

How Large Will the National Pension Be?

(the short version)

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This article summarizes results of different methods of projecting the average replacement level in Sweden's national pension system. The results of the estimates are compared with the pension levels indicated in the Annual Report of the Pension System. The conclusion is that the projected pension level is heavily dependent on the method of calculation used. It is also shown that the lower pensions expected in the new system are explainable largely by the increase in average life span forecast by Statistics Sweden, as well as by the fact that the tax reduction for the individual pension contribution has increased the income with which pensions are compared. The reduction in pension levels due to the increase in average life span could be avoided if the retirement age were raised by 3-4 weeks for each annual birth cohort.

I. Introduction

In each year's Annual Report of the Swedish Pension System *Försäkringskassan*, the Swedish Social Insurance Agency, presents an estimate of what is referred to there as the pension level in the national pension system. The report also indicates that if the retirement age is postponed by roughly two thirds of the increase in life span assumed in the calculations, the pension level will stabilize at around 60 percent.¹

The method of calculating the pension level, as well as the view that its declining tendency is due primarily to the increase in life span while retirement age is assumed fixed at 65, have both been challenged. Flood [1] presents calculations showing that the average *compensation rate* for the national pension system will be 46 percent of the average income at

ages 60-64 for individuals born in 1950 with incomes in an intermediate interval, i. e. in the 25th-75th percentile. The *pension level* shown in the annual report for this birth cohort is 63 percent. In a report commissioned by Länsförsäkringar Göran Normann calculates the national pension for several typical cases in birth cohort 1957. Normann's calculations show that *compensation rates* in the national pension system are around 40 percent of final income for normal wage earners. According to the calculations in the annual report, the average *pension level* for the national pension is 58 percent for individuals born in 1957.

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This article is a highly abridged version of a longer article that can be read at <http://www.sff.a.se/?avd=forlag&sida=pension.lasso>

Table 1 Compensation Rates in Different Reports
Average pension at age 65, calculated by different methods, in percent of incomes variously defined

Birth Cohort	Report					
	Cichon ²	Norman	EU	Scherman	Flood	Annual Report 05
1940	Toward a compensation rate of 30	40	53.0	Substantially lower pensions than in the annual report	54	68
1945			49.6		67	
1950			63			
1955			59			
1960			58			
1965			42.6		-	57
1970			-		56	
1975			54			
1980			54			
1985			40.4		54	
1990			53			

Sweden's National Strategy Report to the EU notes that the compensation rate in the national pension system is 53 percent for persons born in 1940, and 50, 43 and 40 percent, respectively, of final earnings for birth cohorts 1945, 1965 and 1985. Scherman [1, 2, 3] provides calculations for different types of individuals and arrives at similar compensation rates. Table 1 summarizes certain results from the reports.

The methods use different distributions of lifetime income, as well as different definitions of the income with which the estimated pension is compared, to obtain a measure of the proportion of income replaced by the pension insurance system. Moreover, there are differences among the samples of individuals for whom the calculations are performed. In addition to these differences, there are somewhat varied assumptions about the future development of the return on premium pension capital and the question whether balancing will affect the pension level.³ Finally, there are both minor and major differences in the way that the rules of the pension system itself are reflected in the respective analyses.⁴

The choice of the most correct – or least incorrect – projection of the average pension level is thus largely a determination of which

method is best. As an aid in such a determination, some of the various principles used in the reports are briefly described here. Thereafter, a couple of these principles are used to calculate the compensation rate in the national pension system, and the results are compared with the pension levels reported in the annual report 2005.

2. Some Choices of Method – a Summary

Lifetime income, and the size of income at various ages, can be described in various ways. For retired individuals actual income can be used. To describe how incomes will develop in the future, the calculation can be based either on fully fictitious incomes, in so-called typical cases, for example, or on the actual incomes registered for a selection of individuals, with the addition of fictitious incomes for the years remaining until retirement. In Table 1, these two main alternatives for the development of income are given the respective designations of *fully fictitious* and *actual + fictitious*. Moreover, there are two main alternatives within each of these methods. In one case, it is assumed that the income for all ages represented in the labor force

Table 2. Income Profiles and Comparison Incomes in Different Reports

Comparison Income	Income Profile			
	Fully Fictitious		Actual + Fictitious	
	Straight-Line	Concave	Actual + Straight-Line	Actual + Concave
The insured's income in the final year (age 64)	EU Scherman OECD *	*	Normann *	
The insured's average income (ages 60-64)	*	*	*	Flood [1]
Current average, (16-64)	*	*	*	Annual Report

* Method used for calculations in this article.

increases at the same rate as incomes in general up to the time of retirement, a so-called *straight-line* income profile. In the other case, a decreasing, or *concave*, income profile is assumed. The straight-line profile implies that the development of incomes up to retirement is assumed to be the same for all persons each year. If a concave income profile is assumed, the development of incomes up to retirement will be age-specific for each year until retirement; this will mean that incomes either increase only slightly in the final years, or even decrease in the years immediately before retirement.

The fully fictitious and straight-line income profile is easy to describe and understand. Therefore, it is often used in calculations of the size of pensions in various types of pension systems. One of the measures of the size of pensions presented in the National Strategy Report on Reasonable and Sustainable Pensions is calculated according to this principle, which has been jointly adopted by the EU member countries.

One problem with a straight-line income profile is that it is so unlike a typical income pattern and results in higher final-year income than what is, and has been, the case in Sweden at least. If average final earning is overestimated, relative to some "true figure", the average compensation rate of the pension

system will be underestimated.

A more realistic but still fully fictitious income profile would be to assume the in Sweden since long observed concave income profile when making an assumption on the average individual's life earnings. In Sweden yearly average earnings increase more rapidly in ages 16 to around 30, inline with the average earnings from 30 to about 57 and slower than the average from 57 to 65.

An alternative to the fictitious income profiles is to use the information on each insured individual's actual pension credit earned, and to limit the assumptions on incomes to the years remaining until the individual's concerned reach retirement age. If the assumed future development of income for each person is set to coincide with the general development of incomes, the result is a calculation like the one in Table 2, which is designated *actual + straight-line*. In such a calculation, the initial value of pension credit is the same as in the calculation of the pension level in the annual report. However, in the annual report the development of income for the years remaining until retirement is *concave*.

2.1 Comparison income

Which income is appropriate for comparison with pensions in order to provide a measure of their size? The answer depends on the income

profile used in the calculation. Where the income profile is straight-line, it is natural to compare the size of the pension with the individual's income in the year before retirement. But since the average income for all birth cohorts is the same in the case of a purely straight-line income profile, the same results are obtained if the pension is instead divided by the average income for all economically active persons. With a straight-line income profile, there will be no significant problems in choosing an appropriate income for comparison.

Among the assumptions in the National Strategy Report are a straight-line income profile for ages 25-64 and real growth in incomes of 1.8 percent per year. Under these assumptions, income at age 64 will be 140 percent of the individual's lifetime average annual income.

If a concave income profile is used in the calculation, the question which income to compare with is more difficult. If the compensation rate is calculated by comparing the pension with final-year earnings, the calculation may yield a compensation rate that is considered misleadingly high. One reason why incomes decrease beginning around age 57 is that work hours tend to be reduced at these ages, a step that may be regarded as preparation for the transition to retirement. It may then be wrong, or at least questionable, for such a change in behavior to be fully reflected in the compensation rate. One more or less satisfactory way to deal with the problem is to compare the pension with the average income for several years before retirement. It is quite common, for example, to choose the average income for ages 60-64, as in the procedure used in Flood [1].

In the annual report, the question of the income for comparison with pensions at age 65 is managed differently. In the annual report the pension is compared with the average income for all persons in the calculation aged

16-64, provided that the individuals at the time of retirement meet the requirement of 30 years' income of at least one income-related base amount that applies for the calculations in annual report.⁵ One reason to compare pensions with this income is that doing so reduces the sensitivity of the pension level to assumptions about the shape of the income profile. Furthermore, the comparison income thus defined is insensitive to variations in the general growth of incomes, which is not the case with a comparison income determined as each insured's own income at ages 60-64. The comparison income used in the annual report, by contrast, has the obvious shortcoming that the pension level calculated provides basically no information about the change in income that can be expected with the transition to retirement. In the annual report, therefore, the concept of the pension level is used as an indication that compensation rates are not what is described.

Although in principle the *pension level* measured in the annual report provides no information about the change in income with the transition to retirement, it may nonetheless yield such information as a practical matter. The reason is that the average pension-qualifying income of persons aged 16-64 is close to that for persons aged 60-64. This means that if the compensation rate is calculated as the average pension for all new retirees divided by their average incomes when they were 60-64 years old, the result is an average compensation rate that is largely the same (slightly higher with current income patterns) as the pension levels shown in the annual report. It makes no significant difference for the result which definition of comparison income is used. Thus, the pension level calculated in the annual report coincides closely with the compensation rate that would have resulted if the average income of each individual at ages 60-64 had been used as the comparison income.

3. Compensation Rates

In this section follows an abridged description of how compensation rates according to different methods can be calculated.

3.1 Fully Fictitious Straight-Line Income Profile

If a straight-line income profile is assumed it is very easy to calculate the compensation rate in the Swedish pension system. As the "interest" in the *inkomstpension* system is the same as the average rate of growth in income, the average compensation rate for the *inkomstpension* is unaffected by the growth rate. The replacement rate from the so-called *inkomstpension* is calculated by multiplying the contribution rate, 0.16, by number of years worked, here 40. This figure is subsequently multiplied by the effect that survivors bonus have, estimated at 1.06 and by the negative effect that administrative costs have on the size of the notional capital, here estimated at 0.99. This results in a notional pension capital of 6.72 final years earnings. How large yearly pension this notional pension capital will result in depends on the estimated life expectancy of the birth cohort, as this is reflected by the annuity divisor. The projected annuity divisor for birth cohort born in 1955 at age 65 is 16.76. Thus the *inkomstpension* is 0.40 ($6.72 / 16.72$) of final-year earnings, a compensation rate of 40 percent.

The public earnings-related pension also consists of the fully funded *premium pension*. Its size is almost as easy to estimate. The contribution rate is multiplied by the assumed number of years worked, and with the assumed excess return on capital relative to income growth, and with the effect that survivor bonuses and administrative costs are expected to have. In the baseline scenario in the annual report the excess return is assumed to be 1.45 percentage units and the assumed capital-weighted number of years premium

pension earns a return is 21. Thus the size of the premium pension capital before retirement can be estimated to be 1.42 final years' earnings. The annuity divisor of the premium pension is a little bit differently calculated and for birth cohort born in 1955 it is projected to be 15.88, resulting in a premium pension 0.09 final years' earnings, a compensation rate of 9 percent.

However, a troublesome effect arises from the tax reduction for the individual pension contribution that has been phased in gradually and is in full effect as from 2006. This tax reduction has increased the relevant comparison income 7 percent, reducing the compensation rate to 0.46 times final-year earnings ($0.49 / 1.07$).

In Tables 3 and 4 the estimated compensation rate with a fully fictitious straight-line income profile for birth cohort 1955 is only 44 percent. The difference is explained by the fact that in Tables 3 and 4 the assumed excess return on the premium pension has had less impact than the 40 years assumed in the simple standard calculation. Since the premium pension only came into effect in 1995, and then only partially, persons born in 1955 will not have a fully developed premium pension.

3.2 Fully fictitious Concave Income Profile

Estimating the compensation rate with a *fully fictitious concave income profile* requires an assumption on the size of the income at every age pensionable income can be earned. Traditionally in Sweden this has meant from age 16 to 64, since a couple of years there is no lower nor upper age limit. In the calculations made for Tables 3 and 4 the size of the income at each age used has been the one observed in 2003. Notional and premium pension capital at age 64 has been estimated by using this income for each age. For birth cohort born in 1955 this income profile produces combined *pension level* of 54 percent of the average

pensionable income for all persons aged 16-64.

One reason for the higher replacement rate is that the income profile estimated from the pensionable incomes in 2003 implies that 6 percent of all income was earned by persons younger than 25 years. In terms of the straight line profile this amounts roughly to assuming that earnings begin at age 23 rather than at age 25. Generating 42 years of income rather than 40. The excess return of 1.45 percentage units implies that the early incomes increase the pension by some 7, rather than 6 per cent. Thus using the same comparison income as in the straight-line case the compensation rate would increase to 47 percent (44×1.07).

Another reason for the higher replacement rate is that the average income at age 16-64 with which the pension is compared is lower, roughly 0.87 of the final year income in the straight-line income profile. This results in a *pension level* of 54 percent of the average income for all aged 16-64 ($54 = 47 / 0.87$).

It is important to note that, in 2003, the average income at age 64 was only 0.9 of the average income for ages 16-64 and the average income at age 60-64 was 0.98 of the same average. This means that if this concave income profile is assumed both of the two alternative comparison incomes in Table 2 would generate higher replacement rates than the chosen comparison income.

3.3 Actual + Straight-Line Income Profile

The "Orange Envelope" contains a statement with pension projections for each individual based on her/his actual earned pension credit. When the envelope is mailed in February and March, income data are available through the calendar year two years prior to the year of mailing. Thus, envelopes mailed 2005 were based on all incomes that each individual had earned through 2003.⁶ However, income indexation, the return on the premium pension,

inheritance gains and costs of administration were updated to their values as of December 31, 2004. The projection is based on the pension balances of each individual's inkomstpension and premium pension account, respectively, on December 31 of the year preceding the one when the Orange Envelope is sent out.

The Orange Envelope contains projections for the total amount in Swedish currency of the ATP-pension, the inkomstpension, and the premium and guaranteed pensions. The projection is not expressed as a percentage of some income; percentages have not been considered appropriate for this type of information. Projections are calculated for three different retirement ages: 61, 65, and 70. For each retirement age, a projection is provided with two different pairs of assumptions for income growth and for the rate of return, net of the costs of fund management, on premium pension capital. The assumptions are 0 percent annual growth in income and a 3.5 percent annual return on the premium pension for one pair, and 2 and 5.5 percent, respectively, for the other. All assumptions are in real terms, projected pensions are thus in fixed prices.

The reason for providing a projection with an assumption of zero-percent growth in income is that it enables the individual to compare the projected pension with her/his most recent known income. The zero-growth assumption is a way of indirectly furnishing information on the projected compensation rate, assuming a future straight-line income profile. With an assumption of positive growth in incomes – two percent in the Orange Envelope – the projected pension of many younger people, the age limit being roughly 45, will equal or exceed their current income. At the same time, the pension projection in relation to final income, given the assumptions in the projection, is largely identical in the two pairs of income growth and return.

The higher growth and return will lead to a larger pension in terms of absolute purchasing power, but not relative purchasing power. This constitutes a pedagogical problem with the projection, and Försäkringskassan and the Premium Pension Authority are endeavoring to alleviate it.

As the income of the insured is assumed until retirement to be the same in every year as the income most recently recorded, there is an assumption of a straight-line income profile for all years of each insured's remaining working life up to retirement. In the zero-growth alternative of the projection, as previously noted, it is assumed that the premium pension funds earn an annual return of 3.5 percent after deduction of fund management fees.⁷ Thus, the real net return on capital exceeds growth in incomes by 3.5 percentage points.⁸ Whether this return is high in relation to zero growth in incomes can be and has been debated. An extreme condensation of these discussions is that the assumption in the Orange Envelope is roughly in line with the historical relationship between the average yield on the stock market and income growth in Sweden. At the same time, it is clear that the historical tendency during this period and in this geographic region is by no means necessarily a good "forecast".⁹ The current review of the design of the projection will also include the assumption about the size of the excess return.

In Diagram 1, the compensation rate that follows from the projections in the Orange Envelope has been summarized. Here the projected pension of each individual, excluding any guaranteed pension, at the retirement age of 65 and with 0 income growth and a return of 3.5 percent, has been divided by the pension-qualifying income of that individual in 2003. For persons with no income in 2003, no compensation rate can be calculated, and they are excluded from the calculation. Persons with a compensation rate above 150 percent have also been excluded. The reason

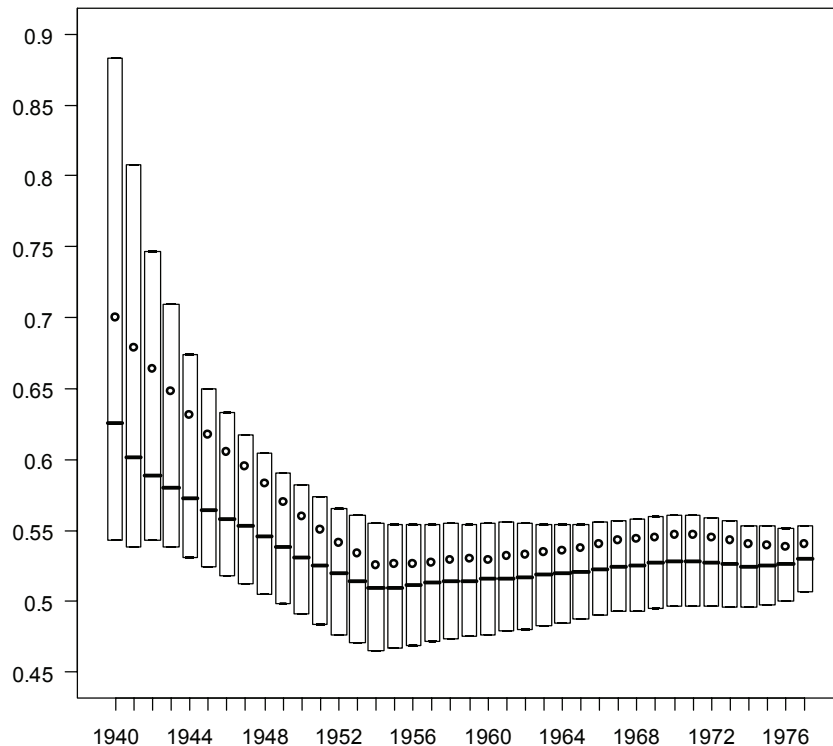
is that such high compensation rates are usually due to an income so low that it is normally temporary. An average for each age/birth cohort has then been calculated by adding up all compensation rates and dividing by the number of individuals.

The compensation rates in Diagram 1 are based on the 3 953 456 projections remaining after this sample. Among the reasons why there are so few projections in the calculation compared to the nearly 6 million Orange Envelopes sent out are that no projections are made for individuals below age 26 and that individuals with no pension-qualifying income have been excluded.

Both the assumptions underlying this calculation and the method used in Diagram 1 differ in significant respects from those used in the annual report and in the simplified calculations with a fully *fictitious straight-line* and a *concave income profile*. In the annual report and the method with a *fictitious + concave* income profile, the comparison income is the average income for persons aged 16-64 who meet the income requirement. In Diagram 1 the comparison income is the respective individual's income below the ceiling in 2003.¹⁰ For young people with few years of pension credit, this means that the compensation rate has been calculated with a virtually straight-line earnings profile. For persons relatively close to the retirement age their historic incomes are concave on average, but straight-line from 2003 until the year of retirement.

The high compensation rates for the oldest birth cohorts are explainable in part by the fact that their own incomes, which have been used as comparison income, have begun to decrease—resulting in a higher compensation rate with the method used here. Another explanation is that the ATP portions of the pensions of older birth cohorts have not been adjusted downward by the increase in average life span according to the method in the new

Diagram 1. The Orange Envelope – Compensation Rates: Average, Median, and Distribution for Different Years of Birth. The circles denote averages, the bold-face lines denote medians, and the rectangle indicates 50 percent of the values. The guaranteed pension is not included in the pension benefit.



Source: 3 953 456 projections in the Orange Envelope for 2005.

system. The reason why the variation in compensation rates decreases with each younger birth cohort is that the younger the birth cohort, the more fictitious and straight-line the calculation. The modest increase in compensation rates beginning with the cohorts born in the mid-1950's is explainable by the greater importance of the premium pension to these cohorts. With the assumptions of an excess return of 3.5 percent and a more gradual increase in life span, the compensation rate shows a slight upturn beginning with birth cohort 1955.

Diagram 1 shows a skewed distribution of compensation rates – the average is higher than the median, and the distance from the

median is greater for the 75th percentile than for the 25th percentile. One reason for the skewed distribution is that the compensation rate is high for persons whose previous incomes have been relatively high but whose recent income is low when the projection is made. Such cases are more frequent than instances of sudden similarly large increases in pension-qualifying income – particularly since only incomes up to the income ceiling are considered. If compensation rate used is the median instead of the average, it is about 7 percentage points less for the oldest individuals and 2-3 percentage points less for younger persons.

3.4 Actual + Concave Income Profile

The pension levels projected in the annual report are calculated with the last of the income profiles in Table 1. As the method has been partly described above and is also described in the report, the results of the projection in the annual report are presented in Tables 3 and 4 without further explanation, together with the results of the other approaches.

4. How Large Will Pensions Be?

The results of using the methods of calculating compensation rates/pension levels are compiled in Tables 3 and 4. Table 3 concerns only the calculations for birth cohort 1955. The results in parentheses are calculated with a comparison income that is inappropriate or at least unusual given the assumed income profile. The results in bold-face type indicate the calculation methods used for more birth cohorts in Table 4.

Comparison between the methods is especially difficult for birth cohorts 1940, 1945 and 1950 since, in the cases which use *actual + assumed incomes*, 70, 45 and 20 percent of their income, respectively, grant pension rights

according to the old rules. The falling tendency of the compensation rate is largely explained by the assumed increase in longevity in combination with a fixed retirement age and the subsequent growth of each birth cohort annuity divisor. The downward trend due to these assumptions is somewhat alleviated by the increased importance of the excess return of the premium pension for younger cohorts.

The compensation rate calculated from the projections in the Orange Envelope, i.e. *actual + straight-line income profiles*, averages about 4 percent less than the pension level in the annual report. However, if the same excess return were assumed in the projection in the Orange Envelope as in the annual report baseline scenario, the compensation ratio for younger birth cohorts with a fully developed share of premium pension, persons born in 1970 or later, would decrease by about 4 percentage points compared to the figures in Table 4. The older the birth cohort, the less important the assumed rate of return.

One factor contributing to the differences in results is that in the compensation rate calculated with the projection in the Orange Envelope there is no requirement of a minimum

Table 3. Summary of Results for Birth Cohort 1955.

Compensation rates / pension levels, percent. See Table 4 for calculation assumptions.

Comparison Income	Income Profile			
	Fully Fictitious		Actual + Fictitious	
	Straight-Line	Concave	Actual + Straight-Line Envelope 05	Actual + Concave Annual Report 05
The insured's income in final year (age 64)	44	(66)	52	(NA)
The insured's average income (ages 60-64)	(45)*	54*	(NA)*	NA*
Current average, (16-64)	44	53	NA	59

* The results of this method depend on the growth in income. Here growth is assumed to be 1.8 percent per year.

number of years with earned income. The calculation includes people with only one or a few years of income. These are generally older persons whose first year of income was 2003. But everyone at least 36 years old in 2003 – that is, the birth cohorts of 1967 and

earlier years – who earned their first pension-qualifying income in 2003 will have fewer than 30 years of pension credit in the calculation of the average compensation rate of the system. Unfortunately, the significance of the absence of an income requirement has not yet

Table 4. Compensation Rates Calculated by Different Methods and with Different Assumptions

Birth Cohort	Method, etc.			
	Fully Fictitious Incomes		Actual + Assumed Incomes	
	Straight-Line Profile*	Concave Profile*	Actual + Straight-Line Envelope 05*	Actual + Concave, Annual Report 05
1940	46	56	70	68
1945	45	55	62	67
1950	45	54	56	63
1955	44	54	52	59
1960	44	53	52	58
1965	44	53	53	57
1970	44	53	54	56
1975	44	53	53	54
1980	43	53	-	54
1985	43	52	-	54
1990	43	52	-	53
Rules for Earning Pension Credit	100 percent rules of new system†	100 percent rules of new system†	Actual transitional rules	Actual transitional rules
Comparison Income	Income at age 64	Average income, ages 16-64	Income at age 64	Average income, ages 16-64
Earned-Income Requirement	40 years of earnings between ages 25-64	42 years of earnings between ages 23-64	No requirement of a certain number of years of earnings.	30 years of PQI of at least one income-related base amount
Rate of Return	1.45 percent more than growth in income	1.45 percent more than growth in income	3.5 percent more than growth in income	1.45 percent more than growth in income

Source: Annual Report 2005 and own calculations. No method includes incomes over the income ceiling in comparison income. The effect of including incomes over the ceiling can be estimated by dividing the compensation rates in the table by 1.09.

* Pension credit earned for child-care years, study, and compulsory national service is not included in the calculation. If such pension credit were considered, the compensation rate would increase by about 3 percent, equivalent to 1-2 percentage points. As for the Orange Envelope, such pension credit is included to the extent that it has already been earned, but is not considered in the projected future pensionable income.

† The calculation is performed under the rules of the new system, but the proportions of inkomstpension and premium pension follow the phase-in of the new system. Beginning with birth cohort 1970, whose members were 25 years old when allocations to the premium pension began, the system can be said to be fully functioning.

been analyzed. An additional explanation for the results is that pension-qualifying amounts for child-care years, study and compulsory national service are treated differently in ways that are described in the Table.

As already stated, with current income patterns and income growth, the average income of newly retired persons at ages 60-64 years old is somewhat lower than the current average income for ages 16-64. Thus if the *pension level* measure currently used were to be changed to a *compensation rate* measure, thus defined, average compensation rate is expected to be slightly higher than the *pension level*.

The answer to the question in the section heading is that those wanting to know their own pension should read the projection in their Orange Envelopes, or – even better – obtain a projection at the website www.minpension.se. The latter projection includes negotiated pensions.

As may be apparent, the answer for the national pension system as a whole is not clear. Different methods yield different answers. As for representativeness and accuracy, it is better to begin the calculation with the history of the insured individual's actual income, and it is better to assume a concave income profile than a straight-line profile for the individual's remaining years of income. Using average income for persons aged 16-64 with pension-qualifying income to compare the pension benefit with makes the measure more robust, but this measure has the drawback that in principle no information is provided on how the income is expected to change at the transition to retirement. As described above, however, such a measure of the compensation rate is not expected to bring about major changes of pension levels in annual report.

5. Does the Rhetoric of the Pension Reform Stand Up to Scrutiny?

One basic assumption about the pension reform from the very start was that the new system would generally provide pensions as high as the ATP and folkpension, provided a number of conditions were met. These were the same life expectancy at age 65 as in 1994, 2-percent real income growth¹¹ and an average number of working years of at least 40. If the rhetoric of the pension reform is to be taken seriously, the lower pension levels provided by the new system with a fixed retirement age should be explainable primarily by the development of life expectancy at 65.

In Scherman [1] it is held that the lower pensions expected in the new system with a fixed retirement age of 65 cannot be explained by the anticipated increase in life span.

In the ATP system, a person with a straight-line income profile, who retired after constant real annual growth in income with earnings of SEK 244 454 in 2003,¹² would receive a total ATP and folkpension of SEK 134 289 as a married pensioner – given that these systems remained unchanged. Thus the compensation rate is 55 percent of final-year earnings.

In section 3.1 it was shown that the same person at age 65, if he or she had worked for 40 years in the new system, would have an inkomstpension “capital” of 6.72 and premium pension capital of 1.42 times final-year earnings.

The basic design of the pension reform was adopted by the Swedish Parliament in 1994. An annuity divisor for birth cohort 1930 at age 65 has been calculated at 14.84 based on life-tables at that time¹³. With the average life span in 1994, a pension balance of 6.72 times final annual earnings would provide an inkomstpension of 0.45 times final annual earnings (6.72/14.84). No annuity divisor for the premium pension has been calculated for birth cohort 1930. Very simplified, however,

such a divisor can be estimated on the assumption that the size relationships of the annuity divisors are independent of life span. Then an approximate value of a divisor for the premium pension for birth cohort 1930, retirement age 65, can be estimated at 14.1.¹⁴ The premium pension will then be 0.1 times final annual earnings, and the total national pension will thus be 0.55 times final annual earnings. A compensation rate of 55 percent. However, as explained in section 3.1 the tax reduction has increased the relevant comparison income by 7 percent. This has reduced the compensation rate to 0.51 times final-year earnings (55/ 1.07)

With the assumption of a straight-line earnings profile, it is thus true that the new system – at least before the effect of the tax reduction for the individual pension contribution – can be expected to provide roughly the same pensions as the old system, given the more detailed assumptions indicated for the reform. If one disregards the decrease of 3-4 percentage points in the pension level that results from the tax reduction, a change difficult to attribute to the pension reform, there are consequently good reasons to claim that the new system, with a requirement of 40 years' employment and growth of two percent, would provide roughly the same pensions on average as the old system if the average life span were the same as when the reform was enacted.¹⁵ In the new system, if life span increases, the period of working life must be extended, and retirement postponed, for the pension level to be constant. This is one of the messages that the pension reformers have sought to convey.

Acknowledgements

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Notes

- ¹ See the The Swedish Pension System Annual Report 2005.
- ² Cichon's estimates of pension levels in the reformed system apply only to the inkomstpension system; the contribution is therefore just 16 percent.
- ³ Only the calculations in Cichon and Sherman have been affected by the assumption that balancing is activated. Differences between various reports regarding the size of the assumed return on capital in relation to the assumed rate of income growth explain only a very small portion of the differences in the results.
- ⁴ For example, Normann does not consider the inheritance gains distributed in both the inkomstpension and the premium pension systems.
- ⁵ In addition, Flood [1] uses the average pension at ages 65-69, not at age 65.
- ⁶ Prior to the mailing of the Orange Envelopes for 2005, information was compiled for 6 532 074 individuals, whereas information was addressed to 5 927 028 of them. Most of the difference consists of persons who are not located in Sweden and whose address is unknown to Försäkringskassan.
- ⁷ The average deduction for fund management fees in 2005 was 0.42 percent of the capital. In addition to the fees deducted by fund management firms, there are costs in the form of broker's commissions, etc.; in 2005 these were equivalent to a fee of approximately 0.30 percent of premium pension capital; see the annual report 2005, page 38. If these costs are also taken into account, the assumption of a net return of 3.5 percent requires a gross return of 4.22 percent. However, since fund management costs are anticipated to decrease sharply with the growth in premium pension capital, the gross return required for a net return of 3.5 percent is expected to go down as well.
- ⁸ In the Orange Envelope alternative of 2 percent real annual growth in incomes, the real rate of return for the premium pension is assumed to be 5.5 percent per year. Thus the return exceeds growth in income by 3.5 percentage units in this alternative as well.
- ⁹ In *Socialförsäkringsboken* for 2001, page 89, Hans Olsson estimates that the average real annual return on shares of stock for the years 1918-1998 was seven percent; real GDP growth

in the same period was 3.1 percent per year, for an approximate excess return of 3.9 percentage points. The result is highly dependent on the period chosen. In the period 1918-1978, for example, the real annual return on shares was 4.2 percent, while GDP growth was 3.6 percent, for an approximate excess return of only 0.6 percentage point. In Olsson's projections, the author assumes an excess return of 1.3 percent in the baseline alternative; in the *low* alternative, it is 0 percentage point, and in the *high* alternative it is 2.6 percentage points.

¹⁰ In 2003 the ceiling was an annual income of SEK 306 750.

¹¹ Since pension credit earned in the ATP system was price-indexed, growth in income mattered for the compensation rate of that system. The ceiling on earnings and the folkpension were also price-indexed, meaning that the pensions provided by the system decreased over time in relation to the average income.

¹² The income determined in the National Strategy Report for an average full-time employee (average production worker) in industry.

¹³ See annual report 2005 page 50.

¹⁴ $15.88/16.76 * 14.84 = 14.06$.

¹⁵ It can be argued that the new system will almost surely provide much higher pensions than an unreformed ATP system would have. The reason is that the ceiling on pension-qualifying income in the ATP system was price-indexed, whereas the ceiling in the new system is income-indexed. The Ministry of Finance expressed this view from time to time in the preparation of the pension reform and contended that the "expansion in expenditure" should be financed. While in substance correct, this view can be considered somewhat rhetorical.

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