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Costs and coverage of occupational pensions

Erik Hernæs
Tao Zhang

Stiftelsen Frischsenteret for samfunnsøkonomisk forskning
Ragnar Frisch Centre for Economic Research

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Abstract: This paper reports on progress in a project to analyse the determinants of the pension decision, that is, the decision by firms to offer a pension plan to its employees. The particular contribution of the present paper is to document empirical groundwork for the research project, and serves as supplement to the paper "The Determinants of Occupation Pension" by Erik Hernæs, John Piggot, Steinar Strøm and Tao Zhang, 2006.

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Contact: erik.hernas@frisch.uio.no, www.frisch.uio.no

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Costs and coverage of occupational pensions[1]

Erik Hernæs[2] and Tao Zhang[3]

1. Introduction

This paper reports on progress in a project to analyse the determinants of the pension decision – that is, the decision by firms to offer a pension plan to its employees. The particular contribution of the present paper is to document empirical groundwork for the research project.

2. Overview

We begin in chapter 3 by describing the procedures used to calculate the direct cost to a firm of a pension plan of the defined contribution type. The calculations have been carried out for each employee with the three alternative replacement targets which are commonly in use, by actuaries who used the actual algorithms which are being used when firms have their pension liabilities and costs calculated.

These calculations are then used in chapter 4 to calculate the tax gains which can arise when a certain amount is given as a contribution to an occupational pension instead of as a wage increase. With progressive and different taxes on wages and pensions, and with the redistributive structure of the NIS, the potential gains depend on the wage distribution and replacement targets of the employees in each firm. In the present paper we present results using a 66 % replacement target which is the most usual rate, and assuming a proportional wage increase in the firm as the alternative.

The register data which comprise the whole Norwegian population do not contain direct information on the occupational pension. A survey conducted in 2003 does contain this information, and is used in the analysis. The surveyed firms have about 383 000 of the 2.1 million employees in Norway.[4] We want to use also the full register data sets which cover all

[1] Financial support from the Research Council of Norway is gratefully acknowledged. This paper is part of the project "Working life and welfare of the elderly".
[2] The Frisch Centre. Contact: Erik Hernæs email: erik.hernas@frisch.uio.no
[3] The Frisch Centre.
[4] However, a wide-spread misunderstanding among firms (see below) has caused the question on replacement target in defined benefit (DB) pension plans to be given to only roughly two thirds of all firms which we believe were actually operating a DB replacement plan in 2003. Before 2001, defined contribution (DC) plans were not tax preferred and hardly present.

employees in Norway in the analyses. As described in chapter 5, we therefore impute information on OP also on the full register data set. This is done by tracking back into employment those persons who were observed in retirement 1994-2001 and who were receiving an OP pension. The procedure is tested on the survey where the firm manager reported the replacement target, and then applied to all firms. Chapter 6 gives an empirical overview of the coverage, costs and tax gains.

3. The direct cost of providing an OP

Up to 2001 only defined benefit (DB) occupational pensions were tax preferred and other types played practically no role. We have therefore focussed on DB pensions. Firms which operate a DB pension are obliged to set up either a pension fund which is legally separate from the firm or a contract with an insurance firm. In either case, the firm will pay a stipulated yearly premium, and have the liabilities calculated yearly. Underfunding above a certain level will enter the firm's balance sheet, either the same year or spread out over up to 20 years, to be decided by the firm.

An occupational pension will always include an old-age benefit, often for life, although it may be restricted to a certain age span. It may include disability and survivor benefits. As a measure of cost to the firm, we have used yearly accrued liabilities, calculated for each employee and aggregated for each firm. Most of the individual characteristics required are available in the register data, and the assumptions we need to make about interest rates, growth rates and discount rates are described below. We have calculated the costs on the assumptions that all programmes include disability and survivor benefits, since this was most usual and we have no information on this in the data.

Firm tenure was not reported, and we assume that all persons have sufficient tenure at the time of observation, to obtain a full OP. If this is not the case, the cost is not greatly affected.

3.1. Old age pension cost to the firm

The calculation of accrued liability, which we will use as a measure of cost, starts with a calculation of Total Benefit Obligation (TBO) which is the present value of the total liability, projected over the life cycle based on parameters listed below. See Gajek and Ostaszewski (2004) and Standard for aktuartekniske beregninger (1996) for technical details and Den norske aktuarforening og den norske revisorforening (2003) for an extensive exposition. At time t TBO is projected as:

$$TBO(t) = S^{aa}_{r-x}\, \upsilon^{r-x-t}\, {}_{r-x-t}p^{aa}_{x+t} \int_{n^{aa}_{r-x}}^{m^{aa}_{r-x}} \upsilon^{\tau} (1+g)^{\tau}\, {}_{\tau}p^{aa}_{r}\, d\tau$$

in which

S^{aa}_{r-x} is the projected pension at age r with pension plan membership since age x

$r = 67$ is the retirement age

x is entry age into the retirement plan

t is time from entry into the retirement plan until time of calculation

$v = 1.07^{-1}$ is the discount rate

$g = 0.025$ is the adjustment rate of the pension after retirement

${}_{r-x-t}p^{aa}_{x+t}$ is the transition probability as a pension plan member, from age $x+t$ (age at the time of calculation) for another $r-x-t$ years, which is up to retirement age. This transition probability includes both survival and quit rate. We assume the quit rate to be zero, since employees who quit are entitled to have some of their entitlements transferred. The survival is modelled with standard mortality tables.

${}_{\tau}p^{aa}_{r}$ is similarly the transition probability as a retiree, and includes only the survival probability from age r which is retirement

$n^{aa}_{r-x} = 67$ is the starting age for the pension

$m^{aa}_{r-x} = 120$ is latest stop of the pension

The size of the pension is described in each pension plan. In our calculations, we assume that

$$S^{aa}_{r-x} = Min(\frac{r-x}{30},1)O\,W(t)(1+b)^{r-t} - N_{r-x}(t)$$

in which

$W(t)$ is the wage at the time of calculation t

$b = 0.033$ is expected wage increase up retirement age

O is the replacement rate, for which we have used three alternative values, 60, 66 and 70 %

$N_{r-x}(t)$ is the NIS pension at retirement age r projected at age t for an employee with pension plan membership from age x. In the projection, it is assumed that the basic amount (G) in NIS will increase by 3.3 % per year. The actual rules for calculating NIS pension is used[5], except that previous earnings towards the NIS pension are assumed to equal the current wage, rather than the actual earnings history of each employee. This can make the actual replacement deviate from the formal replacement rate in the pension plan.

Accrued liability over period t is

$$SCC(t) = \frac{1}{r-x}TBO(t)$$

[5] See The Norwegian Social Insurance scheme (2005) for details on how per

Looking at changes in accrual over time, we obtain

$$\frac{SCC(t+1)}{SCC(t)} = \frac{TBO(t+1)}{TBO(t)} = \frac{S^{aa}_{r-x}\, \upsilon^{r-x-t-1}\, {}_{r-x-t-1}p^{aa}_{x+t+1} \int_{n^{aa}_{r-x}}^{m^{aa}_{r-x}} \upsilon^{\tau} (1+g)^{\tau}\, {}_{\tau}p^{aa}_{r}\, d\tau}{S^{aa}_{r-x}\, \upsilon^{r-x-t}\, {}_{r-x-t}p^{aa}_{x+t} \int_{n^{aa}_{r-x}}^{m^{aa}_{r-x}} \upsilon^{\tau} (1+g)^{\tau}\, {}_{\tau}p^{aa}_{r}\, d\tau}$$

$$= \frac{S^{aa}_{r-x}\, \upsilon^{r-x-t-1}\, {}_{r-x-t-1}p^{aa}_{x+t+1}}{S^{aa}_{r-x}\, \upsilon^{r-x-t}\, {}_{r-x-t}p^{aa}_{x+t}}$$

The increase over time in accrual is driven by changes in the projected pension, eg due to wage increase above the rate g changes in the transition probability as the time to retirement decreases and the discount rate. The latter effect is due to the shorter accumulation period. Even with unchanged projected pension and no mortality up to retirement, accrual will increase by the inverse of discount rate each year.

In addition, the present value of previous accrual $PBO(t)$ increases with the inverse of the discount rate. If entitlements are fully funded, the capital earns a return. If the rate of return equals the discount rate, the increase in entitlement due to reduced discounting will be equal to return. With accumulated assets equal to liabilities and a rate of return equal to the discount rate, capital return will balance reduced discounting of previous accrual. Lacking data on assets, we assume this to be the case.

An estimated amount is paid each year by the firm, and the yearly actuarial calculation of liabilities and assets may therefore show a deficit. Any such deficit can be spread out over many years (following complicated rules), but the cost will eventually show up. However, the observed cost each year may deviate.

The projected pension will change is the wage increase or G increase deviate from 3.3 %, or if there are reforms in the NIS. Mortality gives a "windfall" gain, as do quits.

One remaining problem is still that part of the cost the firm may incur by the return on capital distributed to the firm from the insurance firm is less than the market return. We have assumed that return rates are equal.

3.2. Disability and survivor benefits

The preceding section deals with the pension component, where there is entitlement accumulation for the employee. If the programme includes disability insurance and survivor benefits, as we assume it does, similar formulas apply, see Standard for aktuartekniske beregninger (1996). As a thumb of rule these constitute around a third of total cost.

3.3. Administration cost

Also direct administration costs to the firm are deducted from contributions and returns to give assets at the end of the year.

4. Tax gain with an occupational pension

Below, we will analyse the financial effects of giving compensation via wage or via an occupational pension. All is done in real terms. For the firm, the firm tax is the same whether compensation is given as wage or as contribution to a pension programme, provided it complies with regulations for OP, which most programmes do. For the employee, the pension contribution is not taxed as wage, but the future pension is taxed, and then at lower rate than wage. In addition, the interests on (private) savings are taxed whereas accumulation on pension capital is not taxed. The lower tax on pensions may make the present value of a of pension contribution higher than the present value the same contribution from the firm in the form of a wage increase. The longer the planning horizon, the stronger effect of tax on returns to savings outside tax deferred programs.

The starting point is the same as in Poterba (2004), to compare wealth which accumulates without tax on interest but is taxed on withdrawal, with wealth where the interest is taxed but withdrawal is not. We apply this idea to pension accumulation and improve it in two important ways. First, using the linked data on employees and firms, we use the same actuarial formulas which the firms do, and obtain the exact contribution required by a 66 % OP for each employee. Secondly, we apply actual tax rates which apply in the income bracket of the employee, both on pension (tax free accumulation; tax on withdrawal) and on an alternative wage increase (tax on receipt and on interest; not on "withdrawal"). Our results are therefore close to the actual gains.

4.1 Identical employees

To bring out some key aspects, we first look at the situation with identical employees, so that we do not have to take into account the distribution between employees, but can study only alternative replacements to a representative employee.

Pension contribution (DB)

A yearly amount C_a^p given in the form of a contribution to a DB pension plan will give a yearly, life time pension P^F. We use a simplified version of the pension formulae with end of life fixed at D and no mortality before that. Since we are comparing alternatives, this is not important.

The pension is implicitly given by

$$C_a^P \sum_{t=a}^{R-1} \left(1+r^F\right)^{R-t} = P^F \sum_{t=R}^{D} (1+r^{RF})^{R-t}$$

in which r^F is the interest rate on contributions (in the pension plan) during working life and r^{RF} is the annualising interest rate on retirement for the firm. These can be different from the corresponding rates faced by individual employees who annualise their savings.

For the employee, the pension stream determined by this equation has a present value at age a equal to:

$$\left(1-\tau^P\right)P^F\sum_{t=R}^{D}(1+d)^{a-t}=\left(1-\tau^P\right)C_a^P\frac{\sum_{t=a}^{R-1}\left(1+r^F\right)^{R-t}}{\sum_{t=R}^{D}\left(1+r^{RF}\right)^{R-t}}\sum_{t=R}^{D}(1+d)^{a-t}$$

in which τ^P is the tax on pensions and d is the discounting rate used by the employee for evaluation at age a.

In addition, if there is wage change ΔC_a [6], this will have a present value for the employer

$$\Delta W_a\sum_{t=a}^{R-1}\left(1+r\right)^{a-t}$$

in which r is the interest rate for the employer which can differ from the interest rate inside a pension programme.

For the employee the present value of the wage change is:

$$\Delta W_a\left(1-\tau^W\right)\sum_{t=a}^{R-1}\left(1+d\right)^{a-t}$$

in which τ^W is the tax on wage and we assume the same rate of discount as on future pensions.

Wage increase

When we compare the value of a pension for the employee to the case when a contribution is given in form of a wage increase, we will assume that the latter is privately saved for retirement. If it is not, then it must be the case that the person will be constrained in the case of a pension. This we will not go into. If the amount is saved in an ordinary savings account or financial investment, it will of course not be taxed on receipt, but the interest and capital gain will be taxed. Hence savings of a yearly wage increase C_a^W will give an annuity P_a^W at retirement, defined by the formula below. The logic is that each contribution accumulates from the age of contribution up to retirement, taking into account taxes on interest. Each benefit in the stream after retirement is discounted back to retirement age R. The present values are set equal, implicitly defining the annuity P^W:

$$C_a^W\left(1-\tau^W\right)\sum_{t=a}^{R-1}\left(1+\left(1-\tau^r\right)r^W\right)^{R-t}=P^W\sum_{t=R}^{D}(1+r^{RE})^{R-t}$$

[6] This is not the wage increase which is an alternative to an occupational pension, but an reduction of the wage prior to the pension-wage increase alternatives are posed. It is assumed that this results in reduced consumption.

in which r^W is return on savings up to retirement, r^{RE} is the annualising rate of return faced by the employee on retirement and τ^r is marginal tax on interests.

In addition, the increased wage will give rise to an increased NIS pension, partly offsetting the gain from an occupational pension[7]. The magnitude varies with the level of earnings, since the accrual from earnings falls to one third for earnings above 6 G (the basic amount). This level is somewhat above average full time earnings. The accrual is approximately 42 per cent up to 6 G and 14 per cent above. A simplified version of the NIS pension scheme[8], with accrual ratio denoted by ν gives a present value for the employee of the yearly amount C_a^W given as a permanent wage increase and saved for retirement:

$$V_a^{WE} = C_a^W \left(1-\tau^W\right)\sum_{t=a}^{R-1}\left(1+\left(1-\tau^r\right)r^W\right)^{R-t}\frac{\sum_{t=R}^{D}\left(1+d\right)^{a-t}}{\sum_{t=R}^{D}(1+r^{RE})^{R-t}}$$

$$+C_a^W \nu\left(1-\tau^P\right)\sum_{i=R}^{D}\left(1+d\right)^{a-i}$$

Putting this together we have:

Table 4.1 Evaluation of wage and DB pension contribution with identical employees

Evaluated by	**Amount C_a^W given as wage increase**	**Amount C_a^P given as contribution to a DB plan, with cash wage change ΔW_a**
Employer	$V_a^W = C_a^W \sum_{t=a}^{R-1}(1+r)^{a-t}$	$V_a^P = \left(C_a^P + \Delta W_a\right)\sum_{t=a}^{R-1}(1+r)^{a-t}$
Employee	$V_a^{WE} = C_a^W\left(1-\tau^W\right)\sum_{t=a}^{R-1}\left(1+\left(1-\tau^r\right)r^W\right)^{R-t}\frac{\sum_{t=R}^{D}(1+d)^{a-t}}{\sum_{t=R}^{D}(1+r^{RE})^{R-t}}$ $+C_a^W\nu\left(1-\tau^P\right)\sum_{i=R}^{D}(1+d)^{a-i}$	$V_a^{PE} = C_a^P\left(1-\tau^P\right)\frac{\sum_{t=a}^{R-1}\left(1+r^F\right)^{R-t}}{\sum_{t=R}^{D}\left(1+r^{RF}\right)^{R-t}}\sum_{t=R}^{D}(1+d)^{a-t}$ $+\Delta W_a\left(1-\tau^W\right)\sum_{t=a}^{R-1}(1+d)^{a-t}$

[7] This point was brought to our attention by Sissel Jacobsen.
[8] See The Norwegian Social Insurance scheme (2005) for a detailed description of the actual accrual mechanism

If $V_a^W = V_a^P$ the employer will be indifferent between giving a wage increase or a pension contribution. Since we assume the contribution and wage increase to be constant from age a until retirement, this implies:

$$V_a^W = V_a^P \Rightarrow C_a^W - \Delta W_a = C_a^P = C_a$$

For the employee, the gain from a pension contribution over a wage increase is:

$$V_a^{PE} - V_a^{WE} = C_a\left(1-\tau^P\right)\frac{\sum_{t=a}^{R-1}\left(1+r^F\right)^{R-t}}{\sum_{t=R}^{D}(1+r^{RF})^{R-t}}\sum_{t=R}^{D}(1+d)^{a-t}$$

$$+\Delta W_a\left(1-\tau^W\right)\sum_{t=a}^{R-1}(1+d)^{a-t} - \left(C_a+\Delta W_a\right)\left(1-\tau^W\right)\sum_{t=a}^{R-1}\left(1+\left(1-\tau^r\right)r^W\right)^{R-t}\frac{\sum_{i=R}^{D}(1+d)^{a-i}}{\sum_{t=R}^{D}(1+r^{RE})^{R-t}}$$

$$-\nu\left(C_a+\Delta W_a\right)\left(1-\tau^P\right)\sum_{i=R}^{D}(1+d)^{a-i}$$

Looking at the four terms on the right hand side in turn, the first term gives the present value of the occupational pension resulting from a yearly contribution by the firm at C_a^P. The second term gives the value of the wage change ΔW_a (usually negative). The third term is the present value of the alternative wage increase, saved and annualised on retirement, with returns taxed. The fourth term gives the present value of the increase in the NIS pension following a wage increase.

This difference is therefore driven by the NIS gain, the discount rate, the rates of return and the tax rates. The effect of an increased NIS pension can be quite sizeable. For earnings below 6 G, a marginal tax of 30 % and a discount rate of 4 %, the present value of the gain in NIS, evaluated at age 50 will be 5.4 times the yearly wage increase. This can be interpreted as an implicit tax on an occupational pension, and it is independent of the type of occupational pension, only on whether compensation is labelled earning or pension contribution.

On the other hand, the (usually) lower tax on pensions than on earnings and the tax on interest on savings favour compensation in the form of a pension. This effect can also be sizeable, and whereas the NIS-effect is highest for low earners and persons who can still improve in their NIS-pension, the ordinary tax wedge increase with marginal tax, and the difference between wages and pension, and therefore would usually be increasing in earnings.

4.2 Heterogeneous employees

In practice employees are different both in age and wage, and contributions are not distributed equally or even in equal proportions to the wage. Contributions are pooled and used to cover the total pension cost for the firm. For the firm to be indifferent between

providing a contribution stream towards a joint pension plan, and providing wage increases which might vary across employees, we need the following to hold:

$$\sum_{a=1}^{A}\sum_{i=1}^{N_a} V_{ai}^{W} = \sum_{a=1}^{A}\sum_{i=1}^{N_a} V_{ai}^{P}$$

The distribution across employees will be determined by wage moderation and individual NIS pension. Since the NIS pension relative to earnings falls with earnings, the structure of a Norwegian OP which is set to obtain a total replacement level, implies that the value of the contribution required to give a certain total replacement, relative to the wage is increasing in wage. Therefore, persons with high wages have most to gain from an OP with a total replacement ratio independent of wage. This might mean that they would be willing to take bigger wage moderation. Furthermore, high wage employees might be evaluating pension higher than wage, because they may be less credit constrained. On the other hand, they might be better able to handle savings and obtain higher returns, which in this setting would reduce the tax gains described above. Also the age distribution interacts, since contributions to older employees are relatively larger because of the contribution profile.

4.3 Empirical approach

The wage moderation will not be treated here, and in the following we will focus on the financial gains for the employees, defined the gap between after tax present values of the pension and the alternative wage increase, both giving the same cost for the firm. In the absence of wage moderation, we will work out the tax gains assuming all rates of return and discount rates set at 4%. However, because of the pooling by the firm of pension contribution, there is no obvious distribution of the wage increase. The firm will be indifferent as long as

$$\sum_{a=1}^{A}\sum_{i=1}^{N_a} C_{ai}^{W} = \sum_{a=1}^{A}\sum_{i=1}^{N_a} C_{ai}^{P} = C^{P}$$

We take the potential pension contribution as the individual SCC_{ai} in an OP with 66 % replacement, disability and survivor benefits and the potential pension contribution (see chapter 3) and assume proportional wage increases as the alternative. This gives

$$C_{ai}^{W} = W_{ai}^{W}\frac{C^{P}}{W} \text{ and } C_{ai}^{P} = SCC_{ai}$$

in which W_{ai} is the wage of employee i in age group a and the total wage sum in the firm is

$$W = \sum_{a=1}^{A}\sum_{i=1}^{N_a} W_{ai}$$

Then we obtain

$$V_{ai}^{PE} - V_{ai}^{WE} = C_{ai}^{P}\left(1-\tau_{ai}^{P}\right)\sum_{t=a}^{R-1}\left(1+r\right)^{R-t}$$
$$-W_{ai}^{W}\frac{C^{P}}{W}\left(1-\tau_{ai}^{W}\right)\sum_{t=a}^{R-1}\left(1+\left(1-\tau^{r}\right)r^{W}\right)^{R-t}$$
$$-\nu_{ai}C_{ai}^{P}\left(1-\tau_{ai}^{P}\right)\sum_{t=R}^{D}\left(1+r\right)^{a-t}$$

With interest rates at 4 %, we can calculate the interest terms according to age of each employee, and insert the marginal tax rates according to the (known) wage level and (calculated) pension level. The pension contribution is assumed to be equal to SCC (see chapter 3) which has been calculated on an exact actuarial basis.

The marginal tax rates relevant for an occupational pension or a wage increase are set out below for the years 1996 and 2001

Table 4.2 Tax rates of income above the tax limitation limit for retirees and below 12 G

Income category	**Tax rates 1996**	**Tax rates 2001**
Wage	$\tau^{W}=\begin{cases}0.358\ for\ W<220500\\0.453\ for\ 220500<W<248000\\0.495\ for\ W>248000\end{cases}$	$\tau^{W}=\begin{cases}0.358\ for\ W<289000\\0.493\ for\ 289000<W<793200\\0.553\ for\ W>793200\end{cases}$
Pension	$\tau^{P}=\begin{cases}0.31\ for\ P<220500\\0.405\ for\ 220500<P<248000\\0.447\ for\ P>248000\end{cases}$	$\tau^{P}=\begin{cases}0.31\ for\ P<289000\\0.445\ for\ 289000<P<793200\\0.505\ for\ P>793200\end{cases}$
Interest	$\tau^{r}=0.28$	$\tau^{r}=0.28$
NIS increase	$\nu=\begin{cases}0.42\ for\ W<242460\\0.14\ for\ W>242460\end{cases}$	$\nu=\begin{cases}0.42\ for\ W<303618\\0.14\ for\ W>303618\end{cases}$

The tax rates and limits in the table give substantial tax wedges, since the pension will be considerably below the wage level. With *e.g.* 70 % replacement and wages of 300 000 NOK, the pension will be 210 000 NOK. In 2001, the marginal tax on an occupational pension at this level was 31 %, whereas the tax on earnings was 49.3 %. In addition, interest on savings will be taxed with 28 %.

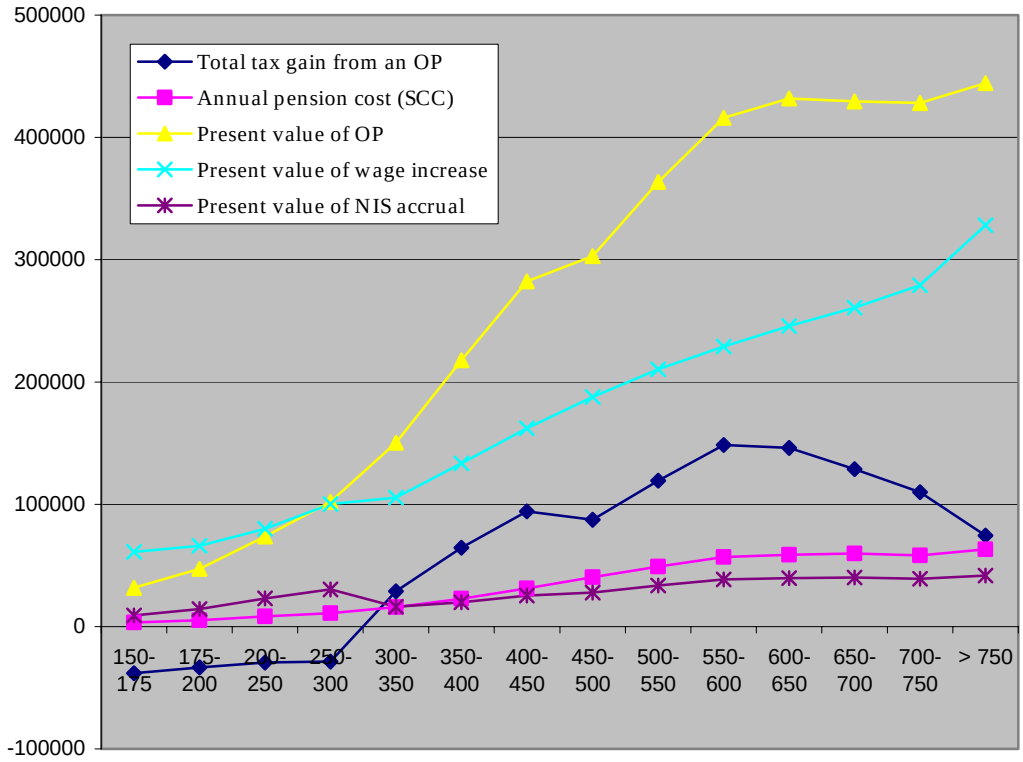
We can then calculate gains on the individual level.

Table 4.3 Tax gains: Difference between present values of contributions to [9]occupational pension (66 % replacement target) and wage increases which are equivalent to the employers

Wage group 1000 NOK	Average pension contribution (SCC) NOK	Average gain NOK
150-175	3 265	-38 174
175-200	5 125	-33 427
200-250	8 225	-29 349
250-300	11 101	-28 592
300-350	16 091	28 718
350-400	22 691	64 393
400-450	31 166	94 271
450-500	40 423	87 246
500-550	49 085	119 374
550-600	56 859	148 328
600-650	58 727	146 029
650-700	59 684	128 648
700-750	58 293	109 897
750-	63 148	74 469

[9] source for this table: \\frarbei\Deteminants Occ Pens\individual_tax_gain.xls, sheet 1.

Figure 4.1 Tax gain and components. [10]



5. Survey data - ABU

In 2003 Statistics Norway conducted a survey (hereafter denoted ABU) of 2 358 firms with about 383 000 employees in the public and private sector in Norway, drawn from the population of firms with more than 10 employees. This was a total of 38 878 firms with a total of 1 658 038 employees. With a labour force of 2.5 million persons, the survey is representative of two thirds of the labour force and contains direct information on 14 % of the labour force.

The survey asks an array of questions answered by the manager of each firm. Of special interest here are questions on ownership, training, recruitment, unionisation, wage and benefit negotiations, profit and capital stock. Data on employees from the register data described above was linked to the survey, creating a very rich data on workplaces and employees.

In the sample, there were approximately 1500 private sector firms with approximately 193 000 employees, which were the only firms to be were asked about OP. 992 firms replied

[10] source for figure 4.1 : \\frarbei\Deteminants Occ Pens\individual_tax_gain.xls, chart 1.

that they had an OP; 501 with a DB and 409 with a DC. The DB-DC split is obviously wrong, since DC was legislated only from 2001. Summary data from the insurances firms give a different picture, with contributions split 97 - 3 % between DB and DC in 2003. Although the trend is towards DC (40 % of contributions to new programmes in 2003 were to DC programmes), DC programmes were of no significance in the 1990s and must be grossly overstated in the ABU for 2003. The explanation given by insurance brokers we have consulted is that that firms mistake the new contribution profile which are gradually being adopted for DB plans with DC plans.

ABU pension responses are outlined in Table 5.1, with the observations used in the analysis boxed in.

Table 5.1 Firms in the private sector asked about OP in the firm survey (ABU)

	Number of firms	Number of employees
Asked about OP	1418	193681
Yes/No:		
OP	972	168886
NO OP	446	24795
Type of OP:		
DB	494	94554
DC	398	59600
Both	39	10571

Note: The observations in the box are used in the analysis.

Table 5.2 Replacement targets reported by ABU firms [11]

Replacement target	Number of firms	Number of employees
Below 55	6	1186
55	5	2289
56	1	24
57	1	150
60	105	24856
62	18	4637
63	7	1218
64	7	1410
65	52	10477
66	173	37635
67	32	3680
69	4	735
69	2	213
70	53	9811
Above 70	4	940

Note: Replacement target is the sum of calculated National Insurance Pension and Occupational pension, divided by final wage, all in pre-tax values

[11] source for table 2 and two figures after this table: \\frarbei\Deteminants Occ Pens\occ pens charts.xls, Comp target.

Figure 5.1 Number of OP firms in the ABU survey.

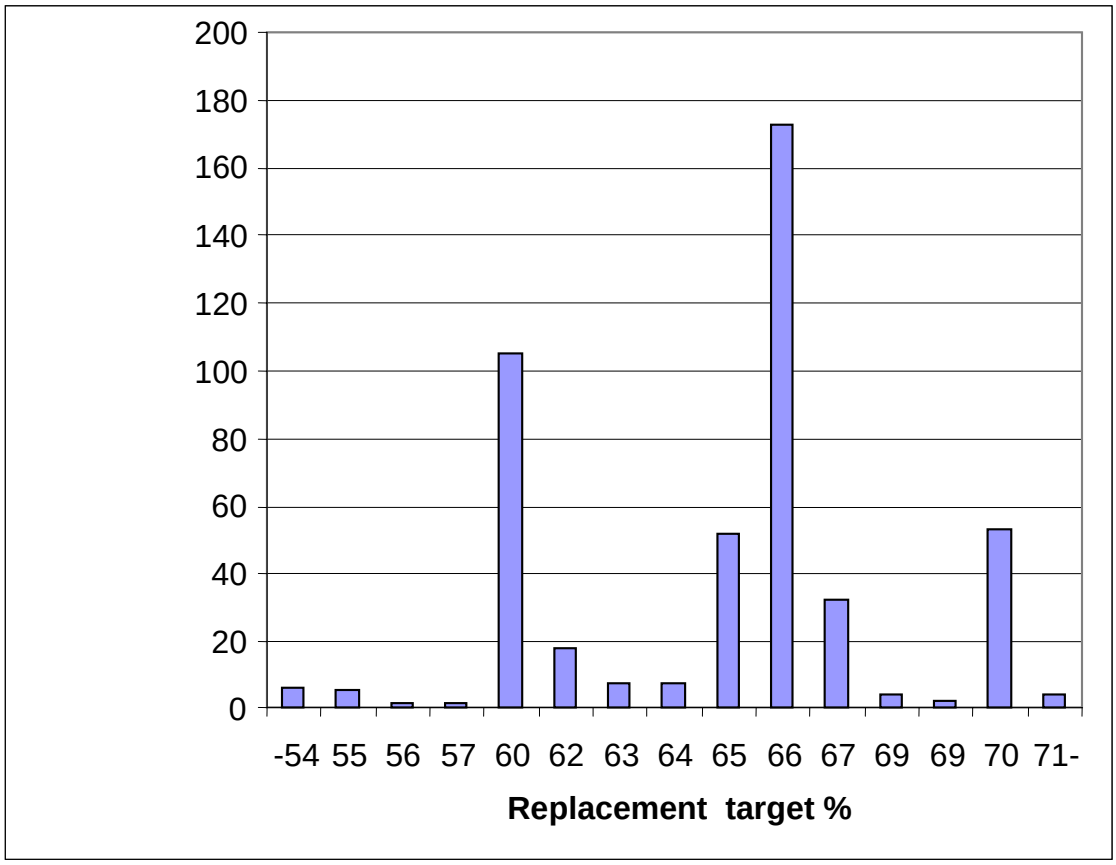
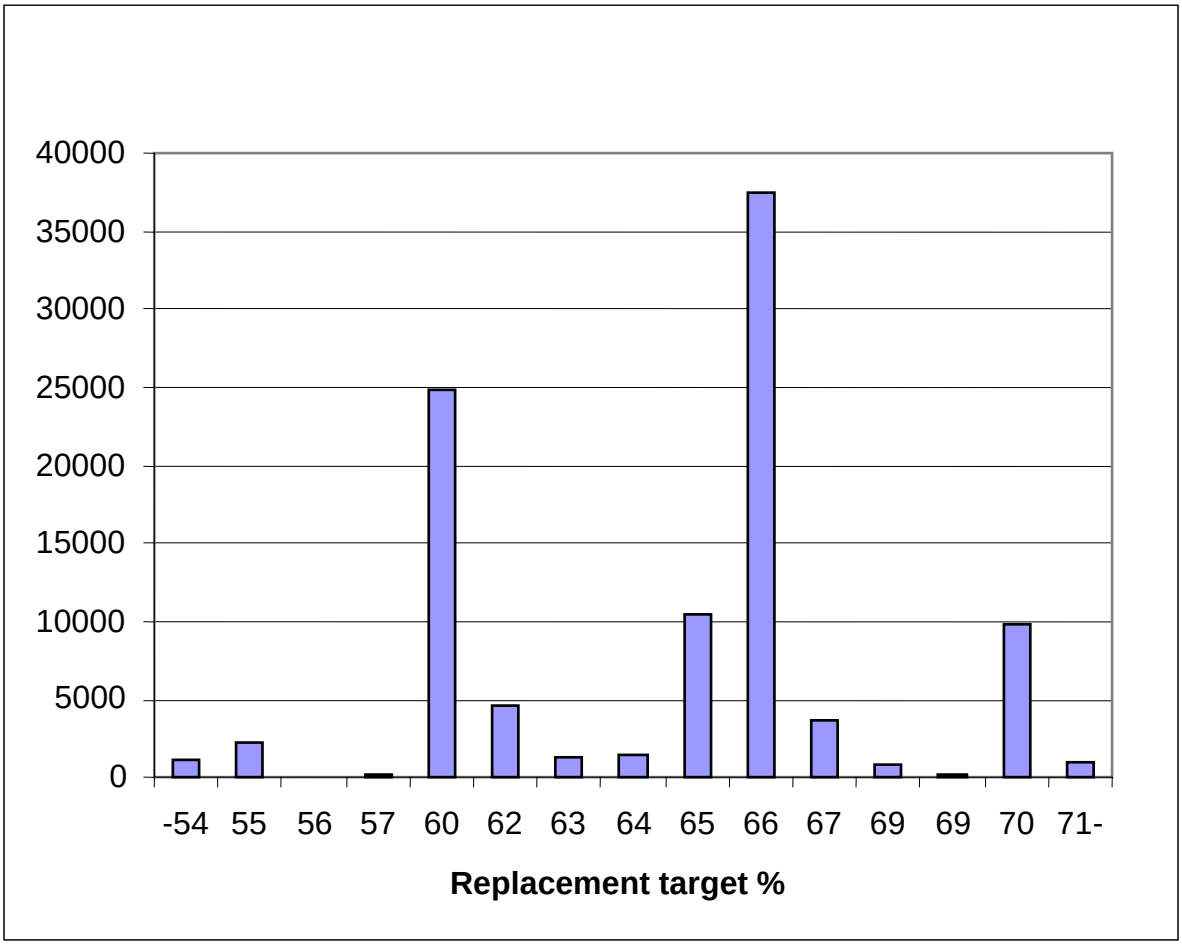


Figure 5.2 Number of employees in the OP firms in the ABU survey.



Although the survey data linked with register give a wealth of information, there are two problems with this study. First, large companies are oversampled, giving relatively few small and medium sized firms. Secondly, the inconsistency described above reduces the value of the survey and motivates the utilization of the full register data, described below.

6. Procedure for identifying pension plans from register data

In order to use also the full register data as a supplement, we develop a procedure for identification of which (private sector) firms were operating an OP, and the compensation target. The procedure uses only register data information, but was tested on firms covered by the ABU survey, assuming that the reply to whether they operate an OP in the survey is correct.

6.1. Identification procedure

For the private sector ABU firms, we identified actual and potential recipients of an OP, as former employees who in one of the years 1997-2001 met at least one of the five following criteria:

- recipient of a OP old age pension
- recipient of a OP disability pension
- recipient of a NIS old age pension
- recipient of a NIS disability pension
- aged 68

Furthermore, we checked whether they received an OP pension, either old age or disability. For recipients of an OP, we calculated the total replacement rate which is the key parameter in an OP, as the proportion between the sum of a calculated NIS pension and the observed OP, and the average earnings over the last three years before the retirement year. In principle, this is the way the actual OP is calculated, as the balance to give the agreed total replacement. In particular, the NIS pension used in the calculation of the OP, is not the actual NIS pension the person will receive, but a "stipulated" NIS pension, based on the assumption that last years earnings were the earnings over the whole accruing period.

There are still a number of problems with identifying pension plan replacement from receipt of OP benefits:

- Some retirees may be receiving pensions from previous unknown (to us) employment spells
- Some may be receiving a survivor benefit, which are sometimes in the registers recorded as an OP from the person's previous employment (not in compliance with the principles for the registers)
- Some may be receiving an individual, private pension
- Some retirees may not have accrued a full pension

The former three points will cause us to overestimate the pension plan in the last firm the persons worked, the latter to underestimate this. The second point is partly corrected by identifying widows/widowers and omitting persons under age 25. If persons with employment spells in more than one firm tend to switch between firms with or within firms without pension plan, there will be a positive correlation and the two effects will tend to cancel.

To reduce the impact of these problems, we restricted our "identifying sample" to persons who fulfilled all the following criteria

- were not widows/widowers
- were above age 25
- were recorded with only one transition year from work to retirement (starting to receive both NIS and OP the same calendar year)
- were employed continuously before that in our observation period from 1992 and were receiving only pension after that
- worked full-time before retirement

Another problem with identifying OP firms is that to positively identify the firm as a non-OP firm we need to observe persons who were not receiving an OP, but who would have been had the firm had such a plan. This is in general persons who receive a NIS old age or

disability pension and we include those. Not observing pensioners from a firm mean that there were no pensioners from the firm in our observation window (3 years), and the firm may still be operating an OP. In particular small OP firms may go undetected in this way.

6.2. The source data

The following data sources were used:

- Pension data from trygd-data: code 211 (occupational aging pension), 217 (NIS aging pension), 218 (NIS disability pension), 247 (occupational disability pension). The pension data is available for year 1992-2001, however for the reason explained below, only year 2001 is used for actual calculation.
- Employment data from atmlto-data.
- Demographic data from demo93-demo01.
- ABU survey data for year 2001.

6.3. Linking register and ABU data[12]

From atmlto-data 1996-2001, only individuals with ONE full-time employment record, satisfactory wages, and identified as employees in an ABU firm are selected.

From trygd-data, 1996-2001, only individuals with ONE record of pension codes are selected.

From pension data, we only take individuals with only ONE record of each code (211,217,218,247). That is to say, if individual *i* has two 211 codes, the individual records are not selected. This is to avoid possible unidentifiable free-policy or gift pension that does not qualify as normal pension.

From employment data, we only take normal employment register in the sense that only full-time records are selected (forv_arb=3). Also we set wage bounds for each employment record as [50000, 650000].

These records are merged with demographic data (by IDNR).

To form a base dataset for further assessment of pension plan, we merged again this dataset with ABU survey data (by first merging with lopenrb, and then use a_orgord from atmlto as firm identifier. Incidentally, one can use a_orgord at http://www.brreg.no to check the actual information on each firm/firm).[13]

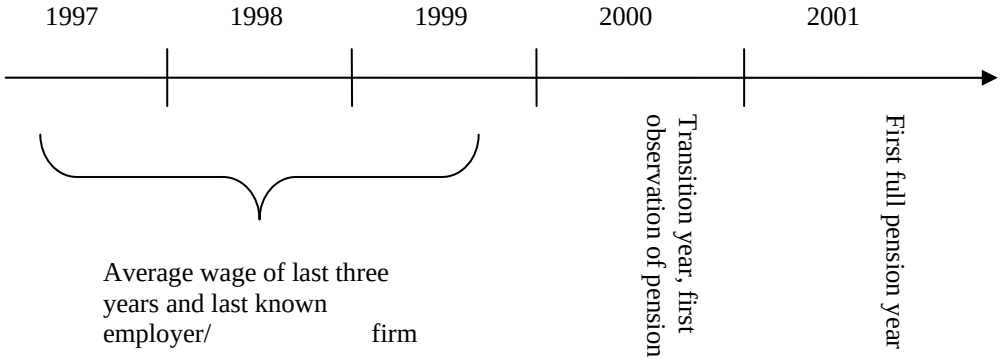
[12] The original "construction..." was limited to 1996-2001 period. In fact all the data from 1992-2001 are linked.

[13] Identification of employer/firm: this is a tricky procedure that is mainly a "calculated guess". From ABU survey data, we only have an internal running id. From Bernt we acquire a matching key lopenrb(8-digits) for ABU running id and the employer register data (not the same as employment register). This lopenrb looks suspiciously alike one of the identification number (bed_idnr in atmlto96 and bednr in atmlto97-atmlto01). After cross check, we can with some certainty assume that the lopenrb is the same as bednr, thus give us a possibility to merge ABU data with regular individual employment data. The normal a_orgord from atmlto-data is used then to identify firms (NOT companies) across years.

However, since the ABU survey is conducted in 2001, we have to bear in mind that the identified ABU firms in year 1996-2000 did not necessarily provide occupational pensions as the survey revealed in 2001.

From ABU survey data, xspm87 ("has private pension arrangement"), xspm92 (stated replacement grade / pension plan) are used.

Figure 6.1 Analysing time span



As figure 6.1 depicts, the pension year is chosen as 2001, due to the availability and reliability of data. Also, after experimenting with the data, we found that to calculate the replacement ratio, it is more reliable to use average wage of last three years prior to pension year as denominator than the last year's wage, due to possible reduction of employment as pension age is approaching.

The base population is described in the linking procedures. We further restrict our attention to individuals that:

- have employment in year 1999,
- have received some pension in year 2000,
- may also have employment in 2000,
- have no employment records in year 2001.

We define 5 types individual (in 2000):

Type 1: receive both NIS pension (aging pension or disability pension) and OP pension. (*fp+fufp+op+oufp*)

Type 2: receive only NIS pension (*fp+fufp*)

Type 3: receive only OP pension (*op+oufp*)

Type 4: not receive pension, age less than 67, possibly still employed (*No pension*)

Type 5: age 67 at year 2000, but not receiving any pension.

Note that for type 4 individuals, we do not require observations of pension in 2001 (they might be still employed).

Since ABU survey data provides (with possible erroneous response from interviewee, see above) firm's pension plan (through xspm87, xspm92), we are able to classify the ABU firms as follows:

- No private pension
- Has private pension, but do not specify replacement grade /degree
- Replacement grade is below 50 percent, < 50
- Replacement grade is between 50 – 62 percent, [50, 62)
- Replacement grade is between 62 – 70 percent, [62, 70)
- Replacement grade is 70 or above

Based on the combined register data and ABU data, we are able to assess whether the register data can reflect the ABU response on firm's pension plan.

In tables[14] below, columns labels are for register data, and row labels are for ABU data. After removing 5 extreme observations (replacement rate outside the 50-80 % range), we were able to link individual data to 1280 out of the 1500 ABU firms which were asked about OP. In 2001 these firms had 58 909 full-time employees with sufficient wage and tenure to be used for linking receipt of pension (OP) with previous wage, in addition to being classified also by stated pension plan (ABU) in last employment. Observed pension and ABU information is given in table 6.2.

[14] (All tables in chapter 6, source c:\prosjekt_work\op\doc\check_abu_with_reg_statistics.xls)

Table 6.1 Classification of full-time employees in ABU firms in 1999 by reported pension plan and by the receipt of pension in 2000

	ABU information about the firm		
Register information in year 2000	No p.plan	with p.plan	Sum
Fp+fufp+op+oufp	65	1381	1446
Fp+fufp	205	456	661
op+oufp	54	1507	1561
None	7828	47236	55064
age 67	15	162	177
Sum	8167	50742	58909

Most of the employees are still working in year 2000, but we do have 3668 persons who receive some kind of pension, and who can be used to identify OP entitlement.
Among the 1561 person receiving only an OP (all below age 67 so they were not eligible for old age NIS) 97 % were tracked back to firms reporting to operate an OP. Among the 1446 persons receiving both NIS and OP, 96 % per cent were tracked back to OP firms. Among the 661 persons receiving only NIS, 69 % per cent were tracked back to OP firms. These are be persons who did not accrue entitlements in that firm (or in any previous firms), possible working part-time or having not been employed long enough.

As a test of how well we will be able to predict OP firms in the full data set, we predicted OP firms among ABU firms, by using OP receipt of former employees. The classification of both of firms and of employees of the firms according to this classification and to ABU is given in tables 6.3 and 6.4.

Table 6.2 Classification of ABU firms by reported OP and by receipt of pension in 2000 by former employees: firms

	ABU information		
Register information	With p.plan	no p.plan	sum
Have PP	527	72	599
No pp	360	321	681
Sum	887	393	1280

Table 6.3 Classification of ABU firms by reported OP and by receipt of pension in 2000 by former employees: employees

	ABU information		
Register information	With p.plan	No p.plan	Sum
Have PP	44479	3866	48345
No pp	6263	4301	10564
Sum	50742	8167	58909

Among the 887 firms operating an OP according to ABU, we predict OP for 59 % (527) of firms with 88 % (4479) of the employees. Among the 393 firms without an OP according to ABU, the probability of (erroneously) allocating the firm to the OP group is 18 % on firm level and 47 % on employee level. The net allocation is to predict OP for 47 % of firms and 82 % of employees to OP, compared to 69 and 85 according to ABU.

6.4. Identification of replacement target in ABU firms

Using average replacement over firms for the 1446 persons we observed with both NIS and OP pension in table 6.2, we also predict the replacement rate, defined as standard calculated NIS plus observed OP, divided by average of last three years earnings. This is compared to the stated replacement in the ABU and given below in the tables 6.4 and 6.5.

Table 6.4: Cross frequency of imputed replacement grade and ABU reported

Register data	ABU						
	No OP	Unknown	< 50	[50,62)	[62, 70)	70+	All
no pplan	220	176	2	20	80	21	519
< 50	4	3	0	2	1	0	10
[50,62)	26	17	0	6	7	1	57
[62, 70)	56	64	2	31	49	3	205
70+	87	197	0	48	131	26	489
All	393	457	4	107	268	51	1280

Table 6.5 Mean imputed replacement grade and ABU reported

Register data	ABU					
	No OP	Unknown	< 50	[50,62)	[62, 70)	70+
Have PP	0.7031	0.7319	0.6381	0.7014	0.7255	0.7562
No pp	0.6957	0.7155	0.6578	0.6854	0.7452	0.7573

(Full Tables for Tables 6.2 – 6.5.)

	no pplan	unknown	< 50	[50,62)	[62, 70)	70+	sum
fp+fufp+op+oufp	65	524	0	303	465	89	1446
fp+fufp	205	229	5	89	121	12	661
op+oufp	54	619	0	255	576	57	1561
None	7828	23304	112	8105	14036	1679	55064
age 68	15	79	0	28	53	2	177
Sum	8167	24755	117	8780	15251	1839	58909

	no pplan	unknown	< 50	[50,62)	[62, 70)	70+	Sum
Have PP	3866	21667	64	8072	13297	1379	48345
No pp	4301	3088	53	708	1954	460	10564
Sum	8167	24755	117	8780	15251	1839	58909

	no pplan	unknown	< 50	[50,62)	[62, 70)	70+	Sum
Have PP	72	241	1	77	178	30	599
No pp	321	216	3	30	90	21	681
Sum	393	457	4	107	268	51	1280

The tables clearly show that although we have the "direction" right, we overestimate the replacement compared to ABU. If we assume the average in the three highest ABU groups to be 60, 66 and 70, we overestimate by 8,5-8,5-5,7 percentage point, respectively. This is compatible with register data included individual pensions, and with reductions in pension from last firm being more than cancelled out by previously acquired entitlements.

7. Empirical overview of coverage, costs and potential tax gains

In this chapter, we will give some key characteristics of the firms with an occupational pension, along with an overview of direct costs and estimates of tax gains. The latter can be shared by employer and employees. The overview is based both on the reports in the ABU and on our identification in the register data sets. The cross tabulations below cover the private sector, since all public sector employees are covered by civil service pensions.

First we present a table showing the role of OP as an income source for retirees. Table 7.1 shows that among 68 and 69 year olds in 2000, OP is roughly one quarter of total pensions, which are the main income for this age group. The average is for those with an occupational pension, so that a proportion of the NIS retirees only have this pension. The average OP increases strongly with education, both in absolute and relative terms.

Table 7.1 Pension Recipients aged 68-69 in year 2001[15]

	Persons	Average NIS pension	Fraction with OP	Average OP	Net wealth (tax assessed)	Earnings	Max wage 1992-1999
Male	21332	144629	0,85	46886	1208932	20985	250926
Female	19491	106096	0,86	36930	704188	11157	162360
Single	2299	131367	0,81	35473	1156302	9144	200717
Married	26829	124596	0,85	42444	987550	17809	220725
Widow	7609	127716	0,88	43784	1011830	12530	168003
Education (years)							
7-9	13936	117821	0,83	25542	639057	8340	169550
10	196	112816	0,81	36961	743525	15410	178577
11-12	13523	122268	0,85	38143	919544	13736	190259
13-16	9441	140648	0,89	57655	1272425	21085	250945
17+	3727	136233	0,83	79639	1612672	43165	298642

Table 7.2 Occupational pension coverage in the private sector by industry. ABU firms

Industrial sector	Number of employees	Number of employees covered by OP	Fraction of males among employees covered by OP	Fraction of companies covered by OP
Agriculture	1889	941	0.7216	0.0139
Manufacturing	104026	88148	0.7583	0.3066
Energy	2052	1778	0.7750	0.0120
Construction	14803	10994	0.9149	0.0739
Trade etc	56972	46232	0.4590	0.2345
Transport etc	66073	63672	0.6050	0.0803
Finance	61251	49167	0.5106	0.1653
Services	44280	41342	0.2890	0.1016
Oil	13278	12073	0.7140	0.0120

[15] Source: pensjon_receipts_statistikk_2001.xls

Table 7.3 Occupational pension coverage in the private sector by firm size. ABU firms linked to register data

Firm size	Number of private sector firms surveyed	Fraction of firms that offered OP	Number of employees in firms surveyed	Fraction of employees in firms with OP
Small	389	0.3393	9432	0.3932
Medium small	347	0.7003	38593	0.7267
Medium	189	0.7831	61130	0.7865
Large	158	0.8608	255475	0.9180
Total	1083	0.6085	364630	0.8621

Note: Small companies, less than 50 employees; medium small, 50-200 employees; medium, 200-500 employees; large, over 500 employees. Same as below for tables 7.4 – 7.9.

Table 7.4 Wage level and tenure by OP coverage and firm size. ABU firms

Firm size	Average wage in firms surveyed	Average wage in OP firms	Average tenure in firms surveyed	Average tenure in OP firms
Small	231764	245210	5.1	6.7
Medium small	241118	244551	5.4	6.3
Medium	246789	254986	5.5	6.2
Large	263080	266951	5.9	6.2
Total	231764	245210	5.1	6.7

Table 7.5 Replacement rates and OP cost by firm size. ABU firms

Firm size	Mean SCC, 60 % pension plan	Mean SCC, 66 % pension plan	Mean SCC, 70 % pension plan
Small	7322	11273	13953
Medium small	7621	11524	14158
Medium	8496	12744	15610
Large	9599	14059	17063
Total	7955	12017	14762

Table 7.6 OP coverage by industry for all firms

Industrial sector	Number of employees	Number of employees covered by OP	Fraction males among employees covered by OP	Fraction of firms covered
Agriculture	20530	5444	0.7318	0.0267
Manufacturing	289903	167518	0.7445	0.1132
Energy	13929	8909	0.7889	0.0036
Construction	121164	39382	0.8894	0.1178
Trade etc	357485	127238	0.4989	0.3236
Transport etc	146048	102018	0.6604	0.0785
Finance	237421	117767	0.5172	0.1961
Services	297316	127180	0.3422	0.1386
Oil	20707	16807	0.7515	0.0018

Table 7.7 OP coverage by firm size. All firms

Firm size	Total number of firms in private sector	Total number of firms that offered OP	Total number of employees	Number of employees in firms with OP	Percentage of employees in firms with OP
Small	77977	6495	577884	99358	17.2
Medium small	2769	1566	255191	154480	60.5
Medium	523	361	159682	110328	69.1
Large	309	204	511791	348111	68.0
Total	81578	8626	1504548	712277	47.3

7.8. Wage level and tenure by OP coverage and firm size. All firms[16]

Firm size	Average wage all firms	Average wage in OP firms	Average tenure, all firms	Average tenure, OP firms
Small	222334	233890	4.52	6.70
Medium small	234654	242438	4.71	5.87
Medium	242668	252146	5.11	5.79
Large	258525	267072	5.48	6.03
Total	223020	236991	4.54	6.49

[16] The source of table is firm_statistics_2001.xls

Table 7.9 Replacement rates and OP cost by firm size. All firms

Firm size	Mean SCC, 60 % pension plan	Mean SCC, 66 % pension plan	Mean SCC, 70 % pension plan
Small	7000	11293	14197
Medium small	7539	11510	14197
Medium	8198	12401	15242
Large	9329	13923	17023
Total	7035	11317	14215

References

Gajec, Leslaw and Ostszevsk, Krzysztof M. (2004): *Financial Risk Management for Pension Plans*. Elsevier

Poterba, James M. (2004) Valuing Assets in Retirement Saving Accounts. *National Tax Journal* vol LVII, No. 2, Part 2, June 2004

Standard for aktuartekniske beregninger i henhold til Foreløpig norsk Regnskapsstandard: PENSJONSKOSTNADER, april 1994. Innstilling, 15. april 1996, Den norske aktuarforening

The Norwegian Social Insurance scheme (2005)
http://www.odin.dep.no/archive/sosvedlegg/01/02/Socia074.pdf

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Ragnar Frisch Centre for Economic Research
Gaustadalléen 21
N-0349 Oslo, Norway
T + 47 22 95 88 10
F + 47 22 95 88 25
frisch@frisch.uio.no
www.frisch.uio.no