent in the *construction* sector. In addition, there is also considerable variation in the prevalence of pension benefits within sectors. The figure also shows that the share of workers with pension benefits increased considerably in all sectors by 2012. Particularly interesting is the drastic change that occurred in those sectors that had a very low prevalence of pension benefits before the reform. For example, the share of workers with pension benefits *accommodation services and restaurants* was only 43 percent in 2002 and it jumped to 71 percent in 2012.

As explained before, a significant part of variation in the prevalence of pension benefits across sectors before the reform can be explained by differences in unionization rates and collective agreements. Figure 5 shows this by plotting the share of workers who belong to a worker's organization and the share of workers who declared that their employment terms are determined by a collective agreement by sector.

7. Tables and Figures

Table 1. Contribution Rates by Year According to the 2008 Reform

As of:	Employer's deposit –pension	Employer's deposit - severance payments	Worker's deposit	Total
1.1.2008	0.83%	0.83%	0.83%	2.50%
1.1.2009	1.66%	1.68%	1.66%	5%
1.1.2010	2.50%	2.50%	2.50%	7.50%
1.1.2011	3.33%	3.34%	3.33%	10%
1.1.2012	4.16%	4.18%	4.16%	12.50%
1.1.2013	5%	5%	5%	15%
1.1.2014	6%	6%	5.50%	17.50%

Table 2. Variation in Pension Benefits across Firms in Year 2006

Fraction of workers	Number of firms	Percent
0	4,295	20%
0-25	765	4%
25-50	2,038	10%
50-75	3,994	19%
75-100	9,949	47%
Total	21,041	100%

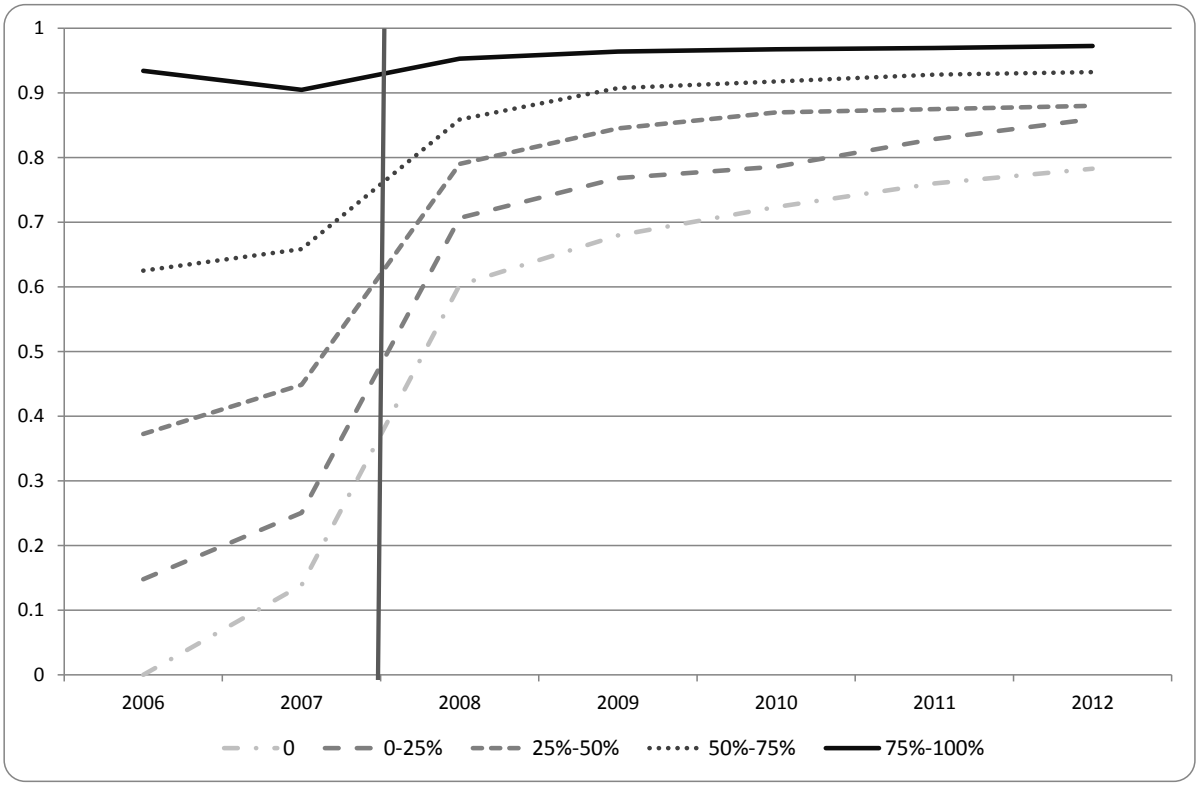
Table 3: Summary statistics for the comparison and treatment groups

	treat	comp
	mean	mean
female	0.42	0.43
age	36.49	38.27
ole	0.32	0.32
new_ole	0.12	0.08
jewish	0.69	0.86
married	0.64	0.73
new_misra	0.32	0.16
tenure	2.77	5.80
real_m_wage_2006	5045.09	10865.69
real_m_wage_2007	5422.44	11590.25
employed_2004	0.87	0.94
employed_2005	0.92	0.96
employed_2006	1.00	1.00
employed_2007	1.00	1.00
pension_any2006	0.00	0.87
pension_any2007	0.00	1.00
pension_any2008	0.52	0.92
pension_any2009	0.59	0.90
pension_any2010	0.61	0.88
pension_any2011	0.62	0.87
pension_any2012	0.60	0.83
pension_oved_rate_2006	0.00	0.03
pension_oved_rate_2007	0.00	0.04
pension_oved_rate_2008	0.01	0.04
pension_oved_rate_2009	0.03	0.04
pension_oved_rate_2010	0.02	0.04
pension_oved_rate_2011	0.04	0.04
pension_oved_rate_2012	0.03	0.04
f_pidionshnati_k	18799.05	176492.26
Num workers	264.64	1088.86
(count) female	367.21	1113.13
(p 50) shnat_pticha	1995.12	1990.10
Observations	113157	281198

Table 4: Compliance by demographic and labor market characteristics

female	0.076***
	(0.001)
age	-0.002***
	(0.000)
ole	0.065***
	(0.001)
new_ole	0.027***
	(0.002)
jewish	0.100***
	(0.001)
married	0.009***
	(0.001)
new_misra	-0.054***
	(0.002)
tenure	0.031***
	(0.000)
tenure_2	-0.001***
	(0.000)

Figure 1. Share of Workers with Pension Benefits by Year According to Firms' Pre-Reform Pension Contributions



Notes: The figure plots the average share of workers with pension benefits by year and by groups of firms. Firms are grouped according to the fraction of workers with pension benefits in year 2006.

Figure 2: share of individuals who receive pension benefits in treatment and comparison groups

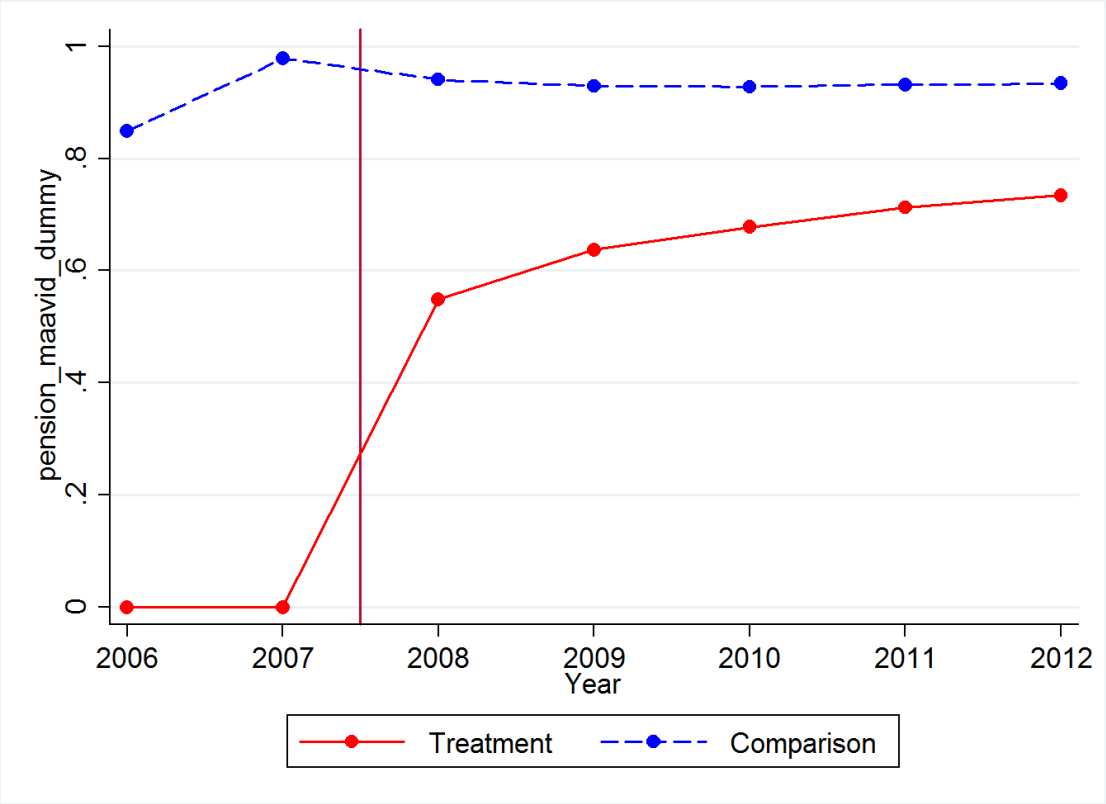


Figure 3: share of individuals who receive pension benefits according to wage quintiles in 2006

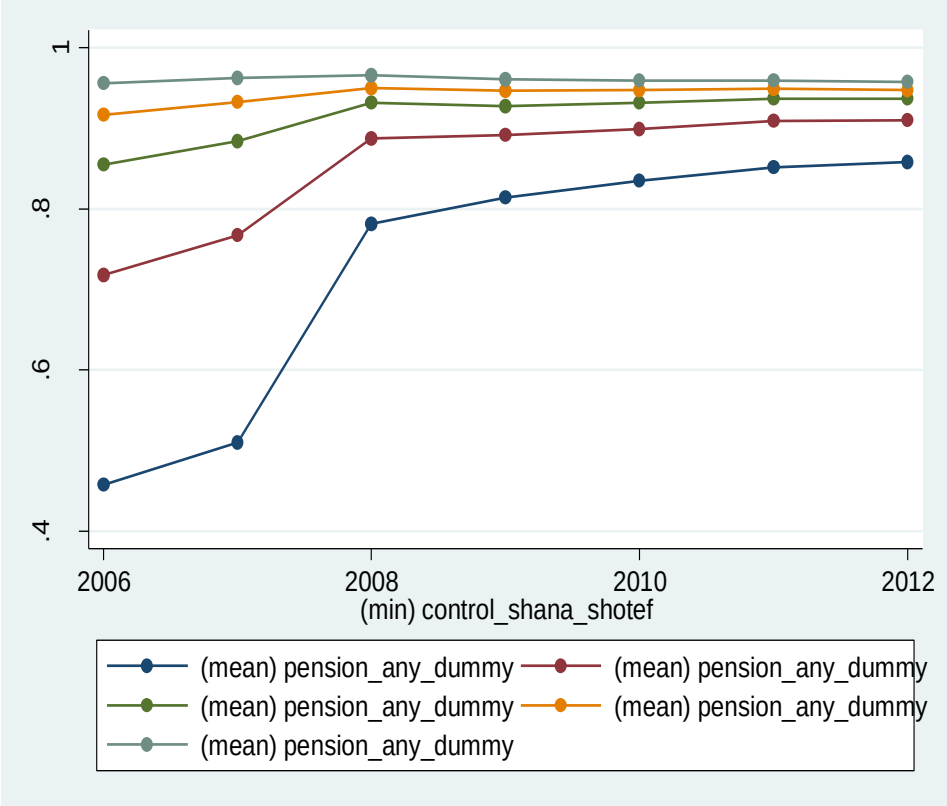
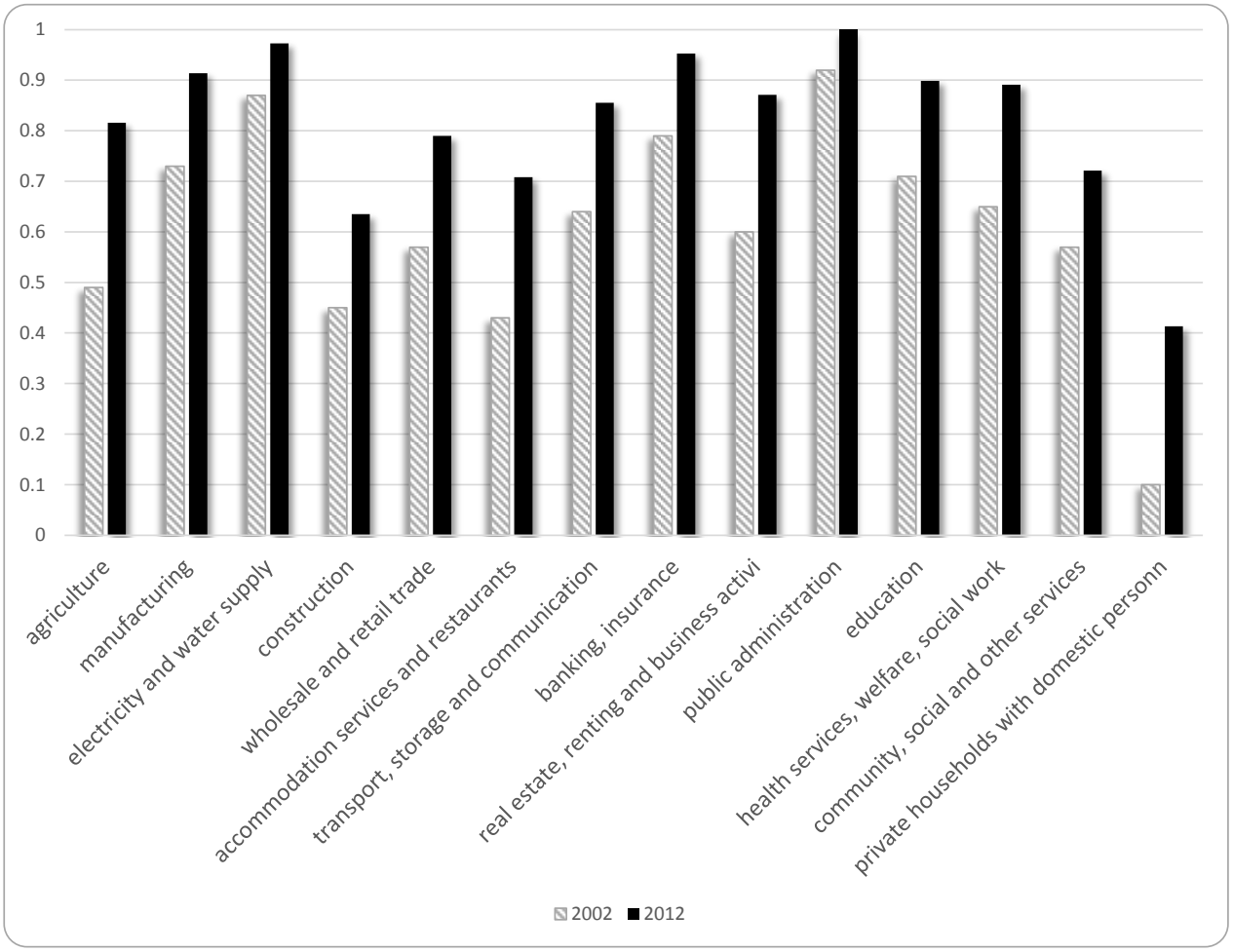
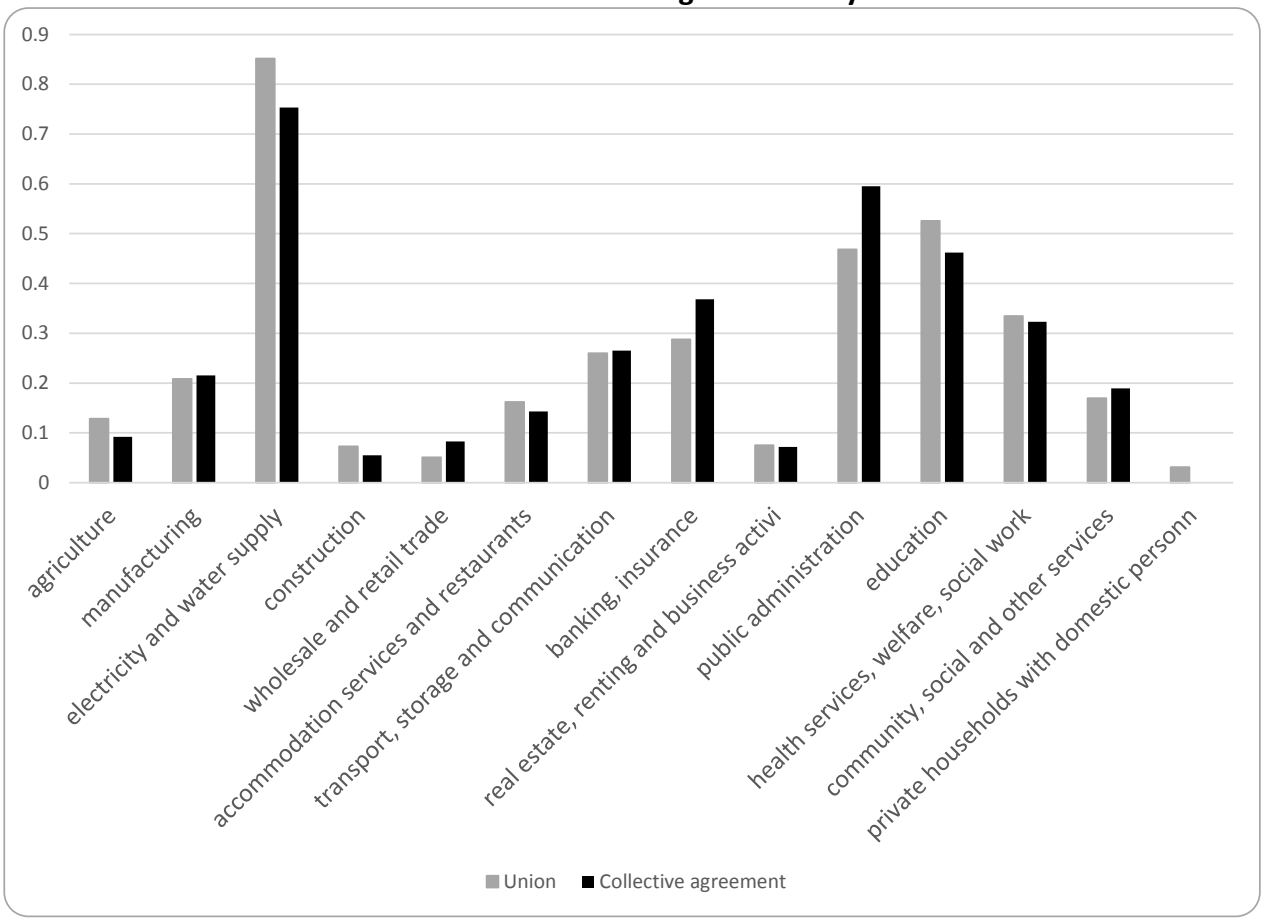


Figure 4. Share of Workers with Pension Benefits by Sector before and after the Pension Reform



Notes: The figure plots the share of workers with pension benefits by sector in 2002 and 2012. Data is based on authors' calculations from the Israeli Social Survey. The sample is limited to working individuals aged 25-64.

Figure 5. Share of Unionized Workers and Workers Under Collective Agreements by Sector



Notes: The figure plots the share of workers who belong to a worker's organization and the share of workers who declared that their employment terms are determined by a collective agreement. Data is based on authors' calculations from the 2012 Israeli Social Survey. The sample is limited to working individuals aged 25-64.

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