Tallamaria Maunu

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ABSTRACT

This paper studies the effect of pensions on the distribution of wealth in Finland. We use a combination of survey and register data, including register information on earned pension rights. We calculate the discounted value of the stream of future pension benefits. Adding pensions to net wealth makes the distribution of wealth somewhat more even. Inequality is reduced within all subgroups studied. The subgroups whose relative situation improves, compared to other subgroups, are the highly educated, singles, and part-time pensioners. We use two samples, with the individual and the household as the units of analysis. The differences between the results are few and mostly mechanical.

ABSTRAKTI

Tutkimuksessa selvitetään tulevien eläkkeiden vaikutusta varallisuusjakaumaan Suomessa. Aineistona käytetään sekä haastattelu- että rekisteritietoja, mukaan lukien rekisteritiedot ansaituista eläkeoikeuksista. Tutkimuksessa lasketaan tulevien eläke-etuuksien diskontattu arvo. Tulevien eläkkeiden lisääminen varallisuuskäsitteeseen tasoittaa varallisuusjakaumaa hieman. Jakauma tasoittuu jokaisen demografisen osaryhmän sisällä. Ryhmiä, joiden suhteellinen asema paranee, ovat korkeasti koulutetut, yksinasuvat ja osa-aikaeläkeläiset.

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1 Introduction

Future retirement benefits are an important form of wealth even for those currently working. In US studies, retirement wealth has been calculated to be 22–43% of total wealth (McDermed et al. 1989, McGarry et al 1998, Gustman and Steinmeier 1999b). With Canadian data, public pension wealth has been calculated to constitute 47% of household entitlement wealth (Shamsuddin 2001).

Although the shares in different countries are not directly comparable because of the differences in the pension systems, it is clear that not taking retirement benefit wealth into account when studying the distribution of wealth will yield misleading results.

In the studies, there is no consensus on the effect of retirement benefit wealth on the distribution of net wealth. If pension wealth reduces saving, those with a lot of pension wealth should have less of other wealth forms. In other words, adding pensions to the wealth distribution should make the distribution more even. On the other hand, if income and wealth are highly correlated, so should pension wealth be, as benefits are a (non-linear) function of income. If this is the case, adding pensions to net wealth should increase inequality.

Gustman and Steinmeier (1999a) find that pension wealth does not replace saving, but instead adds to total wealth. So, according to them, adding pensions to other forms of wealth should make the distribution more uneven. McGarry et al (1998) and Shamsuddin (2001), on the other hand, find that adding pensions reduces wealth inequality.

Kennickell and Sundén (1997) find that adding Social Security wealth makes the distribution more even. However, the correlation between wealth in DB plans and other wealth is negative, but the effect of DC plans is insignificant. Bottazzi et al. (2009) study the development of pension wealth after pension reforms in Italy and find that a reduction in pension wealth has been met with an increase in other forms of wealth.

In the UK, the earnings-related tier of the pension scheme has been estimated to reduce private saving with a substitution elasticity of almost −1.0, while the flat-rate tier does not affect private saving (Attanasio and Rohwedder 2001).

In Sweden, the value of the public old-age pensions has been calculated to be over 60% of the median gross wealth for blue-collar workers, and over 50% for white-collar workers (Andersson et al. 2002). All pension wealth (public plus private) has been calculated to represent 81% of total gross wealth for the median worker (Andersson et al. 2001). Including pensions in the wealth concept reduces inequality, and “the increased uncertainty about future pension have increased private investments in pension policies” in Sweden (Klevmarken 2006).
However, the calculation of pension wealth is not without problems. Roine and Waldenström (2008) put it this way: “On one hand, it is a fairly well-defined future benefit stream accruing to each individual in society that highly influences the incentives of individuals to save for retirement. On the other hand, individuals cannot freely access their pension wealth (e.g., to realize it before retirement age), which violates one of the fundamental aspects of private property rights to personal assets.” There are also practical problems: “First, parts of it are

defined in collective form and hence not well-defined for all individuals (or households) in the system. Second, the calculation of today's claims on future pensions concerns a number of complex assumptions of people's life expectancy, future rates of return on the capital markets and so forth. Third, there are public and private parts of the pension system, funded and un-funded parts, and some of these are more easily observed and measured than others, which may create systematic measurement errors in the data…."

So it is not surprising that the previous studies of pension wealth suffer from data limitations. No study that we are aware of uses register data on actual earned pension rights.

For example, McGarry and Davenport (1998) and Kennickell and Sundén (1997) use survey data. McDermed et al (1989) and Shamsuddin (2001) have employer or administrative information on benefit formulas and rules, but no income histories, and the calculations are done by the authors. Attanasio and Rohwedder (2001) calculate the value of pension wealth by applying the rules of the pension system to observed individual characteristics. They have information on earnings, but no earnings histories nor information on registered pension rights.

Gustman and Steinmeier (1999a and 1999b) use a matched combination of survey and administrative data, but only about 70 percent of the individuals in the survey data set could be matched for the administrative information. The authors calculate the benefit values for the individuals whose administrative information on plan characteristics and rules are available. Bottazzi et al. (2009) calculate the value of pension rights from legislation, based on a number of variables but no income histories nor register information on earned pension rights.

This paper studies the distribution of pension wealth in Finland. In this study, we use register data on actual earned pension rights. There are no previous Finnish studies on the levels and the distribution of retirement benefit wealth. The advantage of Finnish data is the availability of register data, so that we have complete information on the actual earned pension rights.

The structure of the paper is as follows. Section 2 presents the data used. Section 3 presents describes pensions as a specific form of wealth. Sections 4 and 5 present the distributions of pension wealth at the individual and household levels, respectively. The conclusions are presented in section 6. Please note that in order to make the paper readable, only the most important results are presented. The complete result tables are available from the author upon request.

2 Data

For the analysis we combine several data sources: the backbone of the data set is the Household Wealth Survey. This survey is collected by Statistics Finland about every five years. We use the latest Household Wealth Survey that was collected between February 1st and May 31st of 2005. The data were mainly collected with household interviews, but in order to economize the collection, some of the data comes from registers. For our purposes, the most important registered information is the information on net wealth.

The second part of the data, pension register data, has information on earned pension rights until the end of the year 2004. In other words, we have register information on what the benefit amount would have been if the individual had retired at the end of 2004. These data are from two sources: information on earned pension rights in the private sector is from the Finnish Centre for Pensions, and municipal pension rights are from the Local Government Pensions Institution. The government pension rights were not available, so this study includes individuals who have gained their pension rights in the private sector or in the municipal sector[1] [2]. For a more detailed description of the data, see Maunu (2007).

Net wealth is measured at household level, while pension rights are calculated at the individual level. So how should we treat the net wealth of households with more than one adult member? How is net wealth to be divided between household members? Or should we treat the household as one economic unit, and take both spouses' pensions together as well?

We construct two different samples: an individual sample and a household sample. The individual sample consists of 1,457 individuals. The people in the individual sample are either the reference person (the person with the highest income) of the household or the spouse of the reference person. This restriction has to be made, because some survey questions were only asked of the reference person. The people in the individual sample are 45 years old or older and not yet retired. The total wealth of a single individual consists of his/her pension wealth plus household net wealth, while the total wealth of an individual living with a spouse consists of his/her pension wealth plus half of the household net wealth.

1 In 2006, 6% of the employed were in government employment. 21% were in municipal employment and 73% worked for the private sector. In the sample used in this study, excluding the individuals who have pension rights gained from government employment reduces the number of individuals from 2,102 to 1,457.

2 We also did an experiment where we predicted the values of the pension rights gained in government employment. We had accurate information on contract length and accrual percentage, but pensionable wage had to be estimated. This was done by running a regression on the available pensionable wages (from private sector and municipal employment) on age, year and individual dummies (fixed effects). The coefficients from this regression were then used in defining the pensionable wage for government employment. The results were similar, whether or not the predicted government pension rights were included.

The household sample consists of 872 households. The household is represented by the reference person (the person with the highest income) of the household. So the households in the sample are ones where the reference person is 45 years old or older and not yet retired. Because the high earners are more likely to be men, there are more "male" observations than in the individual sample (62.4% versus 50.2%). The total wealth of a household consists of both spouses' pension wealth (if the household consists of a couple) plus household net wealth. For a more detailed description of the samples, see chapter 3.3. and Table A1 in the Appendix.

3 Pensions as a form of wealth

In this paper, two wealth terms are used: net wealth and total wealth. Net wealth refers to the value of real assets (dwellings and recreational residences), transport vehicles, forest and durable goods, and financial assets, i.e. all wealth except future pensions. Net wealth is calculated by subtracting debt from gross wealth. The information on both gross wealth and debt is from registers[3]. Total wealth is simply net wealth plus pension wealth.

In the data, net wealth is measured on household level, while pension rights are calculated at the individual level. So we need to decide whether to take the individual or the household as the unit of analysis.

We construct two samples: a household sample and an individual sample. In the individual sample the unit of analysis is the individual and, in order to avoid counting the same wealth twice, we need to make assumptions on the division of net wealth within a household. When the household consists of a couple, we divide household net wealth by two to get individual net wealth. In the household sample, the unit of analysis is the household, whose total wealth consists of household net wealth plus both spouses' pension wealth (in case the household consists of a couple).

The pension wealth of an individual consists of the discounted value of the stream of his/her earned pension rights that were registered in the employment-based pension scheme at the end of the year 2004.

The Finnish pension system consists of two pension schemes, of which the employment-based scheme is the dominant one. The other scheme, the national pension scheme, is a minimum guaranteed pension with income testing. The individual is only entitled to a national pension when her employment-based pension falls below a set threshold.[4]

The people studied are not yet retired and some expect not to retire in decades. So we need to keep in mind that the value of registered pension rights at the end of 2004 will not be equal to the value of the benefit the individual will receive at retirement. In most cases, the actual benefit will be higher. But some individuals will earn a sufficiently small amount of pension rights and will be entitled to the national pension. In other words, the national pension is the lower limit of pension benefits – in any case, the individual will receive at least the national pension.

So we take the actual earned pension right, and if it falls below the national pension threshold, we include the national pension. If the earned pension rights are above the threshold, we do not make any changes. In other words, we do not make assumptions on future earnings. We use the wage coefficient to calculate the value of the pension right at the individual's retirement. From retirement until the end of the individual's life, the value of the pension right develops according to the pension index. The stream of benefits is then discounted back to calculate the current value of pension wealth.

3 A more detailed description can be found at http://www.tilastokeskus.fi/til/vtutk/index_en.html.
4 A more detailed description of the Finnish pension system is in Maunu (2007).

The value of pension wealth depends not only on how large the benefit will be, but also on how long the individual will be on the benefit. So we need to make assumptions on two dates: retirement and death.

In the interview, the individuals are asked to provide an expected retirement age[5]. We use this as the beginning of the retirement period. However, if the self-reported retirement age is over 68, the individual is assumed to retire at age 68[6]. Life expectancy is expected to vary by age, gender and socioeconomic status, according to tables of the Finnish Ministry of Social Affairs and Health[7].

In the calculations, we assume a real earnings growth of 1.75 per cent per year and a discount rate of 3 per cent per year. The sensitivity of the results to the choice of the discount rate is tested in subsection 4.3.1.

5 98% of the relevant individuals report an expected retirement age. The expected ages vary from 45 to 85. The mean is 62 years and the median 63 years. Of the reported expected retirement ages, 32% fall between 60 and 62 years. 52% of the expected ages fall between 63 and 65 years, and 54% between 63 and 68 years.

6 The accrual stops at age 68, so in most cases it is optimal to start collecting benefits at that age. The individual may still continue working, but he will not earn pension rights anymore. In the data, there are 20 individuals who report to expect to retire after age 68.

7 Hannele Palosuo, Seppo Koskinen, Eero Lahelma, Ritva Prättälä, Tuija Martelin, Aini Ostamo, Ilmo Keskimäki, Marita Sihto, Kirsi Talala, Elisa Hyvönen and Eila Linnanmäki (eds.) 2007. Health inequalities in Finland. Trends in socioeconomic health differences 1980–2005. Publications of the Ministry of Social Affairs and Health.

4 The distribution of pension wealth at the individual level

We begin by studying the distribution of wealth, with and without pensions, visually. We present the mean and median values of wealth, with and without pensions, for various subgroups.

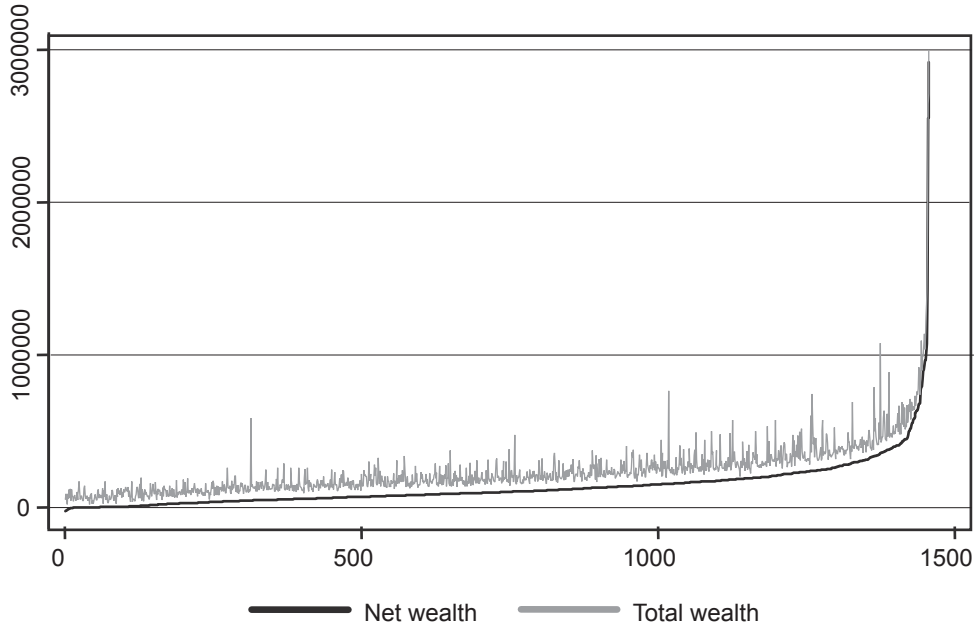
To study the distribution of wealth among the sample, we use four different inequality measures. To study inequality within a subgroup, e.g. the highly educated or the age group 45-49, we use the 10 / 90 per cent ratio. It is the ratio of wealth held by the individual in the 10th percentile to wealth held by the individual in the 90th percentile. The larger the ratio, the more equally wealth is distributed among the subgroup. However, this ratio does not give any information on the distribution between subgroups.

To study inequality between subgroups, we report the shares of each subgroup falling into wealth deciles. The idea behind this measure is that if the distribution was perfectly even, 10 per cent of each subgroup would fall into each decile, obviously. We are interested in seeing which subgroups are under-represented (over-represented) in the lowest (highest) deciles, and whether taking a broader wealth concept, that is total wealth including net wealth plus pensions, changes the pictures or not.

The last two inequality measures are the shares of pensions in total wealth and Gini coefficients.

Figure 1 shows that adding pension wealth does not change the shape of the wealth distribution. The figure presents the individuals in the sample, in order of the value of net wealth, from the left to the right. The vertical axis represents the euro values of wealth. The solid line represents euro values of net wealth, while the other line represents total wealth, i.e. wealth that includes pensions.

Figure 1. *The distribution of wealth, with and witbout pension. The individual sample.*



4.1 Wealth holdings in euros

Table 1. *presents the median and mean values of wealth holdings by subgroup, with and without pensions.*

Subgroup	Net wealth, median (euros)	Pension wealth, median (euros)	Pensions as a share of total wealth (medians)
Whole sample	99,014	89,024	47%
Men	102,546	86,458	46%
Women	95,475	90,618	49%
Age: 45–49	89,904	76,465	46%
Age: 50–54	104,104	89,767	46%
Age: 55–59	106,275	104,222	50%
Age: 60–68	125,243	102,651	45%
Labour market status: working	103,579	89,871	47%
Labour market status: not working	54,652	67,793	55%
Part-time pensioner	151,461	123,336	45%

The median value of pension wealth in the whole sample is almost 90,000 euros, while the median value of net wealth is approximately 100,000 euros. So taking pensions into account almost doubles the value of wealth holdings for the median person.

There is no statistical difference between the holdings of net wealth of men and women. Men's pension wealth is higher than women's, because of their higher earnings, although the median is higher for women.

With regard to age, the youngest age group, not surprisingly, has a lower value of pension wealth than the other age groups. This is because they have the shortest working careers. The age group with the highest pension wealth is the 55−59-year-olds. They are near retirement, they have a long income history, and can expect to enjoy their benefits for a longer time than the oldest age group, whose life expectancy is shorter.

Net wealth increases with age as well. While the median value of net wealth for the 45−49-year-olds is approximately 90,000 euros, the median for the 60-68-year-olds is approximately 125,000 euros. However, even though net wealth increases with age, pension wealth increases even more, so that the share of pensions in total wealth increases with age.

Not surprisingly, those not working have considerably less pension wealth than those working and part-time pensioners.

The median value of pension wealth for men is 81% of the mean value, while for women the median is 90% of the mean. So pension wealth is more evenly distributed among women than it is among men. There is also more variation among the oldest age group, for whom the median is 79% of the mean, than among the other age groups (84–92%). With regard to labour market status, pension wealth is most unevenly distributed among those not working, for whom the median is 82% of the mean, compared to those working and part-time pensioners (86% for both subgroups).

4.2 Distribution measures in the individual sample

In this subsection, we study the distribution of pension wealth in the individual sample via four distribution measures.

4.2.1 10/90 % ratio

The 10/90% ratio is a way of studying the changes in wealth inequality within subgroups. It is the ratio of the wealth holdings of the person in the 10^{th} percentile to the wealth holdings of the person in the 90^{th} percentile. The smaller the ratio, the more unequal the distribution.

Table 2 studies inequality within subgroups via the 10/90 per cent ratio. The tables show that all the 10/90% ratios are greater when pensions are taken into account than when only net wealth is considered. So the distribution with pensions is more even than the distribution without. This result holds for all subgroups. For the whole sample, inequality is reduced by 17 percentage points when pensions are added.

Table 2. *Inequality and 10/90 per cent rations by subgroup. The individual sample.*

Subgroup	10/90% ratio, net wealth	10/90 ratio, pension wealth	10/90% ratio, total wealth	Change in 10/90% ratio when pensions are added (per-centage points)
Whole sample	6%	33%	22%	+17%
Education: low	1%	41%	23%	+22%
Education: intermediate	7%	38%	24%	+17%
Education: high	11%	26%	24%	+13%
Labour market status: working	9%	34%	25%	+16%
Labour market status: not working	0%	32%	15%	+14%
Part-time pensioner	10%	31%	23%	+13%

The change in the 10/90 per cent ratio, when pensions are added to net wealth, is positive for all subgroups. So inequality, as measured by the 10/90 per cent ratio, is reduced within all subgroups when pensions are added.

The subgroup within which inequality is reduced most is those with low education. In other words, adding pensions reduces the variation in wealth most within the low-educated group.

4.2.2 The shares of observations in wealth deciles

The relative status of the subgroups is studied below in table 3.

Table 3. *Shares falling into certain wealth deciles by subgroup, with and without pensions. The individual sample.*

Subgroup	Share in lowest 10% by net wealth	Share in lowest 50% by net wealth	Share in highest 10% by net wealth	Share in lowest 10% by total wealth, pension included	Share in lowest 50% by total wealth	Share in highest 10% by total wealth
Singles	28%	62%	10%	21%	60%	9%
Couples	7%	48%	10%	8%	48%	10%
Labour market status: working	7%	48%	10%	7%	48%	10%
Labour market status: not working	33%	67%	6%	35%	71%	4%
Part-time pensioner	2%	38%	18%	0%	24%	26%

Table 3 studies the shares falling into certain wealth deciles by subgroup. If the distribution was perfectly even, the share falling in each wealth decile would be 10% in all subgroups. This clearly is not the case. For example, the shares falling into the lowest decile of net wealth vary from 2% for the part-time pensioners to 33% for those not working.

The subgroup whose relative situation is affected most when pensions are added is singles compared to couples. Their share in the lowest decile drops by 7 percentage points when pensions are added. For single women, the drop is even larger, 10 percentage points. The relative situation of the highly educated improves somewhat, as does the situation of the older age cohorts. Education and wealth are positively correlated: the highly educated are more likely to be in high wealth deciles, both with and without pensions. However, their situation further improves when pensions are taken into account. The older age cohorts have a longer working history than the younger ones, so it is not surprising that their situation improves when pensions are added. The relative situation of those not working weakens somewhat, while the situation of part-time pensioners improves.

4.2.3 Gini coefficients

The Gini coefficient for net wealth is .486, while for total wealth (including pensions) it is .379. So the Gini coefficients suggest that net individual wealth is less equally distributed. In other words, adding pension wealth seems to make the distribution a little more even.
Table 4 presents the Gini coefficients for net wealth, pension wealth and total wealth.

Table 4. *Gini coefficients for net wealth, pension wealth and total wealth (net + pension wealth). The individual sample.*

Subgroup	Gini coefficient, net wealth	Gini coefficient, pension wealth	Gini coefficient, total wealth	Change in Gini coefficient when pensions are dded
Whole sample	.4864	.2633	.3414	-.1450
Men	.4765	.2944	.3475	-.1290
Women	.4955	.2284	.3349	-.1606
Singles (both genders)	.6349	.2417	.4073	-.2276
Couples (both genders)	.4600	.2666	.3293	-.1307
Age: 45–49	.5201	.2042	.3564	-.1637
Age: 50–54	.4674	.2368	.3281	-.1393
Age: 55–59	.4694	.2672	.3173	-.1521
Age: 60–68	.4360	.3394	.3439	-.0921
Labour market status: working	.4533	.2513	.3157	-.1376
Labour market status: not working	.6970	.2793	.4822	-.2148
Part-time pensioner	.4469	.2834	.3232	-.1237

The highest Gini coefficients for net wealth are among singles and those not working. So net wealth is most unevenly distributed among these subgroups. The Gini coefficient for pension wealth is highest for the oldest age cohort, i.e. pension wealth is most unevenly distributed among the oldest cohort.

For all subgroups, the Gini coefficients are smaller for total wealth than wealth, i.e. adding pensions makes the distribution of wealth more even for all subgroups. The subgroups for whom the Gini coefficient decreases most when pensions are added are the same subgroups among whom net wealth is most unevenly distributed: singles and those not working.

4.2.4 The share of pensions in total wealth

"… pension wealth, without a doubt, is the single most important asset for the majority of Swedes" (Röstberg et al 2005). Pension wealth represents 81% of total gross wealth for the median worker, and for the lowest wealth decile, wealth consists almost exclusively of pensions (Andersson et al 2001).

In this subsection, we show how the share of pensions in total wealth (net wealth + pensions) varies by subgroup in Finland. We begin by studying the variation visually. We then present the shares for each subgroup, and regression results for the share of pensions in total wealth.

Figure 2. *Share of pensions in total wealth by net wealth. The individual sample. (Note: the x axis is cut at 1,000,000.)*

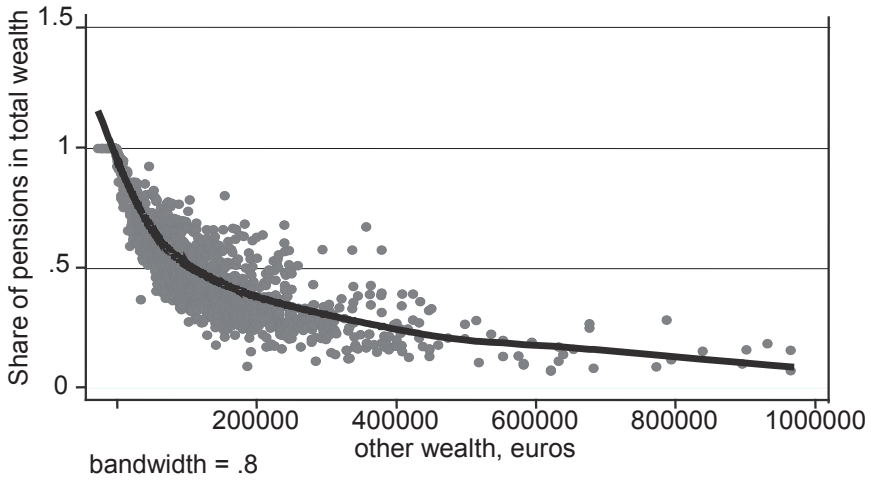


Figure 2 shows that the share of pensions in total wealth is decreasing in net wealth.

Pensions make up 49% of total wealth for the median person in the sample. Please note that in this paper, we study the share of pensions in total net wealth, while Andersson et al. (2001) study total gross wealth. So we cannot conclude that the share of pensions in total wealth is different in the two countries. What we can conclude, however, is that in both countries pensions have a great effect on wealth levels, especially in the lower deciles. Just like in the Swedish study, also in Finland total wealth consists almost exclusively of pensions for the least wealthy decile. Pensions make up 97% of total wealth for the lowest decile, when the sample is divided into deciles of equal size by amount of non-pension wealth. For the wealthiest decile, pensions present a much smaller but still considerable 22% of total wealth.

There is also a difference in the shares held by single persons and couples. The share of wealth that singles hold in the form of pensions is significantly higher. In other words, singles have either more pension wealth or less net wealth than couples, or both. Please note that we have divided the household wealth by two for couples to get individual wealth, so the reason for couples being wealthier cannot be that there are two adults in the household.

To study the subgroups for which pensions make up the most significant shares of total wealth, we run a regression on the share of pension pensions in total wealth. The results are presented in table 5.

Table 5. *Regression results. The share of pensions in total wealth. The individual sample.*

Variable	Coefficient	Standard error	P value
Gender: male	.012	.015	.413
Education: low	Ref.		
Education: intermediate	-.033	.019	.086
Education: high	-.056	.020	.006
Age: 45–49	Ref.		
Age: 50–54	-.025	.018	.151
Age: 55–59	.013	.020	.517
Age: 60–68	-.083	.030	.005
Family status: couple	-.096	.023	.000
Labour market status: working	Ref.		
Not working	.076	.027	.005
Part-time pensioner	.010	.039	.796

Two subgroups stand out in the regression results. The highly educated have a smaller share of pensions, or, in other words, a higher share of net wealth. This is perhaps surprising, as in the last section we noted that the relative situation of the highly-educated improves when pensions are added. Similarly, the relative situation of the oldest age cohort was in the last section noted to improve when pensions are added, and still they actually have a smaller, not higher, share of pensions in their total wealth.

4.3 Sensitivity analysis

In this subsection we study the sensitivity of the results presented above to the choice of the discount rate and retirement age.

4.3.1 Discount rate

We have assumed that the discount rate is 3 per cent. Table 6 presents the euro values of wealth under three different discount rates. The sensitivity of the results to the choice of the discount rate is, not surprisingly, very high. Increasing the discount rate from 2% per year to 4% per year almost halves the median discounted value of pension wealth. However, only the magnitudes of wealth are affected, not the shape of the distribution. Simply put, changing the discount rate means multiplying the values by a different number.

Table 6. *The distribution of wealth, with and without pensions. Three discount rates. The individual sample.*

	Net wealth	Pension wealth, discount rate 2%	Pension wealth, discount rate 3%	Pension wealth, discount rate 4%
Mean	137,629	134,775	103,453	79,897
Median	99,014	118,076	89,024	67,540

Total wealth, as it is defined in this paper, consists of net wealth and pension wealth. Changing the discount rate only affects the value of pension wealth, and the value of net wealth is unaffected. Pension wealth is more equally distributed than net wealth, so changing the discount rate only affects the part of wealth that is more equally distributed.

When the discount rate increases, we discount the future with a higher coefficient – so the euro value of pension wealth decreases. This means that with a higher discount rate, the part of wealth that is more equally distributed will present a smaller share of total wealth. As the share of wealth that is more equally distributed decreases, the distribution of total wealth gets more unequal.

However, the effect of a change of the discount rate from 2% to 4% is quite small. The 10/90 per cent ratios are for total wealth are only some percentage points higher in the 2% case than in the 4% case. So the differences are not large, and they are of equal magnitude for all subgroups. Also the results on shares of subgroups falling into wealth deciles and the shares of pensions in total wealth are almost identical, whichever rate of return is used.

The Gini coefficient for net wealth is .484 and for total wealth, including pensions, in the 3% rate of return case it is .341. The Gini coefficients for total wealth with different discount rates are .322 (discount rate 2%t) and .361 (discount rate 4%). In other words, increasing the discount rate increases the Gini coefficient, but the change is of little magnitude.

We can conclude that the results are not sensitive to the choice of the discount rate.

4.3.2 Retirement age

Above, we have let the individuals choose their retirement age themselves. If wealth and health are correlated, it is possible that the individuals with good health and a high level of wealth are also those who plan to postpone retirement. We cannot test this because we do not have information on the individuals' health.

Using US data, Samwick and Skinner (2004) study the effect of lowering the retirement age from 62 years to 55 years and find that the median value of the yearly benefit is reduced by 44–51%.

In the Finnish data used here, the variation of self-reported expected retirement ages is small. 23% of the sample expect to retire at age 60, 23% at age 63, and 26% at age 65. Only 5% expect to retire before age 58, and only 3% after age 65. But even though the expected retirement ages are quite concentrated, it is possible that that there is a correlation between net wealth and expected retirement age.

We test the sensitivity of the results to retirement age by changing the assumption on retirement age: here we assume all individuals will retire at age 63. The individuals who are over 63 and working are assumed to retire immediately. All other assumptions are as in the previous sections.

The 10/90 per cent ratios are almost exactly the same as in the case where the individuals may choose their retirement age. Also the shares of individuals falling into wealth deciles, as well as the regression results on the share of pensions in total wealth, are almost identical to the results in the previous sections.

The Gini coefficient for total wealth is .3416, i.e. also very close to the one in the case where the retirement age can be chosen by the individual (.3414).

We conclude that the results are not sensitive to the assumption on individual retirement age. This is because variation in the expected retirement ages is small. Compared to the seven-year reduction in retirement age used in Samwick and Skinner (2004), the changes from a self-reported retirement age to age 63 are smaller, and thus the effect here is much smaller than in the US study.

5 The distribution of pension wealth at household level

Pensions are awarded to an individual, so their distribution is best described at the individual level. This is what has been done in the previous section. However, in our data, net wealth is calculated at the household level. So, in order to compare pension wealth to net wealth, we have to make assumptions about the division on household wealth between the members of the household. In the previous section, we have been assuming that wealth is equally divided between spouses. This may or may not be the case in reality.

Atkinson (2007) shows the effect of the individual distribution of wealth to the distribution at the household level. Suppose the individual distribution is such that the top 1% of individuals own 10% of all wealth in the economy. Assume further that all the individuals in the top 1% are single or their spouses have zero wealth. With the assumptions that Atkinson makes, the share of wealth that the top 1% of households own will be 11.8%, i.e. somewhat larger than the share at the individual level.

On the other hand, if all the people in the top 1% are married to each other, and the spouses have the same amount of wealth, the share of wealth held by the top 1% of households will be somewhat smaller than the share held by the top 1% of individuals. With Atkinson's assumptions, the share will be 8.3%. So the division of wealth within a household matters to the distribution of wealth in the economy as a whole.

In this section, we take the household, not the individual, as the unit of analysis. This strategy has been used in McGarry and Davenport (1998). We add couples' pension wealth together to form household pension wealth. So the unit studied is not the individual but the household. To avoid counting the same wealth twice, we drop one of the spouses of each household from the sample. So the household sample studied here consists of single persons and the reference persons of the household, where the household consists of a couple (with or without children). The sample size falls from 1,457 to 872.

There are some differences between the household sample and the individual sample. Obviously, in the household sample, there are more singles than in the individual sample. The share of men is also greater in the household sample. This is because we have included only the member of the household with the highest income to represent the household, and the high earners are more often men than women.

With regard to age and education level, the samples are quite similar. The share of those not working is smaller in the household sample than in the individual sample. For a more detailed description of the samples, see table A1 in the Appendix.

All 10/90 per cent ratios are equal or smaller in the household sample than in the individual sample. In other words, the within-subgroup distributions are more unequal when couples' wealth is added together.

In the whole household sample, the 10/90 per cent ratio for net wealth is 4 percentage points smaller than in the whole individual sample. When pensions are included in total wealth, the 10/90 per cent ratio is 6 percentage points smaller in the household sample than in the individual sample. For all subgroups, with and without pensions, the 10/90 ratios are equal or smaller in the household sample than in the individual sample. So the assumption that couples' wealth is divided equally makes the distribution more even, and abandoning that assumption creates a more unequal distribution.

The Gini coefficients are .497 for net wealth and .336 for total wealth. In the individual sample they were .486 for net wealth and .341 for total wealth.

The shares falling into certain deciles are very similar, with only minor differences in the household sample and in the individual sample.

Not surprisingly, in the household sample, the shares of singles falling into lower wealth deciles are larger. For example, the share of singles in the lower half of the wealth distribution of net wealth is 14 percentage points larger (62% versus 76%). When total wealth is studied, in the household sample, 80% of singles fall in the lower half of the distribution, compared to 60% in the individual sample.

The subgroup whose relative status is weaker in the household sample than in the individual sample is those not working. For total wealth, the shares falling into the lowest decile and into the lowest half of the distribution are 10 and 15 percentage points higher than in the individual sample (35% versus 45% and 71% versus 86%, respectively).

Finally, table 7 presents the regression results for the share of pensions in total wealth in the household sample. There are two differences in these results, compared to the ones in the individual sample.

In the individual sample, there was no significant difference between genders. In the household sample men's share of pensions in total wealth is lower than women's. However, please note that "men" and "women" do not refer to identical observations in the two samples. In the individual sample, obviously, "men" and "women" refer to men and women. In the household sample, on the other hand, "men" refers not only to single men but also to the (whole) households where the highest earner is a man. Similarly, "women" refers to households where a woman is the highest earner – whether or not there are other people living in the household.

Here couples' share of pensions in total wealth is lower than in the individual sample (coefficients −.180 and −.096, respectively). This change is purely mechanical, though. In the individual sample we divided the net wealth of couples by two to get individual wealth, so in the household sample net wealth is twice the amount it was in the individual sample. The household is represented by the highest earner, whose pension is also likely to be highest, so adding the other spouse's pension less than doubles the amount of pension wealth. The share of pensions in total wealth is thus less than it was in the individual sample.

Table 7. *Regression results. The share of pensions in total wealth. Couples' total wealth, including pensions, is added together.*

Variable	Coefficient	Standard error	P value
Gender: male	-.044	.021	.038
Education: low	Ref.		
Education: intermediate	-.026	.026	.311
Education: high	-.053	.027	.049
Age: 45–49	Ref.		
Age: 50–54	-.027	.025	.267
Age: 55–59	.006	.027	.838
Age: 60–68	-.104	.041	.011
Family status: couple	-.180	.025	.000
Labour market status: working	Ref..		
Not working	.138	.047	.003
Part-time pensioner	.030	.043	.480

So we can conclude that the results are not sensitive to the assumption that couples' wealth is divided equally. Most of the results are similar, whether we use the individual or the household sample. The differences between the results in the two samples are few and mostly mechanical, that is, based on the differences between the two samples[8].

8 More detailed results are available from the author upon request.

6 Conclusions

This paper studies the effect of pensions on the distribution of wealth. We use a combination of survey and register data, including register information on net wealth and earned pension rights. We calculate the values of future pensions as the discounted value of the stream of the earned pension rights.

Net wealth is measured at household level, while pension rights are calculated at the individual level. So we need to decide on which unit of analysis we are going to take. Taking the individual as the unit of analysis, if the household consists of a couple, we divide household net wealth by two to get individual wealth. On the other hand, looking at households instead of individuals, we calculate the total wealth of a household by adding both spouses' pensions to household net wealth.

We construct two samples: an individual sample and a household sample. The individual sample consists of 1,457 individuals, while the household sample consists of 872 households. In both samples, either the individual or the reference person of the household is 45 years old or older and not yet retired.

In both samples, adding pensions to net wealth makes the distribution somewhat more even. We study the effect of adding pensions to net wealth both within subgroups and between subgroups.

In the individual sample, inequality is reduced within all subgroups when pensions are added. The subgroups within which inequality is reduced most are those with low education and part-time pensioners. The subgroups whose relative situation (compared to other subgroups) improves when pensions are added are singles (compared to couples), the highly educated, and part-time pensioners. However, the relative situation of those not working weakens when pensions are added.

The results are not sensitive to the choice of the discount rate nor to retirement age. Obviously the values of pension wealth are different in magnitude when different discount rates are assumed, but the signs and qualitative interpretations do not change. When all individuals are assumed to retire at age 63, the results are very similar to when the individuals are assumed to retire at their self-reported expected retirement age.

The household sample results are similar to the ones in the individual sample, but with some minor exceptions. All within-subgroup distributions are either similar or somewhat more unequal in the household sample than in the individual sample. So the assumption that couples' wealth is divided equally (as is done in the individual sample) makes the wealth distribution more even, and abandoning that assumption creates a more unequal distribution.

In the household sample, the relative status of couples compared to singles is improved, compared to the individual sample. However, this change is purely mechanical, i.e. based on the differences between the samples, and not surprising. A subgroup whose relative status is weaker in the household sample than in the individual sample is those not working. Otherwise the results are similar to the ones in the individual sample.

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Appendix

Table A1. *The samples used in this study.*

Subgroup	Number of observations in individual sample	Share in individual sample	Number of observations in household sample	Share in household sample
Whole sample	1457	100%	872	100%
Men	732	50.2%	544	62.4%
Women	725	49.8%	328	37.6%
Singles (both genders)	211	14.5%	211	24.2%
Couples (both genders)	1246	85.5%	661	75.8%
Single men	90	6.2%	90	10.3%
Single women	121	8.3%	121	13.9%
Men in couple	642	44.1%	454	52.1%
Women in couple	604	41.5%	207	23.7%
Education: low	437	30.0%	271	31.1%
Education: intermediate	618	42.4%	365	41.9%
Education: high	402	27.6%	236	27.1%
Age: 45–49	500	34.3%	304	34.9%
Age: 50–54	437	30.0%	259	29.7%
Age: 55–59	405	27.8%	243	27.9%
Age: 60–68	115	7.9%	66	7.6%
Labour market status: working	1229	84.4%	767	88.0%
Labour market status: not working	178	12.2%	76	8.7%
Part-time pensioner	50	3.4%	29	3.3%

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