

Palme, Märten & Ingemar Svensson

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Pathways to Retirement and Retirement Incentives in Sweden*

Mårten Palme[†] and Ingemar Svensson[‡]

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Abstract

We use a large panel data set (LINDA) to describe retirement behavior in Sweden. The importance of different pathways to retirement is analysed. Survival functions for labor force participation of several groups in the labor force are estimated. We then provide a detailed analysis of economic incentives for additional work of older workers in Sweden inherent in the social security system, occupational pension schemes, labor market insurance programs, income taxes and housing allowances. The analysis shows the importance of these components of the income security system in forming the incentives.

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[†]Economics Department, Växjö University, SE-351 95 Växjö, Sweden. E-mail: Marten.Palme@ne.su.se.

[‡]National Social Insurance Board, SE-103 51 Stockholm, Sweden. E-mail: Ingemar.Svensson@rfv.sfa.se.

1 Introduction

The trend towards earlier exit from the labor force, in particular among men, has been one of the most important changes in the composition of the labor force in industrialized countries over the past 40 years. Because this trend has been going on at the same time as a trend towards increased longevity, the financial stability of most social security systems around the world has been threatened.

Since the decline in labor force participation has coincided with the buildup of income security systems in most countries, the economic incentives to exit the labor force inherent in these schemes has been suggested as an explanation for the trend towards earlier retirement. One way to examine this hypothesis is to model the retirement decision econometrically and a growing literature of studies that try to do this exists (see Lumsdain and Mitchell, 2000, for an overview). Palme and Svensson (2001) and Karlström, Palme and Svensson (2002) follow this approach using Swedish data.

This study follows a somewhat different approach: instead of modeling the retirement decision we describe in detail the retirement behavior in different groups of the labor force. We then describe the economic incentives to exit from the labor market in these groups. The idea behind this approach is that, rather than doing a causal analysis of retirement, we study to what extent the observed retirement behavior match up with the observed retirement incentives. This approach also enables us to investigate which policies – the social security system, labor market insurance, occupational pensions, income taxes or housing allowances to the elderly – that affect the economic

incentives for additional work of older workers.

In a previous study, Palme and Svensson (1999), we also used a descriptive approach of economic incentives and retirement behavior: the economic incentives facing a number of representative individuals were described at different ages. The present study extends several dimensions of this study. First, we use real, rather than synthetic, earnings histories for a large sample of individuals collected from a large panel data set (LINDA). Earnings histories can be observed from 1960 to 1997. This long series enables us to study heterogeneity in incentives, also within groups of workers. Second, we study incentives for all major occupational pension programs, rather than just for blue-collar workers in the private sector as in the previous study, and all major labor market insurance programs, rather than just the disability insurance program. Finally, we use a forward looking measure for the economic gain of remaining in the labor force, the peak value measure, in addition to social security wealth and one-year benefit accruals.

The paper is organized as follows. Section 2 briefly describes Sweden's income security system, income taxes and housing allowances to elderly. Section 3 describes the data. Section 4 first shows trends in labor force participation rates among older workers and then exit paths and timing of retirement for different groups in the labor force. Section 5 describes the economic incentive measures for additional work of older workers. Section 6 concludes.

2 Sweden's Income Security System

The income security system in Sweden consists of two main parts: the public old-age pension system and the compulsory labor market insurance programs.

Both these parts are, to about the same extent, used for financing exits from the labor market. In this sub-section we briefly describe the design of these programs.¹ The description is based on the rules pertaining for the persons covered in the study. We start with the public old-age pension programs and the occupational pension schemes. We then describe the disability, sickness and unemployment insurance programs.

2.1 Old-age Pension Programs

Sweden's old-age pension program consists of two main parts: the public old-age pensions and occupational pensions. The occupational pension programs are compulsory for the approximately 95 percent of the labor market covered by central agreements. Table 1 summarizes how the benefits are determined in each program and the actuarial adjustments, i.e., the key facts on how these programs will affect economic incentives for older workers to remain in the labor force.

As can be seen in Table 1, all pension benefits are defined in basic amounts (BAs). The basic amount follows the CPI closely. In the year 2001 the level of one BA was 36 900 SEK.²

2.2 Disability, Sickness and Unemployment Insurance

Eligibility for *disability insurance* (DI) requires that an individual's capacity to work is permanently reduced by at least 25 percent. Full compensation requires that work capacity is completely lost. Work capacity is in general

¹For a more complete description, see Palme and Svensson (1999 and 2001).

²In 2001 the exchange rate was 1\$ \approx 10 SEK.

Benefit	Determination of normal benefit	Actuarial adjustment	Eligibility
<i>National old-age pension</i>			
Basic	unrelated to previous earnings; 96 % of BA for unmarried; 78.5 % of a BA if married	0.5 % reduction for each it is claimed before the 65th birthday; 0.7 % increases for each month delayed.	age 60
ATP	60 % of average earnings of the 15 best years below the social security ceiling; proportionately reduced if less than 30 years of contributions	Same as for Basic pension	age 60
Special supplement	supplement for pensioners with no or low ATP		
<i>Occupational pensions</i>			
Blue collar workers (STP) ¹	10 % of average earnings of the 3 best years between age 55 and 59.	cannot be claimed before age 65	three years of earnings between age 55 and 59
White collar workers (ITP) ²	earning the year before retirement; 10 % below 7.5 BA; 65 % 7.5 - 20 BA; 32.5 % 20 - 30 BA	normal retirement age 65; can be claimed with an actuarial adjustment of about 6 % per year for most occupations	age 60; individual actuarial adjustment if claimed before age 60
Employees in central government ³	average earnings during the five years preceding; retirement; 10 % below 7.5 BA; 65 % between 7.5 and 20 BA; 32.5 % between 20 and 30 BA	normal retirement age 65; actuarial adjustment of about 6 % per year	in general age 60; if the worker retire before age 60, a life annuity is paid out starting at age 65
Employees in local governments ⁴	average earnings of the best 5 of 7 years before retirement; 96% below 1 BA, 78.5% 1 - 2.5 BAs, 60% 2.5 - 3.5 BAs, 65% 7.5 - 20 BAs, 32.5% 20 - 30 BAs	normal retirement age 65; can be claimed with an actuarial adjustment of about 6 % per year	in general age 60; if the worker retires before age 60, a life annuity is paid out starting at age 65

Notes: ¹Currently being replaced by a fully funded scheme. Workers born 1938-40 in a "transition scheme"

²Also contains a funded scheme ITPK. ³Also contains a funded scheme "Kåpan".

⁴Calculated as a "gross" pension. Pension from the public schemes included in the benefit amounts.

Table 1: Old-age pension programs in Sweden.

determined by a physician, and eligibility for disability insurance is determined by the local social insurance administration. Between 1970 and 1991 disability insurance could be granted for labor market reasons. Disability benefits consists of a basic pension and a supplementary pension (ATP). The level of the basic pension is the same as for the old-age scheme and the supplementary pension is determined in the same way as for the old-age scheme with no actuarial reduction for early retirement. "Assumed" pension points are calculated for each year between the date of retirement and age 64.

Sickness insurance (SI) replaces a share of lost earnings due to temporary illnesses up to the social security ceiling. The replacement level in the insurance has been changed on several occasions during the time period covered by this study. A reform in 1987 set the replacement level to 90 percent of the worker's insured income. Since then, the replacement has been decreased several times. In 1991 it was decreased for short sickness spells. In 1996 it was set to 75 percent of the insured income for long sickness spells and in 1998 it was raised to 80 percent.

The *unemployment insurance* (UI) benefit consists of two parts: one basic part, which is unrelated to the worker's insured income, and one part which requires membership in an unemployment benefit fund and is related to the worker's insured income. Unemployed workers who actively search for a new job are eligible for compensation. The main difference between the benefit level in the unemployment and sickness insurance is the ceiling. The ceiling of the latter is the same as for other parts of the social insurance system, while that of the former is subject to discretionary changes, and is lower than

the ceiling for the sickness benefit. The replacement rate for unemployment insurance has also been changed on several occasions during the time period analyzed in this empirical example. These changes have roughly followed the changes in the sickness insurance.

There are also negotiated occupational insurance programs for unemployment, disability and long term sickness. These programs cover the same groups as the occupational pensions. The replacement levels are similar to those of the occupational pensions which are shown in Table 1, i.e., they are complements to the public insurance programs and the replacement levels are higher above the social security ceiling.

2.3 Income Taxes and Housing Allowances

Sweden went through a major income tax reform in 1991. Before the reform, all income were included in the same tax base and taxed with a proportional local government tax (around 30 percent depending on municipality) and a progressive national tax. The maximum marginal tax rate was set to 75 percent. A main feature of the tax reform was that the tax base was divided into capital income and earned income. Income from capital is subject to a 30 percent national tax while earned income is subject to a local government tax and above a certain break-point a 20 percent national tax.

Old-age, disability, and survivor's pensioners with low income are entitled to a housing allowance. In 1995, this allowance was at most 85 percent of the housing cost up to a ceiling. About 30 percent of all old-age pensioners received housing allowances in 1995.

3 Data

We use the Longitudinal Individual Data (LINDA) panel. LINDA is a sample drawn from administrative records. It contains data from Statistic Sweden's Income and Wealth register, which is a register containing data from income tax returns for the entire Swedish population; the Population Census, which is data primarily on occupation and housing conditions from mailed questionnaires distributed every five years to the entire population; and the National Social Insurance Board registers, which contain data on contributions to the public pension schemes.

The total sample size of LINDA is about 300 000 individuals. Detailed income components are available from 1983. Data on earnings below the social security ceiling are available from 1960.

Our sample consists of men born between 1927 and 1940. We have excluded individuals younger than age 50. For example, the youngest cohort, born in 1940, are just 43 years old in 1983 and we therefore exclude the first seven observations for each individual from this cohort. We have also excluded the self-employed because the quality of the income data for this group can be questioned.³ Furthermore, LINDA does not include information on their pension rights.

Using these criteria 15,619 observations remained from the originally 22,375 for the cohorts included in the study. The total number of observations is 127,390.

³Self-employed are always able to accumulate wealth within their own business.

4 Trends in labor force participation rates and pathways to retirement

4.1 Historical trends in labor force participation rates among older workers

Figure 1 shows trends in labor force participation for men in different age groups. These figures reveal several distinct patterns. The males labor force participation rate has decreased in all these age groups over the past decades. However, the development is most dramatic in the age group between 60 and 64. In 1963, the labor force participation rate in this age group was almost as high as in the younger age groups at about 85 percent. Almost 40 years later, in 2001 the corresponding figure is below 60 percent. The development of labor force participation rates for the age group 60-64 is dramatic in the sense that almost one-third of the labor force in this group has disappeared. However, as is shown in Figure 2, the same pattern has emerged in most comparable countries and has been even more dramatic.

Figure 3 shows the trends in labor force participation rates by age groups for women. Compared to the corresponding graphs for men, the trends for women are more complex. Among women, labor force participation rates increase at a decreasing rate in most age groups. The most likely explanation for this pattern is that there is an underlying “cohort effect” of increasing female labor force participation, combined with a “period effect” towards earlier exits from the labor market. The graphs show that the labor force participation rates seem to be fairly stable among women since the early 1990ties.

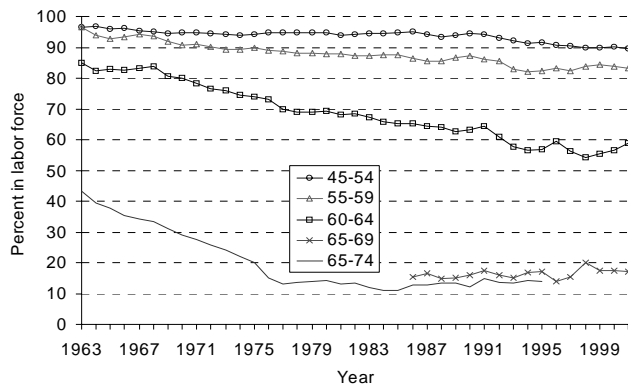


Figure 1: Historical trends in labor force participation in different age groups of older men in Sweden. Source: The Swedish Labor Force survey, Statistics Sweden.

4.2 Timing of the exit from the labor force in different groups of the labor force

Although no direct information on date of exit from the labor market is available in our data set, it is possible to measure this date indirectly from the individual information on income components in the data. We measure exit from the labor market as the year when the worker permanently starts to earn less than one *Basic amount* (BA) from labor. An alternative measure is the year when the worker starts to claim income security benefits. However, in most old-age pension systems in Sweden, the worker is able to continue to work while claiming benefits without any reductions in benefits. This means that using claim of benefits will be a misleading measure of labor market status for individuals who continue working. A worker can leave the labor force in two ways: the worker can either retire or die. We will not distinguish between these modes when we present the results. Because the

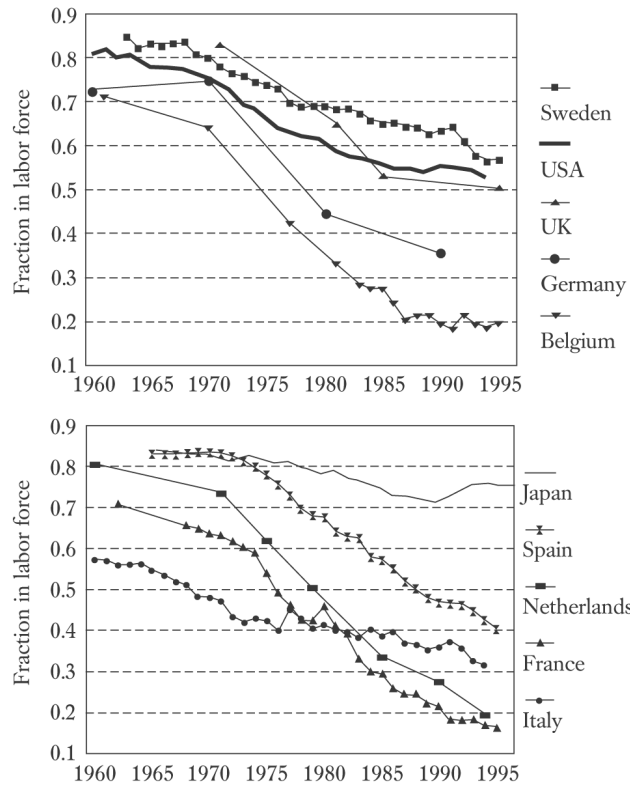


Figure 2: Historical trends in labor force participation rates in the age group 60-64 year olds in different OECD countries. Source: Gruber and Wise (1999).

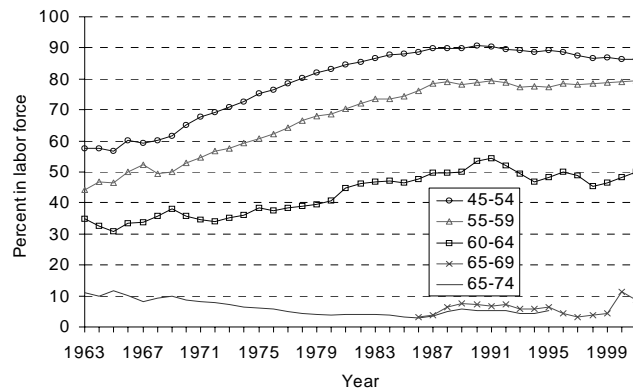


Figure 3: Historical trends in labor force participation in different age groups of older women in Sweden. Source: The Swedish Labor Force survey, Statistics Sweden.

mortality among the individuals who remain in the labor force is quite low, only about 5 percent can be estimated to leave the labor force due to death,⁴ the main differences between the groups shown in this Section are due to differences in retirement behavior.

Table 2 shows survival functions, i.e., the share remaining in the labor force in the one-year age groups between age 55 and 70 conditional on being in the labor force at age 55, for different groups on the Swedish labor market. The north-west panel compares male-female timing of retirement. Until age 62 the survival functions for labor force participation are almost identical for men and women respectively. However, starting at age 63, labor force participation rate among men is about 5 percentage points higher than among women. Very few women work beyond age 65.

The north-east panel compares labor force participation for male white-

⁴See Palme and Svensson (2002).

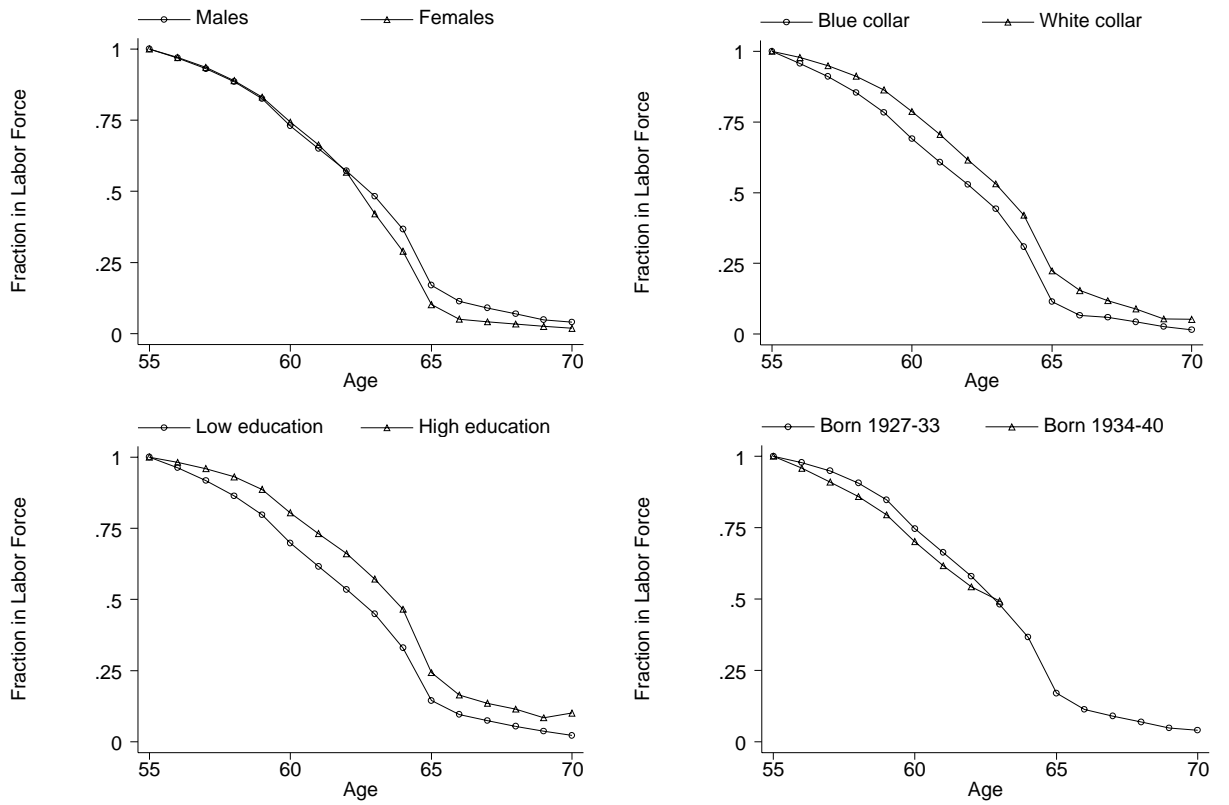


Table 2: Comparing labor force participation rates for different groups of workers conditional on being in the labor force at age 55. North-west panel: male and female workers. North-east panel: male blue and white collar workers in the private sector. South-west panel: male workers with different educational attainments. South-east panel: different birth cohorts. Source: authors' own calculations from the LINDA panel survey.

collar workers with blue-collar workers in the private sector. The graph shows a clear difference between the two groups: white-collar workers retire on average later and the difference is mainly due to a higher retirement rate for workers aged 56-59. This difference can be attributed to a large number of differences between these two groups, such as differences in health, preferences, job characteristics or economic incentives as well as differences in income levels and occupational pensions schemes. The south-west panel shows that the difference between the survival function for labor market participation is even larger between groups with low and high education levels respectively. For example, at age 62 the difference in the labor force participation rates between these two groups is 13 percentage points. Finally, the south-east panel shows that the trend towards earlier retirement seems to be present also in our data set since the survival function for the cohorts born later is below the corresponding graph for the cohorts born earlier.

4.3 Pathways to retirement

The sources of income after the exit from the labor market provided by the Swedish income security system can be divided into two groups: old-age pensions and benefits from labor market insurance (unemployment, sickness and disability insurance).

Table 3 shows the share of workers who receive their main income (more than 50% of their total non-labor income) from one of ten different sources of income after retirement. The table is constructed for the individuals who are born between 1927 and 1932. Since these birth cohorts have reached the “normal” retirement age of 65 at the end of the period under study (1997)

	Men	Women
1. State old-age pension	33.70	26.94
2. Occupational pension	13.68	14.21
3. Disability pension (DI)	6.55	6.59
4. Survivor's pension	-	3.99
5. Wife's supplement	0.02	2.0
6. Severance payments from employer	0.60	0.69
7. Private pension	0.86	0.76
8. Sickness insurance	20.53	26.88
9. Unemployment insurance	8.35	6.42
10. Partial retirement benefit	10.04	6.83
11. No income source more than 50 %	5.67	4.64

Note: The 10.02 percent of the male sample and the 6.11 percent of the female sample who not yet retired by the end of the panel are included in source 1. Source 5 also includes some other minor benefits in addition to wife's supplement.

Table 3: Percentage share of the pathways to permanent exit from the labor market showing main source of income (more than 50 percent from the indicated source); cohorts born 1927-1932.

their pathway to retirement is known. The programs that are designed to serve as old age pensions programs are: the state old-age pension (1), occupational pensions (2), pensions provided by the employer or severance payments (6), private pensions (7) and partial retirement benefits (10). The insurance programs that cover income loss from poor health or unemployment, that can be used to finance retirement, are disability insurance (3), sickness insurance (8) and unemployment insurance (9).

Table 3 shows that the labor market insurances (3, 8 or 9) as initial source of income after retirement account for about 35 percent of the male and about 40 percent of the female sub-sample for these birth cohorts. Sickness insurance is the most common insurance as the initial source of income, accounting for 20 percent of all labor market exits for men and 27 percent for women. Among the old-age pension programs, the national old-age pension dominates with 34 percent for men and 27 percent for women. Occupational pensions are also important as an initial source of income after retirement – about 14% of both men and women use this pathway.

The differences in pathways among workers can to a large extent be explained by differences in occupational pension schemes and education level. Table 4 shows the initial source of income after retirement among workers with different occupational pension schemes, and Table 5 shows the corresponding figures for different educational groups.

According to Table 4, among blue-collar workers in the private sector the most common initial source of income after retirement is sickness benefits. Sickness insurance accounts for 31 percent of all labor force exits in the male sub-sample, and 35 percent in the female sub-sample. Unemployment

	Men					Women			
	1	2	3	4	5	1	2	3	4
1. State old-age pension	25,7	36,2	28,3	41,1	48,9	24,3	31,0	25,9	25,4
2. Occupational pension	5,1	19,5	32,0	16,9	4,4	4,2	12,6	16,4	20,5
3. Disability pension	7,1	4,4	8,9	5,7	9,0	6,0	5,3	10,8	6,4
4. Survivor's pension			0,3			2,7	3,3	3,7	4,8
5. Wife's supplement	0,1					2,8	0,2	1,9	1,9
6. Severance payments from employer	0,1	1,7		0,8	0,1	0,3	3,1	0,3	0,2
7. Private pension	0,4	1,0		0,4	3,1	0,3	0,8		0,6
8. Sickness insurance	31,1	12,6	14,0	17,0	17,8	34,8	18,8	22,4	28,3
9. Unemployment insurance	13,1	7,7	4,8	2,5	5,7	14,1	8,6	5,4	1,8
10. Partial retirement benefit	12,9	8,8	7,3	9,3	7,7	6,2	10,3	9,0	5,7
11. No income source more than 50%	4,6	8,3	4,5	6,3	3,3	4,5	6,1	4,2	4,3

Table 4: Main source of income after exit from the labor force by group off occupational pension scheme.

	Men				Women			
	1	2	3	4	1	2	3	4
1. State old-age pension	30,2	32,1	37,3	47,8	23,2	27,7	31,7	37,9
2. Occupational pension	8,1	14,2	22,4	22,9	9,4	16,9	20,6	18,3
3. Disability pension	6,5	8,1	5,5	4,9	6,2	6,6	5,7	10,2
4. Survivor's pension					3,7	5,0	3,2	1,8
5. Wife's supplement		0,1			3,4	1,4	0,3	
6. Severance payments from employer	0,2	0,6	1,1	1,4	0,5	0,7	1,7	0,5
7. Private pension	0,8	1,0	0,9	0,7	0,8	0,5	1,2	1,5
8. Sickness insurance	27,0	21,2	10,4	7,0	33,0	25,5	19,4	10,2
9. Unemployment insurance	10,5	8,2	6,9	1,2	9,7	4,7	3,2	1,5
10. Partial retirement benefit	11,8	9,1	9,2	5,6	6,5	6,9	7,0	7,9
11. No income source more than 50%	4,9	5,4	6,5	8,6	3,7	4,3	6,0	10,2

Note: 1= compulsory education only; 2= vocational schooling; 3= highschool; 4= college or university education.

Table 5: Main source of income after exit from the labor force by education level.

insurance, and for men, partial retirement benefits are also important. Other groups, that are likely to use insurance programs other than old-age pensions to exit the labor market include women in the public sector - both central and local government. For female local government employees, sickness insurance is the dominant initial source of income.

The differences between educational groups are also large as shown by Table 5. The frequency of the national old-age pension as the initial source of income increases with education, from 30 percent of all exits among men with only compulsory education to 48 percent among men with college or university education. The corresponding figures for women are 23 and 38 percent. The opposite pattern is true for sickness and unemployment insurance. Hence the data indicate clear gender differences with respect to the importance of sickness insurance and the state old-age pension. Women are more likely to retire using sickness benefit and less likely to retire using the national old-age pension than men.

So far we have only described the initial main income source after retirement. Within the Swedish income security system many possibilities to combine and switch between the different labor market insurance and retirement programs exist, e.g. from UI to SI to DI and then finally to old-age pensions. Those who start to receive state old-age pension benefits at retirement are most likely to continue to do so, and those who leave the labor force with disability insurance as their main source of income will be transferred to old-age pensions at age 65. Those who start with occupational pensions are also likely to switch to state old-age pensions as the main source at age 65.

	Number of years before DI as main income source					Mean
	1	2	3	4	5+	
Age 50-55						
Sickness insurance	9.09	37.60	33.47	9.09	10.74	2.75
Unemployment insurance	-	7.69	30.77	15.38	46.15	4.00
All	8.91	35.66	33.33	9.30	12.79	2.81
Age 55-60						
Sickness insurance	20.10	42.44	27.17	6.67	3.62	2.31
Unemployment insurance	3.92	40.20	38.24	13.73	3.92	2.74
No income source more than 50 % alone	51.02	18.37	24.49	6.12	-	1.86
All	18.91	41.21	28.70	7.66	3.53	2.36
Age 60-65						
Sickness insurance	49.31	40.79	9.95	-	-	1.60
Unemployment insurance	10.42	64.58	25.00	-	-	2.15
No income source more than 50 % alone	75.56	18.89	5.56	-	-	1.30
All	49.74	39.48	10.78	-	-	1.61

Table 6: Percentage distribution of the number of years after permanent exit from the labor force before DI becomes the main income source. Retirees with initial income from sickness/unemployment insurance only.

In Palme and Svensson (2001) we show a detailed analysis of the frequency of transitions to other income sources for those who start with sickness or unemployment insurance as their main income source after retirement. It was found that in most cases a transition to disability pensions takes place after one to two years. This finding was used in Palme and Svensson (2001) to construct two stylized pathways to retirement for the purposes of incentive calculations: the old-age pensions pathway and the labor market insurance pathway.

Table 6 shows the distribution of the number of years between retirement and the transition to disability pensions for different age groups. A majority of those who initially left the labor force with sickness or unemployment

benefit make the transition within two years after they retired. Those who retire at relatively older ages make a faster transition to disability insurance.

The east panel of Table 7 shows the labor force participation survival functions for males conditional on financing the labor force exit by old-age pension and labor market insurance respectively. For obvious reasons, those who use labor market insurances retire on average much earlier than the old-age pension group. The graph of the survival function for those who retire by old-age pensions changes slope at age 60. This is probably due to the fact that 60 is the eligibility age for benefits in most old-age pension schemes.

The west panel of Table 7 shows that for old-age pensioners the behavior is remarkably similar between the two groups, although a somewhat larger share of the white collar workers stay after age 65. This means that the difference in timing of retirement between white- and blue-collar workers can be explained by workers who finance their labor market exit by labor market insurance.

5 Measuring income security incentives for retirement⁵

A compulsory old-age pension scheme affects labor market behavior of older workers in at least two ways. First, it creates individual wealth, the expected present value of future benefit payments, which, provided that leisure as retired is a normal good, creates an incentive for the worker to exit from the labor force. For at least some workers, this wealth is likely to be greater than

⁵We have, in order to save space, restricted the presentation of results in this Section to men. However, the main conclusions applies also to women.

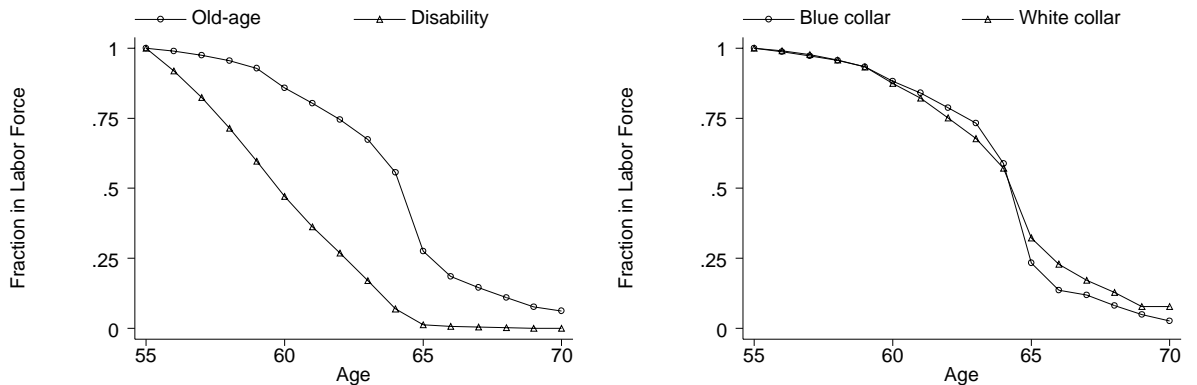


Table 7: Comparing labor force participation rates for different groups of workers conditional on being in the labor force at age 55. West panel: old-age and labor market insurance paths to retirement. East panel: blue and white collar workers in the private sector conditional on taking the old-age pension path to retirement. Source: authors' own calculations from the LINDA panel survey.

the wealth that they would have had saved for their retirement in absence of a old-age pension scheme. Second, the actuarial reductions for early withdrawal of benefit and general rules on contributions to the pension scheme for determining the level of the benefits may, on the other hand, create incentive for the worker to stay in the labor force. Thus, to study individual incentives to exit from the labor force generated by the income security system we need two different measures: one for the size of the wealth at different ages and one for the change in wealth from staying an additional year in the labor force.

Income security wealth is defined as the expected present value of a worker's future pension benefits at year t if he retires at age r , i.e.,

$$ISW(t, r) = \sum_{s=r}^{\max \text{ age}} \delta^{s-t} E_t B(s, r), \quad (1)$$

where δ is the discount factor which we set to 0.97 in the empirical analysis, i.e., 3 percent interest rate, and $E_t B(s, r)$ is the expected benefit at age s if the worker retires at age r , i.e.,

$$\begin{aligned}
 E_t B(s, r) = & p(s | t) q(s | t) BM(s, r) + \\
 & + p(s | t) (1 - q(s | t)) BS(s, r) + \\
 & + (1 - p(s | t)) q(s | t) S(s, r, t),
 \end{aligned} \tag{2}$$

where $BM(s, r)$ is the worker's pension benefit at age s if he is married and retires at age r ; $BS(s, r)$ is the worker's pension benefit at age s if he is not married and retires at age r ; $S(s, r)$ is the survivor's benefit when the worker would have been aged s and retired at age r ; $p(s | t)$ is the probability of survival at time s conditional on survival at time t ; $q(s | t)$ is the probability of the spouse surviving at age s conditional on survival at age t . $S(s, r, t)$ depends on the spouse at time t as well as the retirement age r , while $BM(s, r)$ and $BS(s, r)$ are not dependent on t since we assume perfect foresight about wages. We also disregard the possibility of divorce.

Table 8 shows income security wealth for the old-age pension path of retirement for ages between 55 and 70 for the average in the first, fifth and tenth decile of predicted permanent income, respectively. Permanent income is calculated as the sum of predicted income⁶ for the 15 years that we are able to observe labor income in the data set. Each figure contains three graphs: one showing the wealth from the public pension system, one which in addition

⁶Predicted income equals actual income when observed. If it is not observed, e.g. because the worker has retired, it is calculated as the average of the earnings the three years preceding the missing observation. We have predicted earnings for each missing individual observation over the 15 years between 1983 and 1997 covered by the data.

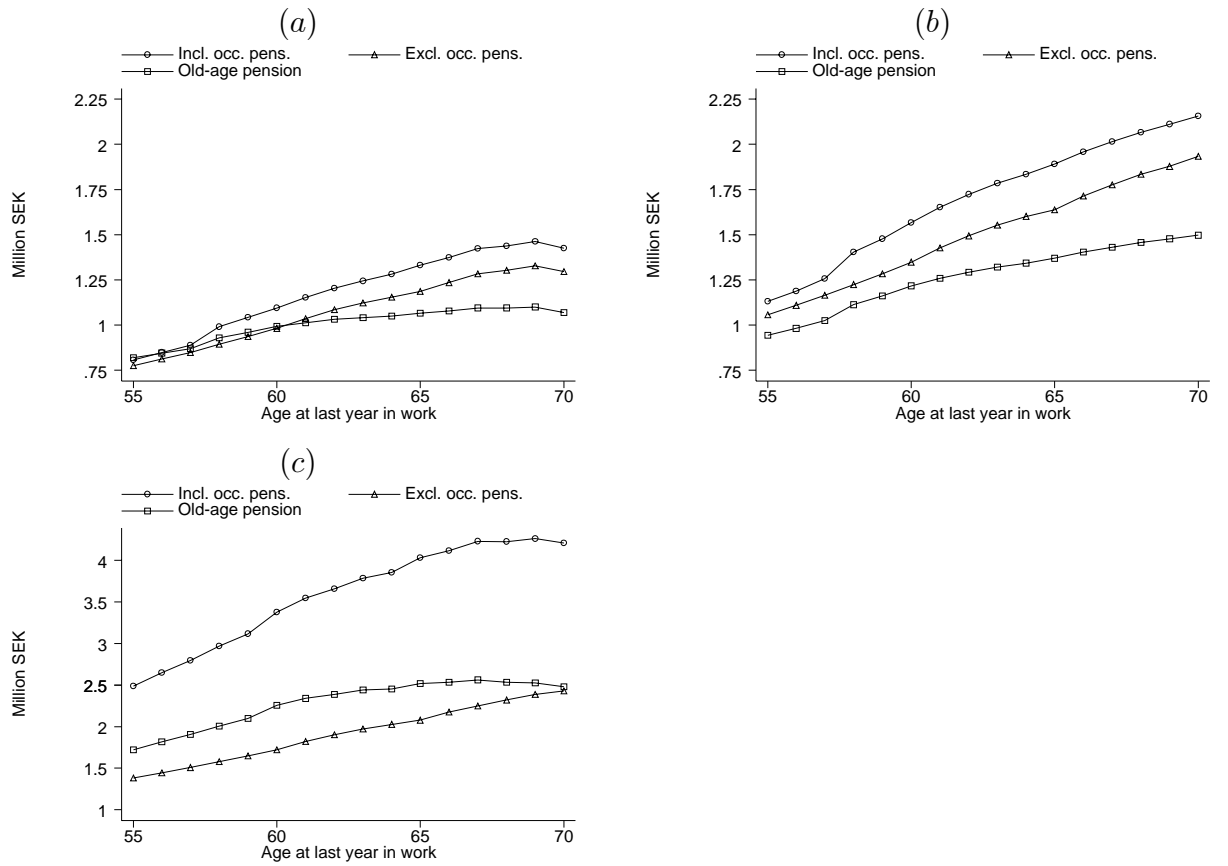


Table 8: Average income security wealth by age for different income concepts. 1st (a), 5th (b) and 10th (c) decile in the distribution of permanent income.

to the public system also includes occupational pension, and, finally, the net income security wealth, i.e. the wealth corresponding to benefit income net of income taxes and housing allowances. The differences between the first two graphs shows the importance of occupational pensions and the difference between the second and third graph, the effect of income taxes and housing allowances.

The results in Table 8 show that there are considerable differences in the

size of the income security wealth between the income groups. If a worker retires at age 65, mean income security wealth is 1.3 million SEK in the first decile, compared to about 2 million in the fifth and more than 4 million in the tenth decile. This shows that the Swedish public and compulsory occupational schemes insure the incomes for all deciles in the income distribution. It is clear from the graphs that the occupational pensions are much more important for the high income earners: it corresponds to more than half of the income security wealth in the tenth decile, but only about 10 percent in the fifth decile. The reason for these results is that most high income earners have earnings above the social security ceiling, which are not covered by the public income security system but are covered by occupational pensions.

Table 9 shows mean income security wealth by age for different occupational pension group: white- and blue-collar workers in the private sector and employees in central and local governments respectively. Each figure shows two different graphs: one for the public old-age pension system and one where the occupational pension is also included. The results show that the occupational pension is most important for white-collar workers in the private sector. The explanation for this result is the fact that this group has the most generous pension scheme and that the share of workers above the social security ceiling is the largest in this group.

The income security system affects retirement behavior not only through the old-age pension scheme but also through unemployment, sickness and disability insurance. Typically, the worker has access to an old-age pension scheme once a minimum age requirement is met. The labor market insurance schemes have additional eligibility requirements. Access to the

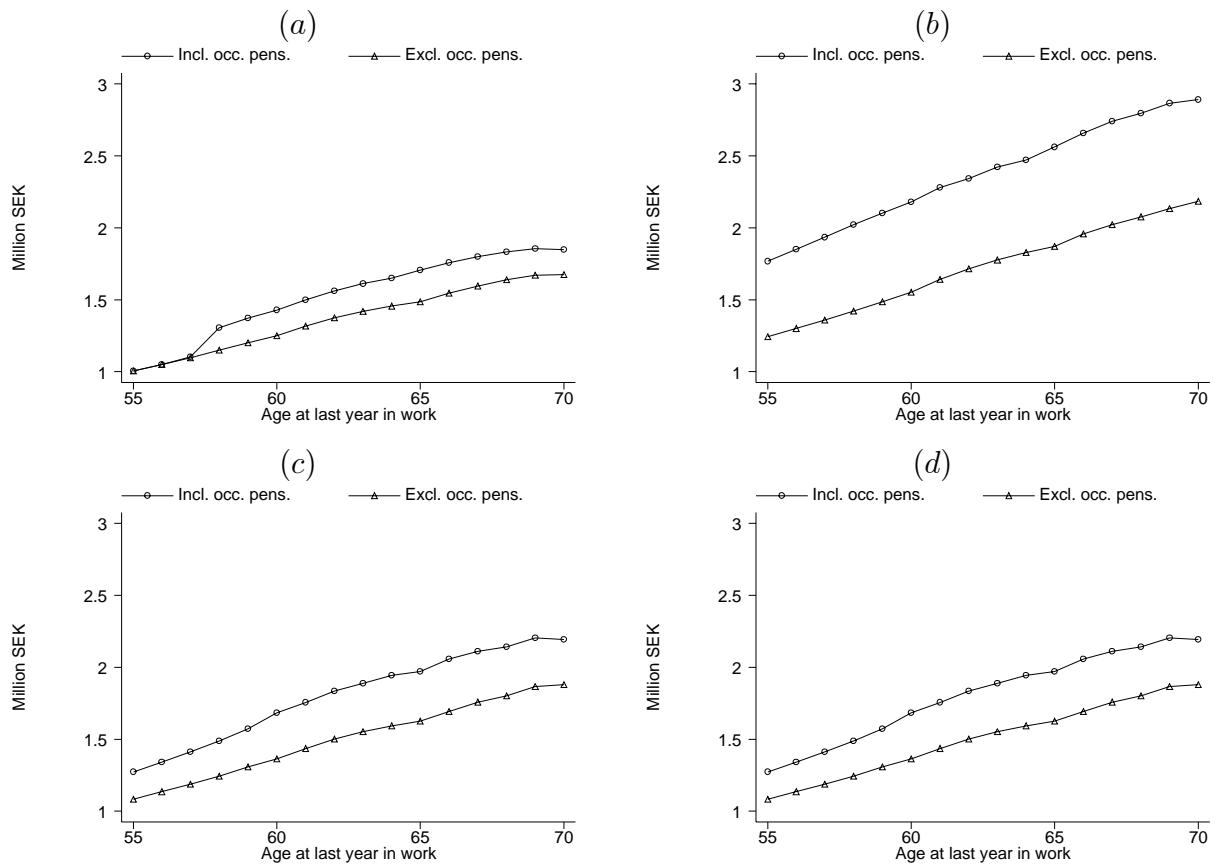


Table 9: Average income security wealth by age for the old-age pension path to retirement. Including occupational pension versus excluding this income source. (a) blue collar workers in the private sector; (b) white-collar workers in the private sector; (c) employees in central government; (d) employees in local governments.

unemployment insurance schemes requires active search for a new job. Access to compensation from the disability insurance require that the worker permanently has lost his ability to do his regular work due to health reasons. Therefore, these insurance schemes affects the retirement behavior both through the strictness in giving access to these schemes and the general economic incentives inherent in the schemes.

Table 10 compares income security wealth between the old-age pension and labor market insurance paths to retirement for the first, fifth and tenth permanent income deciles respectively. We use the stylized pathway to retirement through the labor market insurance programs as we described in Section 4.3.⁷ The same mortality risks are used in both cases in order to show the difference in incentives for the same individual.

It is clear from these graphs that there is a huge gain in wealth, in all income groups, from being admitted to a labor market insurance program, rather than retiring through the old-age pension system, if a worker would like to retire at a relatively young age. If a worker retires at age 55, this difference in wealth ranges from 0.75 in the first decile to 1.5 million in the tenth decile. These results imply that not only the old-age pension schemes, but also the labor market insurances cover the incomes in all deciles of the income distribution.

We use two different measures for the gain of staying in the labor force compared to retiring in the current period. The first one, the *benefit accrual* measure, is simply the change in the income security wealth of staying one

⁷See Palme and Svensson (2001) for a detailed description of how this pathway is constructed.

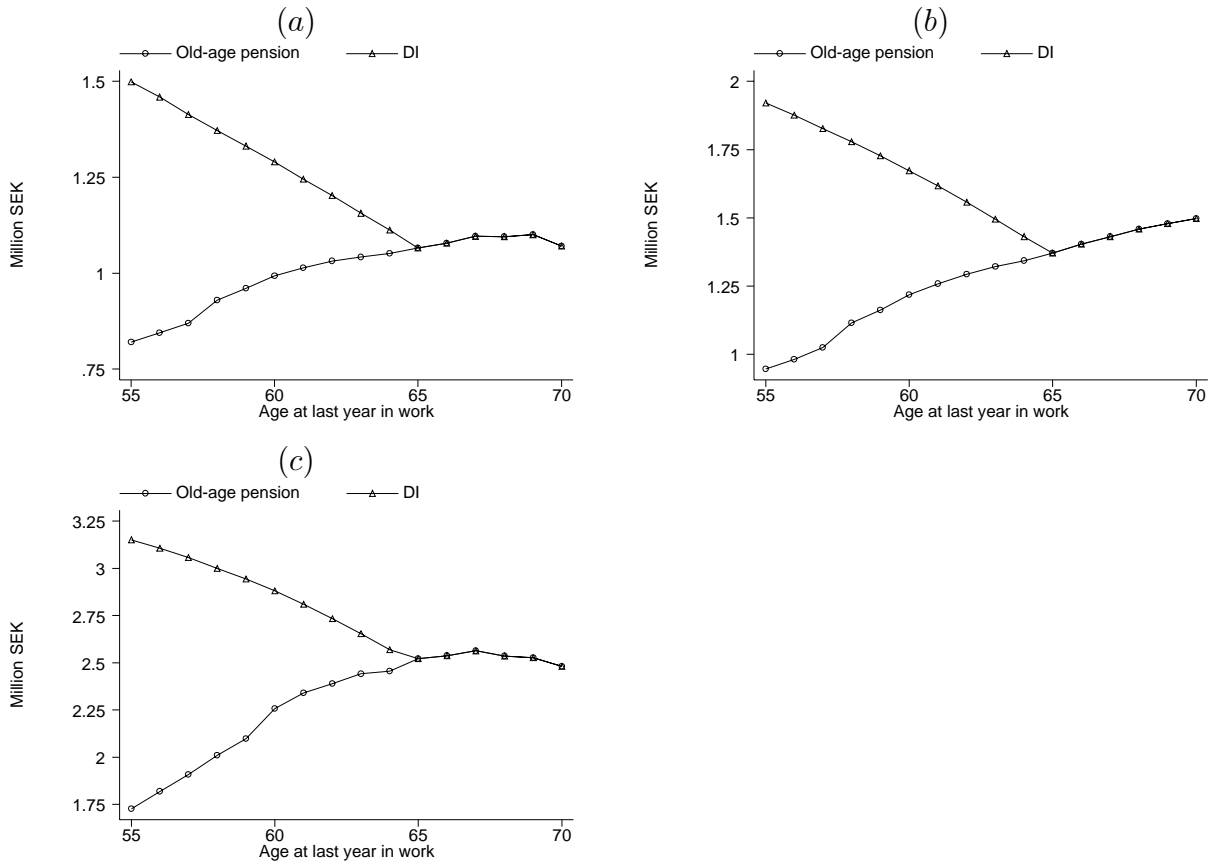


Table 10: Income security wealth by age. Old-age pension and labor market insurance paths to retirement. Averages for 1st (a), 5th (b) and 10th decile groups in the distribution of permanent income.

additional year in the labor force compared to retiring in that period. At age t this measure is defined as

$$ACCR(t) = \sum_{s=t+2}^{\max age} \delta^{s-t} E_t B(s, t+2) - \sum_{s=t+1}^{\max age} \delta^{s-t} E_t B(s, t+1). \quad (3)$$

The benefit accrual measure has been criticized for being myopic in the sense that, although it considers all expected future benefit payments to the individual, it disregards the possibility that the individual may have a greater gain from staying in the labor force some years ahead of the decision period. Since the retirement decision in most cases is irreversible and future gains of staying in the labor force may be an important aspect of the economic incentive, this omission may be misleading for measuring of the economic incentives to stay in the labor force.

An example where this aspect may be important is the STP pension scheme for blue collar workers in the private sector. The benefits from this scheme is, as described in Section 2, equal to 10 percent of the average of the three best years of earnings below the social security ceiling between age 55 and 59. If the worker contributes less than three years to the scheme he or she will not be eligible for any pension at all. This means that the benefit accrual for the first two years are zero while it will be quite large for the third year, i.e., for working between age 57 and 58. The large accrual in the third year is, however, likely to affect the retirement decision the first two years as well although it is not taken into account in the benefit accrual measure.

There are different ways to construct “forward looking” incentive measures. One of the most commonly used is the Stock and Wise (1990) *option value* measure, i.e., a measure of the value of the option of retiring at some

later time than in the current period. The option value measure requires estimation of a number of parameters. Since this is beyond the scope of this paper, we will use a simplified version of the option value measure, the so called *peak value* measure (see Coile and Gruber, 2001). The peak value is defined as social security wealth (SSW) at its maximum value minus SSW at time t , i.e.,

$$PEAK(t) = \max_{r=t+2, \dots, 71} \sum_{s=r}^{\max \text{ age}} \delta^{s-t} E_t B(s, r) - \sum_{s=t+1}^{\max \text{ age}} \delta^{s-t} E_t B(s, t+1).$$

This measure is forward looking in the sense that rather than measuring the immediate accrual in SSW of working one additional year it measures the maximum gain of staying in the labor force in the future.

Table 11 shows the benefit accrual and peak value measures for benefit income by age for the first, fifth and tenth deciles in the permanent income distribution. The results from the first and fifth deciles show a very similar pattern: a spike in the benefit accrual measure of working one additional year at age 57 and a steeply declining peak value measure until age 60, where the negative slope becomes flatter. The explanation for the spikes at age 57 is the eligibility rules in the STP scheme for blue-collar workers in the private sector, as discussed above. The fact that blue-collar workers dominate both the first and fifth decile in the permanent income distribution explains why this spike is apparent in both graphs.

The change in the slope of the peak value measure at age 60, for the tenth decile in the distribution of permanent income shown in panel (c) in Table 11, is due to the fact that old-age pensions from pension schemes for public employees for public employees cannot be claimed if the worker retires before

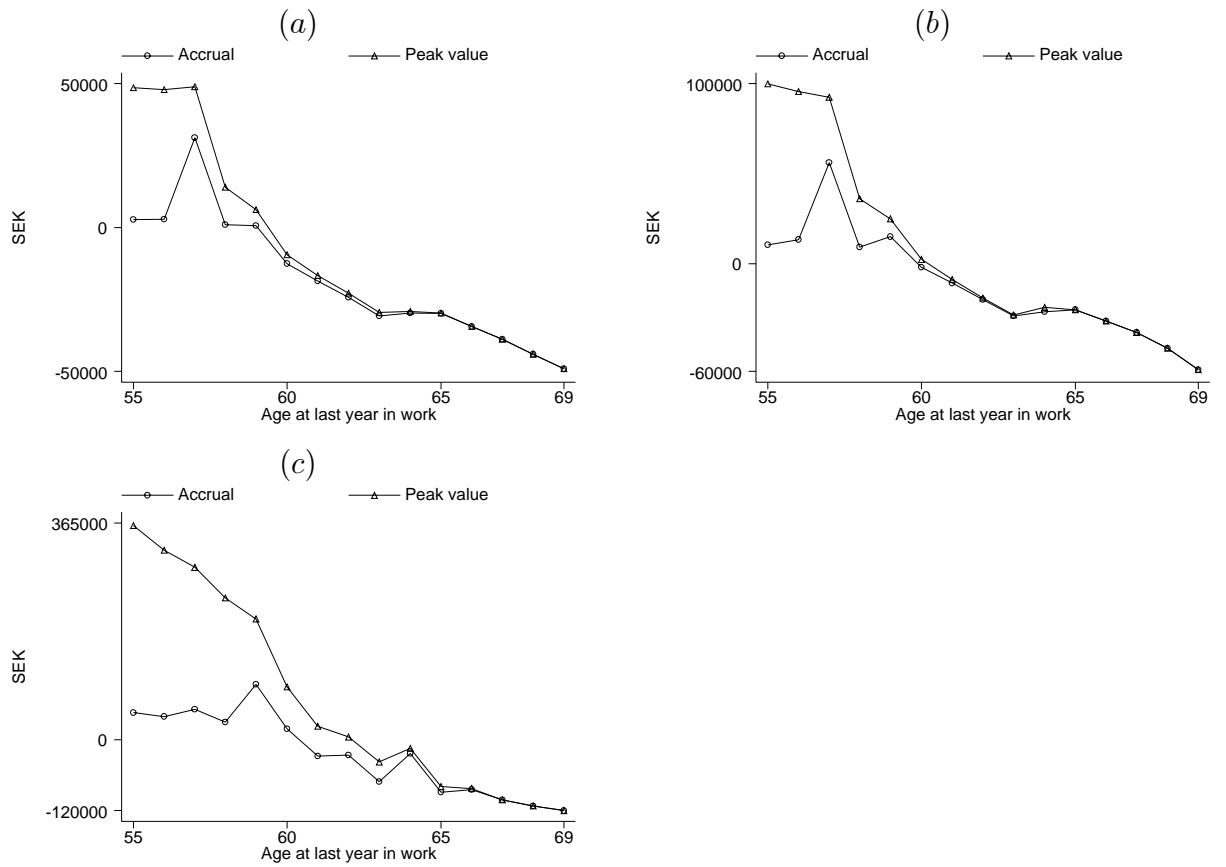


Table 11: Peak value and benefit accrual rates by age at last year of work. Averages for the 1st (a), 5th (b) and 10th (c) decile in the distribution of permanent income.

age 60. The graphs for benefit accrual and peak value start to coincide at age 60 for the first and fifth decile, but not until age 64 for the tenth decile. The reason for this pattern is that the maximum accrual in the future coincides with the one-year change for the first and fifth percentile. The difference in this respect in the tenth decile is likely to be due to more heterogeneity in the benefit accrual pattern in this group.

A negative benefit accrual, that is when the value of the foregone benefit payments is greater than the expected increase in benefits later on by staying one additional year in the labor force, can be interpreted as a tax on additional work from the social security system. As can be seen in Table 11, the benefit accrual becomes negative after age 59 in the first decile and after age 60 in the fifth and tenth deciles. This difference, and the in general lower accrual rate in the first decile, can probably be explained by the greater progressivity of the income taxes for low-income retirees and the means tested housing allowance system for elderly. Comparing the fifth and tenth deciles, it can be seen that although the benefit accrual measure is on average zero at age 60, the peak value measure is still on average positive at that age in the tenth decile. This result implies that workers in the tenth decile have, compared to those in the fifth decile, on average more incentives to additional work at this age.

Figure 4 shows the share of negative benefit accrual observations by age for each of the three decile-groups. These graphs confirms the general picture of the incentives presented in Table 8: the share of negative observations increases rapidly at age 60 and the share of negative observations are in general highest among the low income earners in the first decile.

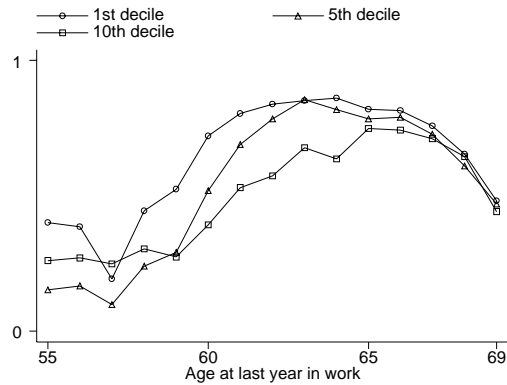


Figure 4: Share of negative benefit accrual observations by age of last year of work for different decile groups in the permanent income distribution.

To sum up, let us compare the results from benefit accrual with those of the peak value measures. The peak value measure, being forward looking, gives less “noisy”, more realistic results: the incentives to stay in the labor force decreases rapidly at age 60 in all three groups. To the extent that workers are forward looking when making decision about retirement, the peak value measure can be expected to work better in modeling retirement behavior econometrically. The results in Palme and Svensson (2001) show that the forward looking measures of economic incentives work slightly better in the sense that the models where they are included gave a higher log-likelihood compared to the models that included benefit accrual. For descriptive purposes the measures convey similar information. However, the benefit accrual measure reveals more clearly the discontinuities, the “spikes”, created by different rules in the social security system. Therefore, in order to save space, we confine ourselves to henceforth just show the results from the benefit accrual measure. We should, however, keep in mind how these

results should be interpreted in the peak value framework.

To study how the public old-age pension system, occupational pensions, housing allowances and income taxes affect the benefit accruals we do the same decomposition analysis as we did above for social security wealth. Table 12 shows separate graphs for benefit incomes from the public system only, incomes from the public system and occupational pensions and, finally, net from housing allowances and income taxes for the averages in the first, fifth and tenth decile in the permanent income distribution.

Table 12 shows several interesting results. First, it can be seen that the graphs for the public old-age pension systems in all three groups show a very similar pattern. The accrual is on average positive up to age 60, but beyond that age the actuarial adjustment for early withdrawal is on average too small to make the system actuarially fair in the sense that benefit accrual is zero.⁸ There is a small spike of working the last year at age 65. This is due to the asymmetry in the actuarial increase from delaying withdrawal of pension benefits: a 0.7 percent increase for each month before the 65th birthday compared to a 0.5 percent reduction for each month of early withdrawal. A second interesting result is the relatively large effect of income taxes and housing allowances in all three groups. A general result is that the income tax and housing allowances “smooths out” spikes in the accrual rate. This will have a more permanent and apparent effect on the peak value measure. Comparing the first and fifth decile groups, it can be seen that the lower accrual rates shown in Figures 12 (a) and (b) is due to the effect of income taxes and the means tested housing allowances to elderly.

⁸Remember that this is conditional on the chosen discount rate.

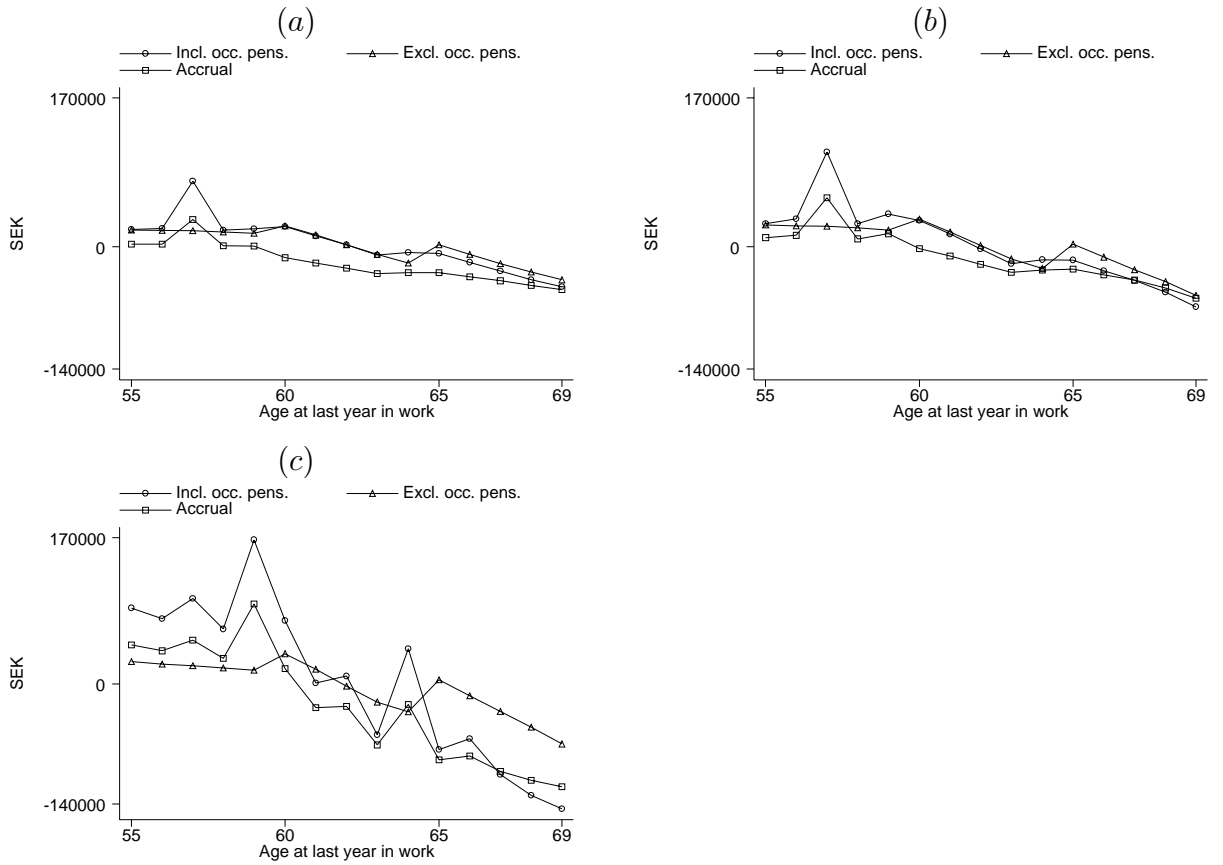


Table 12: Benefit accrual rates by age for different retirement income concepts. Old-age pension path to retirement. Averages for 1st, 5th and 10th decile in the distribution of permanent income.

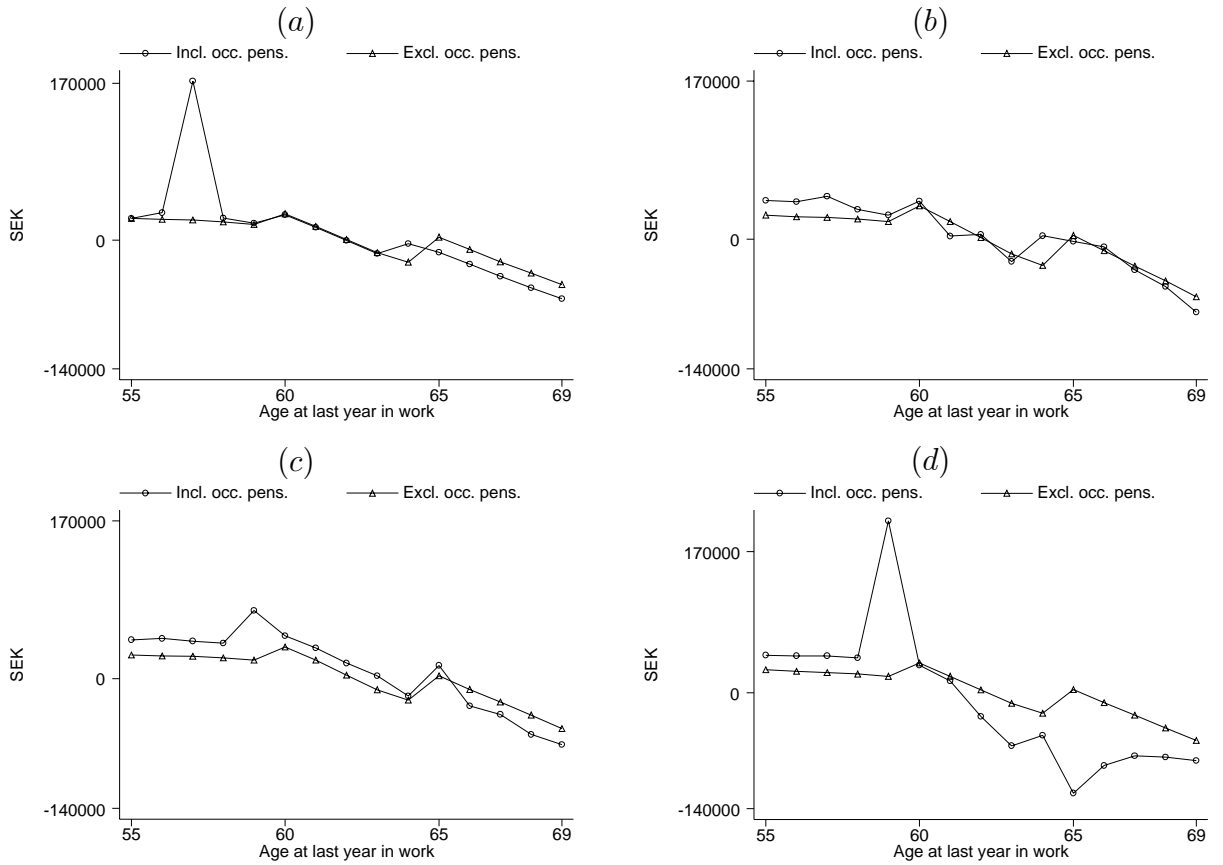


Table 13: Benefit accrual rates by age. Old-age pension path to retirement. Averages for blue collar workers in the private sector (a); white collar workers in the private sector (b); employees in central government (c); local governments (d).

To isolate the effect of occupational pensions, Table 13 shows the average benefit accrual rates by age within each of the four occupational pension-groups. Each figure contains two graphs: one where only the public pension system is considered and one where occupational pensions are also included. We have already discussed the spike for working the last year at age 57 for blue-collar workers. Figures (c) and (d) show similar spikes for workers in the public sector of working the last year at age 59. The reason for these spikes, which is more pronounced for local government employees, is that, as we described in Section 2, public sector employees can only claim their old-age pension at retirement before age 60 as a life annuity which is paid out starting at age 65 with an actuarial reduction.

In sum, the analysis of the accrual measures shows that there are large actuarial penalties for workers who retire one, two or three years before age 60. To what extent does this observation on the incentives to stay in the labor force match up with the observed retirement behavior? One piece of evidence that these discontinuities actually do matter for the retirement behavior is the labor force participation rates by age shown in Table 7 in Section 4. The slope of the graph for those who retire through the old-age pension path changes markedly at age 60. Another way to assess the importance of these incentives is to compare the retirement behavior with another country with different incentives.

Figure 5 compares labor force participation rates in Sweden and the United States for men by age. In the United States there is a stronger element of private pension which supposedly are more closely tied to the contribution made to the insurance than the defined benefit schemes in Swe-

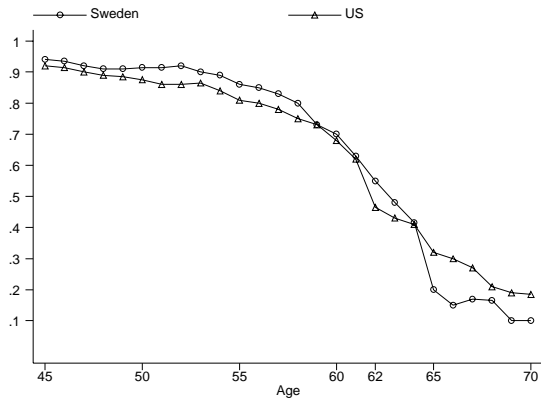


Figure 5: Male labor force participation rates by age in Sweden compared to the US.

den. The graphs in Figure 5 show that Sweden has a higher labor force participation rate up to age 59. Between age 60 and 64 the graphs intersects at several ages, with the US labor force participation rate drops at a faster rate at the early eligibility age of social security at age 62. After age 64 there is a higher labor force participation rate in the US. One interpretation of this pattern is, again, the large actuarial penalties in Sweden for retiring before age 60.

6 Conclusions

Although labor force participation among older worker in Sweden has decreased substantially in recent decades, this decrease has been quite modest, viewed in an international perspective. In this study we have shown that the different old-age pension systems in Sweden create several discontinuities, “spikes”, in the incentives to stay in the labor force. These are concentrated

in the ages before 60 and the observed participation rates suggest that these discontinuities are important for participation behavior.

A second finding in the study is the importance of income taxes and housing allowances for the retirement incentives. By decomposing the incentive measures it was seen that, in particular for low income earners, progressive income taxes and means tested housing allowances, policies designed to make the income distribution among pensioners more equal, counteracted the actuarial adjustments in the pension schemes.

A third finding is the importance of labor market insurance programs. Most workers who retire before age 65 use labor market insurance programs. Our calculations show that eligibility to these insurance programs increases the value of the income security wealth by about 1.5 million SEK at age 55 for a median income earner and by much more for high income earners. These generous insurance programs create strong incentives for workers to exit from the labor force and highlight the importance of the rules for access and their application.

Sweden is currently going through a reform of the old-age pension system: the old defined benefit scheme is being replaced by a notional defined contribution system (see Palmer, 2001, for a detailed description). Also several of the occupational pension programs are changing to defined contribution scheme. In light of the results from this study, alleviating the discontinuity in the benefit accrual, which is an effect by the latter reform, may actually weaken the incentives for workers to stay in the labor force until age 60. Our results also show that considering the incentives generated by the old-age pension scheme alone may be misleading: income taxes, housing allowances

and labor market insurance programs are also very important in determining the overall incentives for older workers to stay in the labor force.

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