

The Swedish Pension System Annual Report 2001

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Further information on social security in Sweden is available on the RFV web site, www.rfv.se. More detailed information on the premium pension system can be found on the web site of the Premium Pension Authority, www.ppm.nu. For further information on the national pension funds, please see their web sites at: www.ap1.se, www.ap2.se, www.ap3.se, www.ap4.se, respectively.

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Preface

This annual report presents the financial position of the Swedish public pension system as of December 31, 2001. It also measures how the assets and the liabilities of this system have been affected by demographic, economic, and behavioral changes in year 2001. It does so with greater precision, clarity, and wealth of detail than ever before for a national pay-as-you-go pension system.

This is achieved by subjecting, for the first time, a pay-as-you-go pension system to the rigorous and confidence-inspiring discipline of double-entry bookkeeping. When the old, defined benefit pay-as-you-go pension plan has been phased out and fully replaced by the new notional defined contribution plan the income statement and the balance sheet will be calculated entirely without projections. However, already in this report 100 percent of the assets and 75 percent of the liabilities of the pay-as-you-go scheme have been calculated without projections. The purpose of the report is to spread and improve the knowledge of how our new pension system works, thus contributing to an enlightened discussion on what is required in order to provide socially and economically sustainable pensions.

New infrastructure

Public pension systems, as they have evolved in Sweden and other countries in the past century, provide a social and economic infrastructure for major elements of the lives of citizens. Ideally, it should be possible to modernize this infrastructure while maintaining its basic outlines. With the pension reform, however, portions of the old system have been removed and reshaped. To come to the realization that the old national pension plan (ATP) had developed serious flaws harmful to the individual and to society, and needed redesigning in certain fundamental aspects, was a difficult and sometimes painful process.

Often political systems are only capable of carrying out difficult changes in a national pension plan when pressured by an acute economic crisis. The pension reform process was nevertheless initiated at a time when government finances were in satisfactory order, and the ATP system had one of the largest buffer funds in the world. The financial deficit to be addressed by the reform was 20–30 years down the road. However, when the time came to implement the reform concepts presented at the outset of the 1990's, Swedish government finances were under greater strain than at any other time in the 20th century. Even so, this budgetary crisis left only a marginal imprint on the new system.

High ambitions

The level of ambition for the new pension system is high. It is to be a socially and economically efficient form of public pension insurance that will be sustainable in the long run. The system aims at fairness within and between generations. Even taken singly, these goals may be difficult to attain. To achieve them all at the same time is not always feasible in light of economic and demographic developments. But the system is designed to satisfy all of these criteria as often and for as long as possible.

The system owes its positive features to new ideas. The innovations in it consist largely of what is called "crossover" in the world of cooking, i.e. new combinations of different traditions. In the new system, social-insurance traditions have been combined in an unconventional manner with proven technical solutions from the private-insurance sphere. In one respect – the rules for automatic balancing – the knowledge applied is new, as far as we are aware.

One example of a principle that the new system has borrowed from private insurance is the requirement that the pension entitlement credited to an individual must be fully based on a contribution in the same amount and paid at the time the credit accrues. Also borrowed is the concept that the size of pensions must be related to the development of the average life span.

Indexation

The indexation of the system – one of its more characteristic features – has been given a design that is only possible in a legislated public pension system: the indexation, or compounding rate, of the pay-as-you-go system is linked to the growth in the average income of the economically active. In an insurance scheme designed to replace the income lost on retirement, this compounding rate is virtually ideal for individuals. For the financial stability of the system, however, it may lead to problems. These problems are managed by the *automatic balance mechanism*¹, briefly described in the section The New Swedish Pension System.

Traditional schemes of private pension insurance customarily promise a guaranteed nominal return. Guarantees of this kind are often made with great caution about the level of the benefit promised and are frequently accompanied by other provisions to be on the safe side. One common such provision is to add a safety margin in the used life expectancy assumption. To promise little, thus creating a tendency toward a surplus that can be subsequently distributed, may be an appealing way to manage uncertainty, particularly from a psychological viewpoint; all or most discrepancies turn out to be pleasant surprises. However, this approach is not without its disadvantages. With guaranteed benefits limited to provide a margin of safety, pensions will tend to be systematically lower than they would have been without guarantees.

¹ For details on the automatic balance mechanism see the Technical Appendix.

In the new pay-as-you-go system, there is no nominal or real guaranteed rate of return, neither during the saving phase nor after retirement. In the design of the rules, however, there is a clear target for indexation, i.e. the compounding of the pension commitment. The target is for pension credit earned to be compounded at the rate of growth in nominal average income, and for pensions to be indexed at that same rate less the compounding rate of 1.6 percent that is credited when withdrawal of the pension commences.

Safety margins

Whether "the return on the assets" of the pay-as-you-go system – in principle, the growth rate of the Swedish economy, together with the return on the buffer fund – will be greater or less than the future growth in average income is impossible to know. It follows that the indexation of the pension commitment by average income growth was not chosen in order to provide a margin of safety. Nor is any margin of safety factored into the calculation of the average life span.

It was possible to do without deliberate margins of safety in these critical aspects – and thereby to provide higher pensions – by managing the risk of a deficit through the provisions for balancing. These provisions are designed to maximize pension levels within the scope of the existing and fixed contribution rate. Deficits are countered only *if* they arise. In that case, they are distributed over the entire pension liability. With the rapid response and broad base over which the deficit is distributed, deviations from the desired rate of indexation are minimized.

To determine the deficit or surplus, measurements are made annually and, when the old system is phased out, solely on the basis of actual events and transactions. Compared to the actuarial projections previously used to analyze systems of the pay-as-you-go variety, the rules for performing the calculations required for these measurements are simple, understandable, and easily communicated. Moreover, measurements will be taken annually on an on-going basis, and any adjustments necessary will be made successively in small steps.

Generational fairness

The vital issue of fairness between generations is managed through the "full package" – the fixed contribution rate, average income as the basis for compounding in the system, adjustment of pension levels to changes in average life span before age 65, absence of any adjustment thereafter, the buffer fund, and automatic balancing. The annual report relates to another central aspect of a pension system: information and clarity.

The principal drawback to the new system is probably psychological. The "surprises" that the insured may face are negative; in other words, a pension may be less than expected. This is no minor disadvantage.

The alternative, given the fixed contribution rate, would have been to create a margin of safety by systematically paying lower pensions. This fact must not be forgotten in future discussions about the design of the system. One purpose of the annual report is to show clearly and unambiguously how the financial position of the system develops year from year and why it has done so. This should limit the element of surprise in any negative tendencies and help people to understand why these tendencies may mean lower pensions for shorter or longer periods.

I firmly believe that, in time, it will be clear that Sweden has adopted a uniquely well-functioning public pension system. It is a great pleasure to see this report mark the transition from a period of pension reform, to a phase of active management of the new system. Our ambition is that this management be as efficient and transparent as possible. Annual reports like this one are part of our effort to fulfill that ambition.

I hope you enjoy reading the report!

Stockholm, June 2002

Anna Hedborg

Director General

Background and Accounting Principles

The legislation for the new pension system states that:¹

An agency to be designated by the Government shall prepare each year a report on the financial position and development of the Earnings-related Old Age Pension System. The National Social Insurance Board, the Premium Pension Authority, and the First-Fourth and Sixth National Pension Funds shall make available to such agency all information required for this purpose.

In 2002 the Government designated *Riksförsäkringsverket* (RFV), the National Social Insurance Board, as the agency that shall prepare the annual report.

The preparation of an annual report on the old-age pension system was proposed by the Government in the bill 2000/01:70 on Automatic Balancing of the Old Age Pension System, hereafter referred to as the *Balancing Bill*. This bill contains detailed rules for calculating the assets and the liabilities of the pay-as-you-go system; see Sec. 1, Art. 5 a-c of the Law (1998:674) on an Earnings-related Old Age Pension and Appendix 1 of the Balancing Bill.² However, the law contains no provisions about principles or other legal requirements to be observed in preparing the annual report. Thus, aside from the provisions for calculating assets and liabilities, no requirements governing the present report are imposed by law or regulation. RFV is therefore at liberty to design the report as it deems most appropriate for achieving the objectives of the report as set forth by the Government and which the *Riksdag* approved.

From the law it follows that the annual report concerns only the *earnings-related old-age pension system*.³ Therefore, the present report does not cover the *guaranteed pension*. The guaranteed pension benefit is a basic retirement protection for low-income earners financed by the central government with general tax revenue. See the List of Terms for brief information on its design.

In the bill, the Government notes that the division of the earnings-related old age pension system into two parts – the largely pay-as-you-go financed *inkomstpension*⁴ and the fully funded *premiumpension*⁵ – may make it difficult to understand what determines the pension amount. At the same time, there has been a growing need for such an understanding since both parts of the system function according to the principle of a defined contribution system. In a defined contribution system, the pension level is flexible, i.e. changeable, according to the demographic and economic conditions that determine the financial evolution of the system. For this reason, among others, the Government has found it essential to provide an annual report on the system so that its financial development can be monitored and understood. It is also stated that the report shall review each of the factors that determine the size of a pension in both the pay-as-you-go system and the premium pension system.⁵ The proposition provides further that the report be designed to promote healthy institutional competition in the management of the two parts of the earnings-related pension system.

¹ Sec. 15, Art. 20 of the Law (1998:674) on an Earnings-related Old Age Pension.

² The provisions for calculation of assets and liabilities are presented in full in the Technical Appendix.

³ During the phasing-out of the old pensions system the earnings-related old age pension system consists of the pension from the old system, i.e. ATP, and the two types of pensions from the new system, *inkomstpension* and *premiumpension*. See the List of Terms for more information on these benefits.

⁴ The Swedish name, *inkomstpension*, that have been given the notional defined contribution, pay-as-you-go financed, pension will not be translated in this report. The name refers to the fact that the indexation of this pension is a function of the growth in average income. The Swedish word for income is *inkomst*.

⁵ The fully funded defined contribution pension, the Swedish name is *premiumpension*.

One primary objective of the report is thus to explain as clearly as possible the processes that may affect the pensions of the insured. This means that the report shall seek to reflect the demographic, behavioral, and economic risks that govern the financial position of the system and that directly affect or may subsequently affect the value of pensions. A secondary ambition of RFV is that the report should conform as much as possible to generally accepted accounting principles for insurance companies. Given this order of priority, the income statement departs in design from a conventional income statement and more closely resembles a financial analysis.

The preparation of an annual report for the premium pension system is the responsibility of the Premium Pension Authority (PPM). In this task, PPM is guided in part by the Law (1995:1560) on Annual Reports of Insurance Companies. The annual report of the pension system has been prepared as a set of consolidated financial statements that include the premium pension system. In the consolidated financial statement, the accounting for the premium pension system has largely followed the PPM annual report; however, some items have been simplified and aggregated for purposes of clarity in presentation.

The information in this report concerning the First-Fourth and Sixth National Pension Funds⁶ is taken entirely from the annual reports of these funds for 2001. In other respects, the reporting for the pay-as-you-go system is based on data from RFV records – within the system there is no accounting in a conventional sense. The amounts reported are based on the RFV records on individual pension credit earned and individual pension payments.

A central accounting principle for the pay-as-you-go system is that the entries in the income statement and balance sheet shall be based only on events or transactions that have occurred and been recorded. No projections will be used for calculating these entries. Since ATP pension points will be earned according to the rules of the old pension system, until the year 2017, this accounting principle cannot be fully applied. This since the ATP liability to economically active individuals, can not be estimated without assumptions of future economic and demographic developments. This portion of the pension liability has been estimated according to the principles set forth in the Balancing Bill.⁷ The ATP liability to economically active individuals is currently about 25 percent of the total pension liability. It will decline sharply in the future and will cease completely in 2018. In other respects, the assets and the liabilities of the system have been calculated entirely on the basis of events and transactions that have occurred and been recorded, thus without projections.

Principles for Calculating Assets and Liabilities of the Pay-as-you-go System

A distinguishing feature of a pay-as-you-go pension system is that its benefits are financed more or less directly by current contribution revenue. Inasmuch as current contribution revenue finances the liability of the pay-as-you-go system in the form of pension payments, the flow of contributions may be regarded as the principal

⁶The system has a buffer fund. The main function of the buffer fund is to smooth the financial effects from variations in the size of birth cohorts. The bulk of the assets of the buffer fund are separately managed by the First, Second, Third and Fourth National Pension fund. They each receive one quarter of monthly contributions and pay one quarter of monthly pension payments. The Sixth National Pension Fund receives no contributions nor does it pay any pensions.

⁷In short these principles state that RFV in each annual report should use latest official economic and demographic forecast for its calculation of ATP liability to economically active individuals. For periods for which there is no economic forecast RFV should assume a growth in average income of two percent.

asset of the pay-as-you-go system. It may be treated as a *contribution asset*. The contribution asset is valued according to the pension liability that could be financed by the flow of contributions given the relative pension credit earned by each age and the mortality at each age after age 61, during the accounting period. This hypothetical pension liability is equal to contribution revenue multiplied by the *turnover duration* of the system.⁸

The actual pension liability is measured at the value that would have to be paid out if all accrued liabilities were to be liquidated on the balance sheet date. Total liability to persons not yet retired is thus calculated as the sum of all insured's pension account balances.⁹

The pension liability to retired persons is determined in principle by multiplying pensions granted by the number of times that this amount is expected to be paid. The expected amount to be paid is determined by measuring the number of years an average pension in RFV's records are disbursed.¹⁰ For this type of nominal valuation of pension liabilities to turn out to be ex post accurate the indexation of pension liabilities must equal the discount factor used for calculating the present value of the liability. From the systems point of view the correct discount factor for calculating present values is the systems internal rate of return. Further, for the valuation of liabilities to retired to turn out ex post accurate, also the life expectancy must remain constant.

The assets of the National Pension Funds, which is referred to as the *buffer fund*, are valued at their market value. This means that assets are valued at the latest price paid on the last trading day of the year, or otherwise at the latest buying quotation.

Thus, the valuation of the assets and liabilities of the pay-as-you-go system is based solely on what can be observed at the time of valuation. The normal assumption that contribution revenue will increase by the rate of economic growth is not explicitly considered in calculating the contribution asset of the system. Nor is the expected future increase in pension payments, in part by indexation, explicitly taken into account in determining the value of the pension liability. One major reason why it is deemed reasonable to value assets and liabilities only on the basis of what can be observed, i.e. without actuarial projection, is that the financial position of the system is not dependent on the amount of assets and liabilities as separately calculated. Rather, the financial position of the system is governed exclusively by the relationship between assets and liabilities. In other words, it is determined by the ratio referred to as the *balance ratio*.¹¹

In the pay-as-you-go system, there is a strong link between the development of the system's assets and that of its liabilities. However, in cases where the balance ratio exceeds one (x), the liabilities and assets of the system will increase at somewhat different rates. In cases where the balance ratio is less than one, the automatic balance mechanism secures, a virtually total correlation between the growth rates of liabilities and assets. Therefore valuing the assets and liabilities

⁸ The calculation of the turnover duration follows equation 3 in the Technical Appendix.

⁹ Pension account balances refer to the nominal value of individual accounts in the notional defined contribution system, i.e. the *inkomstpension* system. As mentioned above, this simple calculation of pension liabilities at face value is fully applicable only when ATP-points can no longer be earned, that is in 2018.

¹⁰ See equation 4.3 in the Technical Appendix.

¹¹ See equation 1 in the Technical Appendix.

¹² In the turnover duration used in calculating the balance ratio, the trend in population growth is by implication assumed to be zero. Thus, turnover duration will be somewhat overestimated in cases where the trend is negative. This entails a risk that the system's assets will be somewhat overestimated in relation to its liabilities.

of the system solely on the basis of conditions observable at the time of valuation does not, regardless of demographic or economic development, entail any risk of overestimating assets in relation to liabilities. The only possible error is that the relationship may be underestimated.¹² The rules for automatic balancing have eliminated the need to make assumptions about future economic and demographic developments in order to ensure the financial stability of the system.

The principal drawback to the robust and simple methods of valuation is probably that they may activate balancing, with a consequent decrease in pensions, in situations where a forecast indicates no need for such a reduction. In the case where the forecast proves to be correct, pensions will have been unnecessarily, temporarily, decreased. This is a welfare loss. However, with forecasts, there would also have been a risk of unnecessarily lowering pension levels, in this case because the forecast can turn out to be wrong.

It is apparent from the above that the method of valuing the assets and liabilities of the pay-as-you-go system is implicitly based on the assumption that assets and liabilities will grow at the same rate starting from the time of each valuation. Put another way, the method of valuation is based on the assumption that the system's internal rate of return is always congruent with the indexation of the pension liability, even though this is guaranteed only if balancing has been activated. As long as the balance mechanism is inactive, the yearly internal rate of return may be either greater or less than the yearly indexation of the pension liability. If forecasts of the system's internal rate of return and of growth in average income could be presumed to be more accurate than the assumption that they are congruent, the use of forecasts would have diminished the risk of welfare losses.

In our experience, however, the economic and demographic forecasts required for predicting the internal rate of return of the pay-as-you-go system and the rate of growth in average income are not accurate. Not even for the short run are we capable of making such forecasts with an acceptable degree of certainty. Our capacity to generate accurate forecasts for the very long run, as is required for a pension system, is even more limited.

Terms Used in the Pay-as-you-go System and their Counterpart in Funded Insurance.

The term *contribution asset*, which refers to the value of the contribution flow to the pay-as-you-go system, has no actual counterpart in funded pension insurance, where the closest analogy would be to insurance capital. The change in the contribution asset would then correspond to the return on insurance capital in funded insurance. The contribution asset increases or decreases in part by changes in contribution revenue, in part by changes in turnover duration. The effects of these two factors on the contribution asset are shown separately in the income statement.

To reduce the volatility of the balance ratio the law governing its calculation provides that the contribution asset shall be calculated by multiplying a three-year moving average of contributions by the median turnover duration for the three years.¹³ It has not been possible to calculate averaged values for use in this Annual Report, but in next year's Annual Report the balance sheet will be in fully appropriate form for calculating the balance ratio.

Apart from the contribution asset the terms used in the income statement and balance sheet of the pay-as-you-go system have more direct counterparts in conventional accounting for life insurance business. The *contributions* of the pay-as-you-go system correspond to the *premiums* of funded insurance, *pension payments* to *insurance benefits*, *the change in pension liability* to *change in life assurance provision* and the *opening balance* to *profit or loss brought forward from the preceding year*.

¹³ See equation 1 in the Technical Appendix. The design with a three year moving average for contributions is due to the three year moving average in the income indexation, which affects the size of the pension liability, the denominator in the balance ratio. The design with a three year moving median value for the turnover duration is expected to be more efficient in reducing volatility than an arithmetic mean.



Income Statement and Balance Sheet¹

Income statement for 2001

Millions of SEK

	Note	PAYGO System	Note	Premium Pension System	Consolidated
Change in fund assets					
Pension contributions	1	156,811	1	18,314	175,125
Pension payments	2	-143,564	18	0	-143,565
Return on funded assets	3	-24,915	19	-5,670	-30,585
Costs of administration	4	-1,927	20	-499	-2,426
<i>Total change in fund assets (a)</i>		<i>-13,596</i>		<i>12,145</i>	<i>-1,450</i>
Change in contribution asset					
Value of change in contribution revenue	5	405,877	.	.	405,877
Value of change in turnover duration	6	15,745	.	.	15,745
<i>Total change in contribution asset (b)</i>		<i>421,622</i>		<i>.</i>	<i>421,622</i>
Change in pension liability²					
New pension credit & ATP-points	7	-138,627	21	-18,314	-156,941
Pension payments	8	143,564	22	0	143,564
Indexation and return, respectively	9	-116,287	23	5,670	-110,617
Value of change in average life span	10	-18,727	24	0	-18,727
Inheritance gains arising	11	5,476	25	97	5,573
Inheritance gains distributed	12	-5,490	26	-97	-5,587
Deduction for costs of administration	13	923	27	210	1,133
<i>Total change in pension liability (c)</i>		<i>-129,168</i>		<i>-12,434</i>	<i>-141,602</i>
Net income (a) + (b) + (c)		278,722		-289	278,433

Balance Sheet as of 31 December 2001

Millions of SEK

	Note	PAYGO System	Note	Premium Pension System	Consolidated
Assets					
Assets in buffer fund	14	565,171	.	.	565,171
Insurance assets	.	.	28	65,026	65,026
Other assets	.	.	29	43,449	43,449
Contribution asset	15	5,085,252	.	.	5,085,252
Total assets		5,650,423		108,475	5,758,898
Liabilities & Surplus					
Opening balance	16	-60,315	.	-964	-61,279
Net income 2001		278,772		-289	278,433
<i>Closing balance</i>		<i>218,407</i>		<i>-1,253</i>	<i>217,154</i>
Pension liability	17	5,432,016	30	65,028	5,497,044
Other liabilities	.	.	31	44,700	44,700
<i>Total liabilities</i>		<i>5,432,016</i>		<i>109,728</i>	<i>5,541,744</i>
Total liabilities and surplus		5,650,423		108,475	5,758,898

¹ As this Annual Report is the first to be provided for the pension system there are no comparisons with figures for previous years. Such comparisons will be provided as from next year's annual report.

²A negative value for this item denotes an increase in the pension liability; a positive value denotes a decrease by the amount specified.

Comments on the Net Income Year 2001 of the PAYGO System

The pay-as-you-go system reported a net income of SEK 278.7 billion in 2001. Most of this net income was attributable to an increase of the labour-force during the accounting period. As a result, the contribution base grew faster than the average income in 2001.³ However, a substantial share of the net income, some SEK 105 billion, is related to the phase-in of the reformed pension system.

³ The assets of the system increase largely with the growth in contribution revenue, whereas the liabilities of the system chiefly increase with the growth in average income. Thus, when the contribution base is increasing more rapidly than the average income, there is a tendency for a positive net income in the system.

Net Income of the PAYGO System Adjusted for Phase-in Effects

Billions of SEK

Net income for the year	279
Effect on net income from the phase-in of the contribution base	-55
Effect on net income from the deduction, beginning in 1999, of the employee contribution in the calculation of pension-qualifying income	-50
Net income adjusted for phase-in effects	= 174

The contribution revenue of the pay-as-you-go system was SEK 156.8 billion in 2001 and SEK 144.3 billion in 2000, an increase of SEK 12.5 billion, or 8.7 percent. It is estimated that SEK 1.7 billion of the increase is due to the fact that the contribution base for the years through 2003 is in the process of being established. The underlying reason is that the central government pays no so-called government old-age pension contributions for annual cohorts that remain completely in the old system, that is cohorts born in 1937 and preceding years. Therefore, during the years when these cohorts are retiring and being replaced by younger cohorts for which the central government is paying contributions, the contribution base is increasing more rapidly than the product of growth in average income and growth in labour-force. If the contribution base had been fully phased-in by the year 2000, the opening balance for 2001 would have been SEK 55 billion higher, and net income would have been SEK 55 billion lower. The underlying rate of growth in the contribution base is 7.5 percent, when the extraordinary increase in contribution revenue is disregarded.

However, the *income index*⁴ increased by "only" 2.87 percent between 2001 and 2002. There was an extremely large difference, 4.63 percentage points, between growth in the contribution base, which affects assets, and in average income, which affects liabilities. More than half of this difference, or some 2.6 percentage units, is explained by the increase in labour-force between 2000 and 2001. The remaining two percentage points are explained by the deduction, beginning in 1999, of the employee pension contribution from pension-qualifying income. Owing to the design of the income index, this deduction slowed the growth of the income index by some two-percentage points at each of the years: 1999, 2000, and 2001.

⁴ The notional accounts are yearly indexed by the increase in the income index, pensions are yearly indexed by the increase in income index minus 1.6 percent. The income index is a three year moving average of the increase in average pension qualifying income.

As a result, the indexation of the pension liability at the end of 2001 was roughly 2 percent lower, with a positive effect of some SEK 50 billion on net income. Thus, the total impact of nonrecurring conditions on net income for 2001 may be estimated at approximately SEK 105 billion.

The balance ratio, i.e. the ratio between the assets and liabilities of the system, is 1.04.⁵ The level of this balance ratio, calculated without the smoothing to be performed starting with next year's report, denotes that the system has a surplus, or a margin, of four percent against a situation in which balancing would be activated. The margin is greater than was forecast in the *Balancing Bill*, but is at the level projected last year for the pension system.⁶

When the contribution base has been fully established and when the assets and liabilities of the system are calculated entirely with the smoothing⁷ incorporated in the balance ratio, the fluctuations in the relationship between the opening and closing balance of assets and liabilities will normally be much more moderate than in this year's annual report. The degree of fluctuation to be expected for the balance ratio when the system is fully functional, however, is a question that RFV intends to analyse further.

$$\frac{5,650.4}{5,432.0} = 1.04$$

⁶ See RFV Analyserar 2002:2

⁷ See equation 1 in the Technical Appendix.



Notes and Comments to the Notes

Note 1

Pension Contributions and Taxes in 2001, by Type of Contribution

Millions of SEK

	PAYGO system	Premium Pension System	Tax	Total	of which pension system
Employer contributions	67,316	17,572	9,428	94,316	84,888
Contributions (self employed)	1,662	434	233	2,329	2,096
Employee contributions	65,156	0	0	65,156	65,156
Central-government old-age pension contributions	21,210	3,481	0	24,691	24,691
Final settlement in 2001 for prelim. contributions in 1999	1,543	-2,678	1,135	0	-1,135
Loss in collection, settlement	69	0	0	69	69
Adjustment for discrepancy between RFV accounting and the AP funds and PPM accounting	-124	-507	0	-631	-631
Total	156,811	18,314	10,803	185,928	175,125

The taxes reported are "contributions" in the form of employer contributions paid on incomes higher than the ceiling on pension-qualifying income. This ceiling before deduction of the general pension contribution of 7 percent is 8.07 *income-related base amounts*¹ and 7.5 after this deduction. Since "contributions" on amounts above the ceiling do not give rise to pension credit, they are taxes transferred to the central-government budget.

The discrepancy between the RFV and the National Pension Fund (AP funds) accounting (-124) is explainable primarily by periodization differences. The discrepancy between the RFV accounting and that of the Premium Pension System (-507) is due to differences in accounting principles between the agencies. RFV follow a "cash" principle, it recognizes contributions as they are transferred to the buffer fund and to PPM. PPM recognizes as contributions (premiums) when individual pension credits have been settled in the taxation process and transferred by PPM to the funds the insured's save in. On average contributions are transferred 18 months after it has been paid.²

¹ The first income-related base amount was for 2001. For that year, it was the same as the price-related base amount: SEK 36,900. See the list of terms for further information.

² During this time PPM invests the "preliminary" contributions in government treasury bills and bonds.

Pension Contributions by Contribution Base

Millions of SEK

	Employer, and central-government contrib.	Employee contributions	Total
Earned income ³	85,278	56,870	142,148
Transfer payments, see Table A	10,858	8,286	19,144
Pension-qualifying amounts, see Table B	13,833	0	13,833
Total	109,969	65,156	175,125

Table A. Pension Contributions by Type of Pension-qualifying Transfer Payment

Millions of SEK

	Central-government contributions	Employee contributions	Total
Sickness benefits	3,217	2,455	5,672
Rehabilitation benefits	168	128	296
Benefits to immediate relatives	5	4	9
Compensation for work-related injuries, etc.	1,490	1,137	2,627
Partial pension	16	12	28
Parental insurance	1,670	1,274	2,944
Care allowances	182	139	321
Unemployment compensation, etc.	3,538	2,700	6,161
Variety forms of student allowances	511	390	901
Educational allowances	52	40	92
Daily allowances (Armed Forces)	1	1	2
Artists' Board	8	6	14
Allowances to disease carriers	0	0	0
Total	10,858	8,286	19,144

³ Earned income includes sickness benefits paid during the 14 days employer period at the beginning of a spell of sickness.

Table B. Pension Contributions by Type of Pension-qualifying Amount

Millions of SEK

	Central-government contributions
Disability pensions	9,201
Amounts credited for child-care years	3,276
Amounts credited for studies	1,118
Amounts credited for compulsory national service	238
Total	13,833

Note 2

Pension Payments in the Pay-as-you-go System

Millions of SEK

ATP	137,387
Inkomstpension	89
Non income-related national basic pension	6,088
Total	143,564

Persons born in 1937 or earlier receive their entire pension according to the rules of the "old" system, ATP. Persons born in 1938 will receive sixteen twentieths of their unreformed ATP and four twentieths of a fully phased-in inkomstpension. Persons born in 1939 will receive fifteen twentieths of their unreformed ATP, and five twentieths of a fully phased-in inkomstpension. The phasing in of the new system ends with individuals born in 1953, they will receive one twentieth of an unreformed ATP, and nineteen twentieths of a fully phased-in inkomstpension. However, both types of earnings-related and pay-as-you-go financed pensions, that is ATP and inkomstpension, are indexed beginning in 2002 according to the provisions of the new system.

Since it is possible to receive a pension from the age of 61 persons in the cohorts born in 1938, 1939, and 1940 were eligible for inkomstpension in 2001.

The item designated here as "Non income-related national basic pension" is financed in 2002 from the National Pension Funds. Beginning in 2003, these amounts are converted to the guaranteed pension and are financed through the central-government budget.

Note 3

Return on Funded Assets in the Pay-as-you-go System

Millions of SEK

National Pension Fund no:	1	2	3	4	6	*	Total
<i>Stocks and shares</i>	-10,328	-6,713	-8,957	-9,690	-1,270	354	-36,604
of which							
direct yield	997	823	1 104	964	417	277	4,582
realized & unrealized capital gains	-11,325	-7,536	-10,061	-10,654	-1,687	77	-41,186
<i>Bonds and other interests-bearing securities</i>	3,372	2,808	2,716	2,704	159	559	12,318
of which							
direct yield (net interest)	3,088	3,775	3,219	3,037	81	1,042	14,242
realized & unrealized capital gains	284	-967	-503	-333	78	-483	-1,924
<i>Other items</i>	-579	-913	577	248	-297	215	-749
of which							
direct yield (net interest)	11	0	0	0	0	0	11
realized & unrealized capital gains	-597	-1,812	-250	-113	-297	210	-2,859
net foreign-exchange gain	7	899	827	361		5	2,099
Total return	-7,535	-4,818	-5,664	-6,738	-1,408	1,128	-25,035
Costs of administration	176	187	110	175	272	26	946
Total return after costs	-7,711	-5,005	-5,774	-6,913	-1,680	1,102	-25,981

Sources: Annual reports of the First, Second, Third, Fourth, and Sixth National Pension Funds.

*Special administration of the First and Fourth National Pension Funds.

Note 4**Costs of Administration in the Pay-as-you-go System**

Thousands of SEK

Tax administration	249,943
RFV	417,000
Regional Social Insurance Offices	317,000
Institute (KPA), and National Institute of Economic Research	12,983
<i>Total Costs of Insurance Administration</i>	<i>996,926</i>
First National Pension Fund	176,000
Second National Pension Fund	187,000
Third National Pension Fund	110,332
Fourth National Pension Fund	175,000
Sixth National Pension Fund	272,000
First and Fourth National Pension Funds, Special Administration	26,000
<i>Total Costs of Buffer Fund Administration</i>	<i>946,332</i>
Total Costs of Administration	1,943,258

The costs of insurance administration are shared equally by the First through the Fourth National Pension Funds. Each fund finances its own administrative costs by withdrawals from itself. The sum of both forms of administrative costs are financed by a percentage deduction from the pension balances of the insured. As is shown in the income statement, however, pension balances were not charged with the full costs of administration in 2001 – the explanation is found in Note 13.

The reported costs of administration by the National Pension Funds are the costs not directly associated with individual transactions. Thus, items like brokerage fees are instead deducted from the return.

Some Key Numbers for the Administrative Costs of the Pay-as-you-go System

Costs as a....	Insurance administration	Buffer Fund administration	Total
Percentage of the total pension liability	0.0183 %	0.0177 %	0.0353 %
Percentage of the inkomstpension liability for insured persons aged 16-64	0.0388 %	0.0361 %	0.0750 %
SEK per insured person aged 16-64	180 SEK	168 SEK	348 SEK

Note 5

Value of Change in Contribution Revenue

Millions of SEK, turnover duration in years

Contribution revenue 2001	156,811
Contribution revenue 2000	-144,275
Change in contribution revenue	= 12,536
(turnover duration 2001 + turnover duration 2000)/2 ⁴	x 32.37688
Value of change in contribution revenue	405,877

The value of the change in contribution revenue has been calculated by multiplying the change in contribution revenue by the average of the turnover duration for 2000 and an estimated value of the turnover duration for 2001. This estimated value has been calculated by assuming that the pay-in duration⁵ for 2001 (which cannot be calculated until next year, when every individual's pension credit has been established) is the same as the pay-in duration for 2000. As from next year's annual report the change in turnover duration will equal the change in the median turnover duration used for calculating the balance ratio, see equation 1.3 in the Technical Appendix.

$$\frac{4(32.42918 + 32.32459)}{2} = 32.37688$$

⁵ See equation 3.1 in the Technical Appendix

Turnover duration

	1998	1999	2000	2001
Pay-in duration, years	21.22597	20.78628	21.99799	21.99799 ⁶
Pay-out duration, years	not calculated	not calculated	10.32660	10.43119
Turnover duration, years			32.32459	32.42918

⁶ The pay-in duration has not been calculated for 2001; here the pay-in duration for 2000 is used.

Note 6

Value of the Change in Turnover Duration

Millions of SEK, turnover in years

Turnover duration 2001	32.42918
Turnover duration 2000	-32.32459
Change in turnover duration	= 0.10459
(contribution revenue 2001 + contribution revenue 2000)/2 ⁷	x 150,543
Value of change in turnover duration	= 15,745

As the same pay-in duration is used in determining turnover duration for 2000 and 2001, the value of the change in turnover duration is attributable entirely to the increase in pay-out duration.⁸ The higher pay-out duration is due in turn to the increase in *average economic life span* – that is, to average life span weighted by pension amounts.

$$\frac{7(156,811 + 144,275)}{2} = 150,543$$

⁸ See equation 3.2 in the Technical Appendix.

Note 7

New Pension Credits and ATP-points

Millions of SEK

Inkomstpension credits earned, estimated value	128,181
Value of ATP-points earned, projected value	10,446
Total	138,627

As earnings for tax purposes for 2001 have not yet been established, the value of Inkomstpension credit earned in 2001 can at present only be estimated, the "final" value will be known in December 2002.

The value of the *ATP-points*⁹ earned in 2001 has been projected using RFV's simulation model. The cohort born in 1953 will reach the age of 64 in 2017. This year is the last one in which ATP-points can be earned. This means that contributions will not be the same as pension credit recorded until 2018.¹⁰

Note 8

Pension payments reduce the pension liability by the amount disbursed.

Note 9

Indexation of the Pension Liability of the Pay-as-you-go System

	Percent	Millions of SEK
ATP, active persons	2.7100 %	32,642
Inkomstpension, active persons	2.8682 %	71,677
ATP, retired persons	0.8197 %	11,952
Inkomstpension, retired persons	0.8197 %	16
Total indexation		116,287

Note that in practice the indexation of pensions and pension balances is by the ratio between two indices, not by the percentage change in the index calculated here and rounded off to four decimal places.

The value of indexation calculated here refers to the indexation that has affected the pension liability as of December 31, 2001. As for the liability referring to ATP to "active persons," it has been affected by the change in the *price-related base amount*⁹ between 2001 and 2002. This while the liability referring to inkomstpension to active persons has been indexed with the change in income index between 2001 and 2002. The pension liability to all "retired persons" as of December 31, 2001 has been affected by the change in the price-related base amount between 2001 and 2002. From January 1, 2002 on, both ATP-pensions and inkomstpensions are to be indexed by the change in the income index less the norm. The norm is the interest rate credited in the *annuitization divisor*.⁹ From year 2003 the norm will be 1.6 percent.

⁹ See the List of Terms.

¹⁰ The reason why pension contributions (SEK 156.8 billion) so greatly exceed the total value of *inkomstpension* credit and ATP-points earned (SEK 138.6 billion) is that the ATP system has not yet been phased out. Since the new pay-as-you-go system is defined contribution yearly *inkomstpension* credits will equal yearly contributions to this system when ATP is phased out. In the ATP system, pension entitlements are often earned in the relatively early years of a working career. An individual of 55 who has already had his/her 15 best earning years, and has worked for at least 30 years, will achieve no increase in ATP entitlement at all even if he or she continues to work and to pay contributions until reaching 65. The contribution revenue attributable to ATP for 2001 may be estimated at SEK 26.9 billion. The value of the ATP-points earned by the same group that year was only SEK 10.4 billion. Thus, contributions exceeded the value of pension credit earned by SEK 16.5 billion. This situation is quite illustrative of the negative influence of the ATP system on the labour supply of older members of the labour force.

Base Amounts and Indexes used in the Calculation of the Pension Liability

	2000	2001	2002
Price-related base amount, SEK	36,600	36,900	37,900
Change in price-related base amount		0.8197 %	2.7100 %
Income index		103.20	106.16
Change in income index			2.8682 %

Note 10

Value of Change in Average Life Span, Pay-as-you-go System

Millions of SEK

ATP, active persons	7,732
Inkomstpension, active persons	0
ATP, retired persons	10,996
Inkomstpension, retired persons	0
Total	18,728

The life span used for the calculation is the "economic life span", the concept used in reference to the time over which an average pension is assumed to be paid, with consideration also given to the norm of 1.6 percent.¹¹ If there is a correlation between the size of pensions and life expectancy, the economic life span will differ from life expectancy. For example, if persons with higher than average pensions live shorter than the average retiree, economic life span will be shorter than life expectancy.

The effect of changes in economic life span is calculated by first determining the pension liability based on the economic life span that can be measured in the system in the current year. This liability is thereafter reduced by the pension liability that would result with the economic life span measured in the previous year. In 2001 the average economic life span increased by about 1 percent. More about the effects of this year's change in the economic life span is reported in section Analyses of Certain Items in the Income Statement and Balance Sheet.

Changes in average life span affect the liability for ATP-pension, both to the economically active and to retirees. This is due to the fact that in the ATP system pensions are not determined on the basis of life expectancy. Pensions already granted in the reformed system are not affected by the development of the life expectancy after the age of 65; thus, the effect of changes in average life span on the inkomstpension liability to retirees is the same as in the ATP system. From age 61 to age 65, the inkomstpension is calculated using a preliminary annuitization divisor that is adjusted when the individual reaches 65. The increase in average life span during the year has not entailed any cost in the form of a higher inkomstpension liability since in 2001 no pensioners who had reached the age of 65 were receiving an inkomstpension.

¹¹ See equation 4.3 in the Technical Appendix for the calculation of economic life span.

¹² See table 4 on page 55 for details on how projected increases in life expectancy will affect pensions or pension age for various birth cohorts.

The divisor used to transform pension account balances into monthly pensions adjusts to changes in average life span. The inkomstpension liability to the economically active is therefore not affected by changes in life expectancy. Without the adjustment of the divisor in accordance with the development of the life expectancy, the cost, in the form of an increase in pension liability, due to the change in life expectancy would have been SEK 20 billion higher, or nearly SEK 40 billion in all. If the new pension system had been fully functioning in 2001, the increase in the pension liability due to the measured longer life expectancy would have been limited to the SEK 10,996 million shown above as an increase in the liability in "ATP, retired persons". These amounts are illustrative of the economic impact of the increase in average life expectancy and of the need to postpone retirement in order to maintain pension levels in the reformed system.¹²

Note 11

Inheritance Gains Arising in the Pay as-you-go System

Millions of SEK

Ages 60-64	765
Ages -59	4,711
Total	5,476

Inheritance gains arising are the pension account balances as of December 31, 1999, of persons younger than 65 years dying in 2000.

Note 12

Inheritance Gains Distributed in the Pay as-you-go System

Millions of SEK

Ages 60-64	779
Ages -59	4,711
Total	5,490

Before the year when a birth cohort reaches the age of 60, the inheritance gains arising in the cohort are distributed among its surviving members. Beginning with the year when a birth cohort reaches 60, the inheritance gains that it is estimated will arise are distributed among the surviving members of the cohort. The estimated inheritance gains are determined on the basis of the mortality observed by Statistics Sweden, the Swedish central office of statistics. Since these mortality assumptions will not be exactly the same as actual mortality in the inkomstpension system, there will be small differences between inheritance gains arising and gains distributed for ages 60-64.

The reason for the transition to estimated inheritance gains, rather than actual gains arising, is that a pension may be claimed from age 61. Thus, it is not possible to apply the procedure for distribution of actual inheritance gains used for ages below 60.

Note 13

In 2001, 60 percent of the costs of administrating ATP and inkomstpension, including, the national pension funds, were financed by a deduction for these costs from each pension account balance. The deduction is calculated on the basis of estimated costs of administration; differences between estimated and actual cost is taken into account in the deduction for administrative costs the following year. The estimated cost for 2001 was SEK 1,538,000 million; 60 percent of this cost is SEK 923 million. As a percentage of the pension account balance the deduction for costs of administration was 0.034 percent in 2001.

During the period 2002-2021, the proportion of the costs of administration financed by the deduction for this purpose will increase by two percentage points per year. The deduction will not equal 100 percent of the costs of administration until 2021. The reason for phasing in the deduction is to avoid charging a disproportionately large cost to the birth cohorts with pension balances in the new system during the period when the ATP system is being phased out.

Note 14

Assets in Buffer Funds, Pay-as-you-go System as of December 31, 2001

Millions of SEK

National Pension Fund no:	1	2	3	4	6	*	Total
<i>Equities**</i>	77,792	81,882	69,752	86,200	16,468	1,498	333,592
of which							
Swedish stocks and shares	19,630	31,885	26,848	36,619	16,468	1,443	132,893
foreign stocks and shares	58,162	49,997	42,904	49,581	0	55	200,699
<i>Bonds and other interest-bearing assets</i>	56,636	48,172	57,151	42,972	1,302	0	206,233
of which							
Swedish issuers	34,404	44,630	31,579	18,530	1,302	0	130,445
foreign issuers	22,232	3,542	25,572	24,442	0	0	75,788
Other items	3,127	3,737	5,868	2,638	142	18,669	34,181
<i>Total assets</i>	137,555	133,791	771	131,810	17,912	20,167	574,006
Liabilities	6,767	298	47	225	1,184	314	8,835
Total fund capital	130,788	133,493	132,724	131,585	16,728	19,853	565,171

* Special administration of the First and Fourth National Pension Funds

** Equities are reported under the marketplace where they were acquired

For more detailed information on the buffer funds, see their web sites at: www.ap1.se, www.ap2.se, www.ap3.se, respectively.

Note 15

Contribution asset

Millions of SEK

Contribution revenue (2001)	156,811
Turnover duration (2001)	x 32.42918
Contribution asset	= 5,085,252

As previously mentioned the contribution asset as of December 31, 2001, has been calculated without the smoothing to be used in calculating the balance ratio.¹³ Beginning with next year's annual report, the calculation of the contribution asset reported will be linked to the calculation of the contribution asset in the balance ratio.

¹³ See Equation 1 for the years and the smoothing used in the calculation of the contribution asset in the balance ratio.

Note 16

Opening balance in the Pay-as-you-go System

Millions of SEK

Closing balance 2001	218,407
Net income 2001	278,722
Opening balance 2001	- 60,315

Since the report for 2001 is the first to be prepared, the opening balance has been calculated a residual item by deducting net income for 2001 from the closing balance, i.e. total assets minus pension liabilities as of December 31, 2001.

Note 17

Pension Liability in the Pay-as-you-go System

Millions of SEK

	Active	Retired	Total
ATP	1,244,876	1,481,059	2,725,935
Non-income-related national basic pension		6,030	6,030
Inkomstpension	2,697,997	2,054	2,700,052
Total	3,942,873	1,489,143	5,432,016

The non-income-related basic pension liability refers to benefits that will be assumed by the central-government budget in 2003 as this benefit is converted to the guaranteed pension.

The pension liability for ATP and for inkomstpension to retired persons is determined by first totaling the pension payments in December to each age group, 61 and older. This total is then multiplied by the estimated number of remaining payments of an average pension amount for each age group, discounted by the norm of 1.6 percent. Thereafter, the pension liability to each retired age group is summed up.¹⁴

The estimated number of remaining payments of an average pension amount to each age group is based on a calculation of the length of time the amount is paid out according to RFV records. Also considered is the fact that the value of these pension amounts will decrease by 1.6 percent per year in relation to the growth in average income

¹⁴ See Equation 4 in the Technical Appendix for details on this calculation.

by being indexed to the change in the income index minus 1.6 percent. Thus, the calculation involves a form of economic life span, rather than the life expectancy of the individuals concerned.

In cases where the amount of individual pensions is related to the mortality of these individuals, economic life expectancy will differ from the life expectancy of the individuals. The expected remaining pay-out duration, discounted by the norm of 1.6 percent, is referred to in this annual report as the *economic annuitization divisor*.¹⁵

The inkomstpension liability for the economically active consists of the pension account balances of all persons insured as of December 31, 2001, with the addition of the estimated inkomstpension credit earned in 2001. The pension account balance for each insured is a nominal figure that is retrieved from the administrative records kept by RFV.

The ATP-pension liability for the economically active cannot be calculated directly from the data in the records on earned ATP-points. This liability is estimated using the RFV pension model.¹⁶ The annual cohorts for which this calculation is performed are those born in 1937–1953 – that is, those whose pensions will be calculated entirely or in part by the ATP rules. The ATP-pension liability is calculated by estimating the supplementary pension for each annual cohort in the month when its members reach the age of 65. This amount is then multiplied by the expected number of payments of an average pension amount, adjusted by the norm of 1.6 percent. The pension liability thus calculated is thereafter discounted with the assumed future increase in the income index and reduced by the assumed future contributions to the system by that cohort.

In these calculations, it is assumed that the general development of incomes will conform to the forecast in March 2002 of the National Institute for Economic Research granted for the period 2002–2007; for the period 2008–2018, it is assumed that the average income will increase at an annual rate of 2 percent. The year 2018 is the final one in the calculation since the cohort born in 1953 reaches the age of 65 that year. The expected number of payments of an average pension amount is the same as was calculated for the cohort born in 1936. Thus, in calculating the ATP-pension liability to active persons, no consideration is given to the future increase in average life span assumed by Statistics Sweden.

Note 18

Pension Payments in the Premium Pension System

Thousands of SEK

Pension payments from fund insurance	371
Pension payments from conventional insurance	32
Total ¹⁷	403

¹⁵ The method for calculating economic annuitization divisors is shown in Equation 4.3 of the Technical Appendix.

¹⁶ RFV uses a micro-simulation model for its actuarial projections. The model is based on a selection of approximately 250,000 individuals in the records kept by RFV. The model simulates the biographies of these individuals in various relevant aspects and also creates entirely synthetic biographies.

¹⁷ Including pensions granted but not yet paid.

In the premium pension system, a pension may be received in two different forms, as fund insurance, implying variable annuity, or as conventional insurance, with an annuity compounded at guaranteed minimal rate. Both forms provide a life-long pension. In fund insurance, the insured retain their premium-pension capital in their funds. The size of their variable annuity is then recalculated each year according to the yield on the chosen funds. In conventional insurance, the capital in the premium pension funds is transferred to the PPM, which pays out a life-long pension annuity with a guaranteed nominal compounding rate at which the pension is recalculated annually. If PPM capital management achieves a return exceeding the guaranteed rate, the pension will be further increased. Both fund insurance and conventional insurance can cover the lives of two persons, in other words, be paid out as long as one of two spouses/cohabitants is alive.

Note 19

Return on Funded Assets in the Premium Pension System

Thousands of SEK

	Fund insurance	Conventional insurance
Direct yield	484,002	52
Unrealized capital gain	.	11
Miscellaneous costs	-10	-40
Unrealized capital losses	-6,153,911	.
Total	5,669,919	23

Note 20

PPM Administration Costs

Thousands of SEK

Operating expenses	- 442,151
Return on capital, revenue	56,593
Total	- 498,744

The costs of administration include the cost of interest on loans taken to finance the PPM. Costs of fund management are defrayed directly from insurance assets.

Note 21

In the premium pension system, the total of all new pension credits will be equal to the contribution revenue.

Note 22

Pension payments reduce the pension liability by the same amount, see note 18.

Note 23

The pension liability changes with the return on assets on the funds, see note 19.

Note 24

There has been no change during the year in the assumptions PPM make on life expectancy.

Note 25

What is termed "Inheritance gains arising" in the pay-as-you-go system is called "Allocation to capital on death" in the premium pension system. Amounts of reduction relate to the reduction in premium-pension credit when premium pension is transferred between spouses.

Note 26

Inheritance gains are set aside for the benefit of pension savers; however, as of the balance-sheet date, they had not been allocated individually to the accounts of each pension saver.

Note 27

The amount of SEK 210 million is for the PPM fee of 0.3 percent withdrawn in 2001 to help finance the operating expenses of the PPM. During the build-up phase and until 2018, the authority will be financed through a combination of fees charged and interest-bearing loans from the National Debt Office to meet the need for working capital. The authority is permitted to withdraw annual fees equivalent to a maximum of 0.3 percent of the aggregate account balances of pension savers. During the build-up phase, these withdrawals will be less than the costs sustained by the PPM; the difference is to be financed by loans. This will be done to avoid charging disproportionately high fees for persons currently insured at a time when their premium-pension capital is limited.

Note 28**Insurance Assets of the Premium Pension System**

Thousands of SEK

Fund insurance	65,128,618
Conventional life insurance	1,169
Total	65,129,787

Fund insurance refers to the total assets in the 575 pension funds that, as of December 31, 2001, had entered the premium pension system. Conventional life-insurance refers to the capital managed by PPM for the guaranteed annuity pensions that the authority offers.

Note 29**Other Assets of the Premium Pension System**

Thousands of SEK

Temporarily managed preliminary fees paid	42,902,092
PPM's administrative inventory of fund shares (trading inventory)	33,821
Miscellaneous assets	409,131
Total	43,345,044

The PPM is responsible for temporarily managing the preliminary fees transferred monthly by the RFV until pension credit has been determined and the moneys have been invested in the insurance alternatives of the PPM. The return obtained by capital management is allocated among pension savers according to the pension credit established for each of them.

Note 30

Pension Liability of the Premium Pension System

Thousands of SEK

Pension liability, fund insurance	65,130,474
Pension liability, conventional life insurance	1,151
Total	65,131,625

Note 31

Other Liabilities of the Premium Pension System

Thousands of SEK

Liabilities related to preliminary contributions paid	42,713,386
Miscellaneous liabilities	1,882,943
Total	44,596,329

The PPM invests preliminary contributions paid in accounts with the National Debt Office. These contributions are managed for an average of 18 months. In April 2001, the contributions for the earning year 1999 were invested in the funds chosen by the insured.

Sweden's New Pension System – a Brief Description

The new pension system works much like ordinary saving at the bank. This comparison applies to both parts of the system, the essentially pay-as-you-go system financed *inkomstpension* and the fully funded *premium-pension* system. Pension contributions are paid in each year by the insured themselves, by their employers, and in some cases by the central government. Contributions paid in by and on behalf of an insured are recorded in his or her "bankbook". Like bank savings, the contributions accumulate, and like bank savings, contributions earn a return. Every insured person receives a kind of "bank statement" each year. It enables each insured to follow the growth from year to year in his or her account in the pay-as-you-go and premium-pension systems. When the individual retires, the bankbook is closed, and the stream of payments is reversed. Now the individual's savings are paid back by the pension system as a lifetime monthly pension.

Pension Contributions and Pension Credit

Pension contributions are paid into the system each year by the insured themselves, by their employers, and in some cases by the central government. The pension contribution is 18.5 percent of the contribution base, which consists of *pension-qualifying income* and any other *pension-qualifying amounts*. Pension-qualifying income includes wages and salaries, as well as "transfer payments" in the form of social insurance and unemployment benefits.¹ Pension-qualifying amounts are for disability pensions, child-care years, study, and compulsory national service.²

Employees and self-employed pay a contribution of 7 percent on their wages/salaries and on any social-welfare or unemployment benefits that they may have received. This contribution to the pension system is paid on incomes up to 8.07 *income base amounts*, the maximum pension-qualifying income.³

Employers pay a pension contribution for employees of 10.21 percent of their wages/salaries. This contribution to the pension system is also paid on incomes exceeding 8.07 base amounts. Since no pension credit is earned on the portion of an income above 8.07 base amounts, the "contribution" on such wages/salaries is a tax. As such, it is transferred to the central-government budget, not to the buffer funds or the premium pension system.⁴

The central government pays contributions for persons receiving pension-qualifying social-welfare benefits or unemployment benefits. These contributions to the pension system are 10.21 percent of the benefits received. For persons credited with pension-qualifying amounts, the central government pays a contribution of 18.5 percent of these amounts to the pension system.

How can the pension contribution and pension credit be 18.5 percent of the contribution base when the total of virtually all contributions on the various bases is 10.21 plus 7, i.e. add to 17.21 percent? The explanation is that the employee pension contribution, 7 percent,

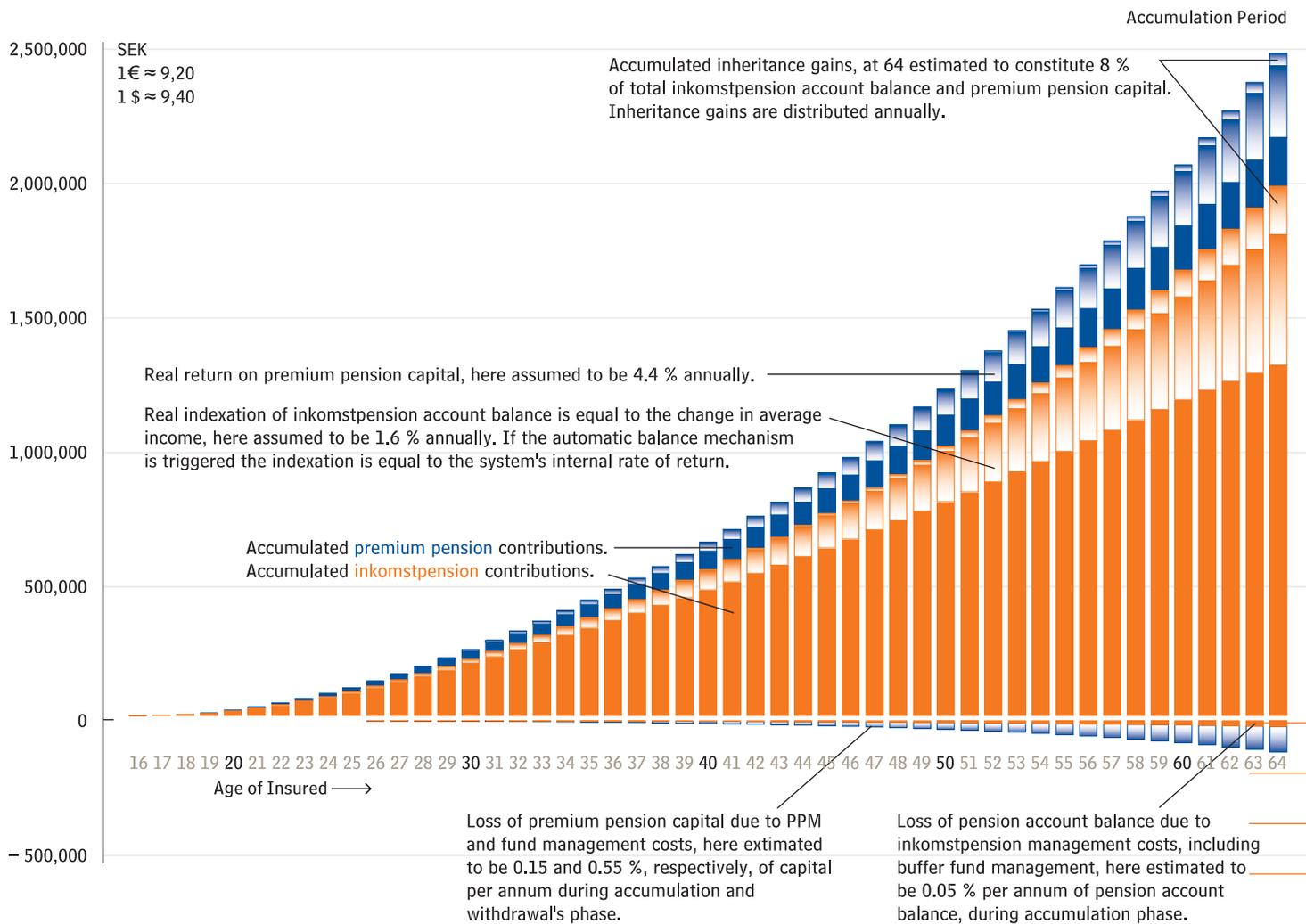
¹ See Note 1 Table A.

² See Note 1. Table B.

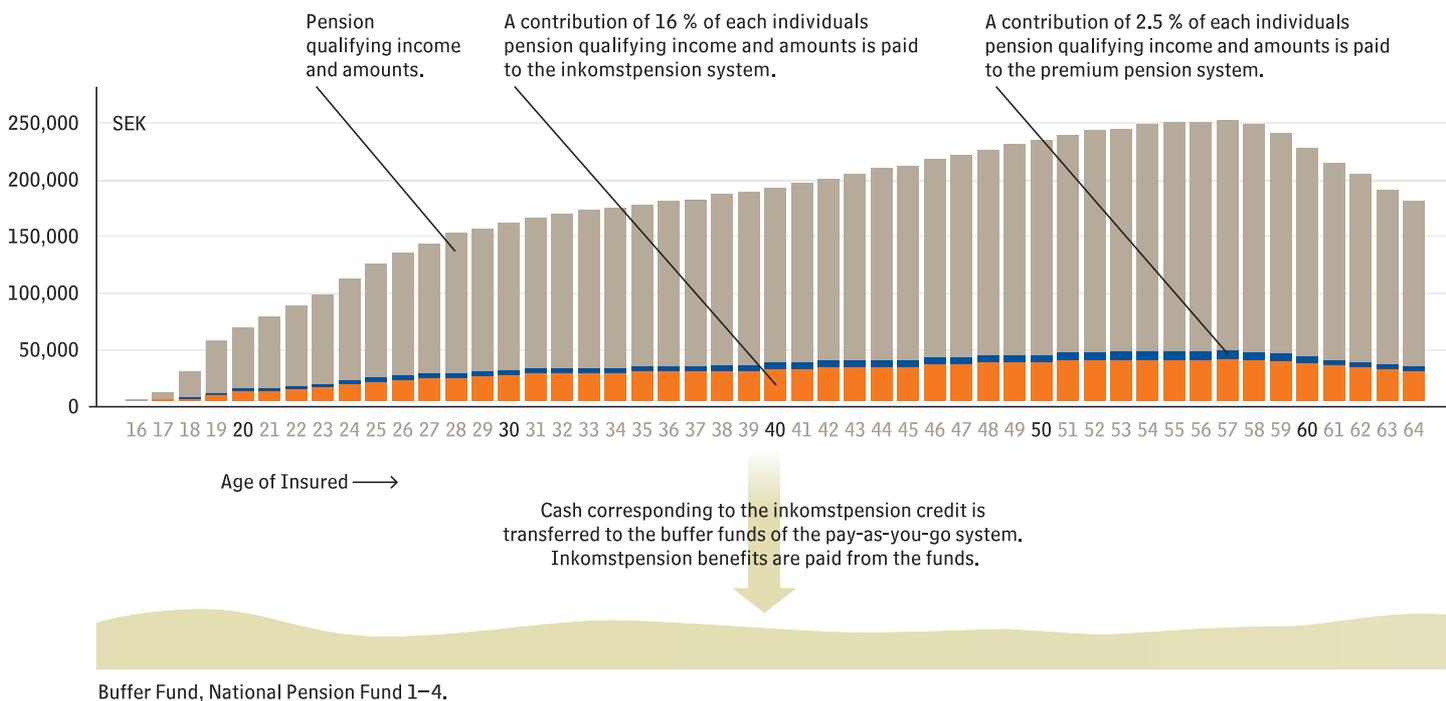
³ In 2002, the income base amount is SEK 38,800, and the maximum pension qualifying income on which an individual must pay a contribution is thus SEK 313,116.

⁴ See Note 1 for the size of this tax.

Accumulation and Withdrawal of Inkomstpension Account Balance and Premium Pension Capital for a Typical Insured

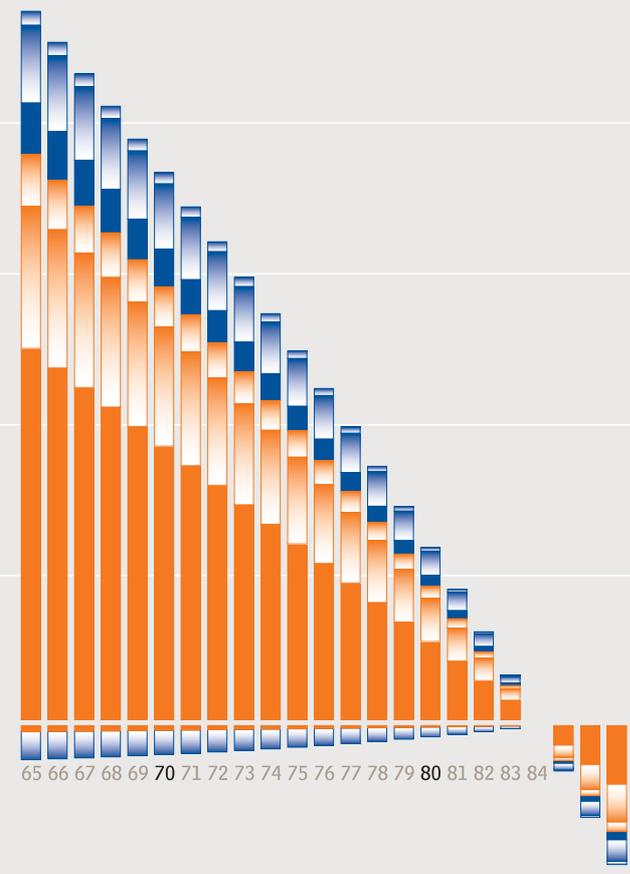


Yearly Pension Qualifying Income, Contributions and Pensions for a Typical Insured



Insured

Pay-out Period



Withdrawal of premium pension capital. Premium pension can be withdrawn as a guaranteed annuity with profits, or as a variable annuity.

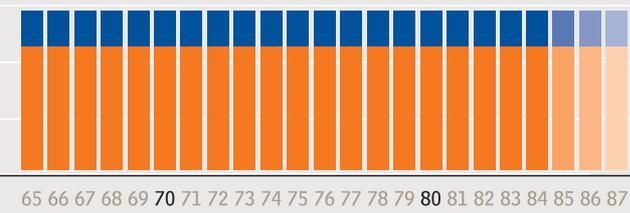
Withdrawal of inkomstpension account balance. Inkomstpension is calculated by annuitizing the pension account balance with an annuitization divisor. The divisor reflects the unisex remaining life expectancy at retirement and an interest rate of 1.6 %. Final divisors are calculated for each annual cohort when it reaches age 65.

Premium pension and inkomstpension are paid for the lifetime of the insured. Individuals who live beyond the average age of mortality will receive pension payments exceeding their accumulated premium pension capital and pension account balance. The deficit is financed by the unused accumulated premium pension capital and pension account balances of those who die before reaching the average age of mortality.

If the pension is drawn as a variable annuity it will be recalculated annually according to the change in the value of the funds. In the illustration the value of the premium pension is fixed in real terms, implying a real return on premium pension capital, net of costs, of 3.7%. This return minus costs, here assumed to be 0.7%, is credited at the time of annuitization.

The inkomstpension is, when the balance mechanism is inactive, indexed annually by the increase in average income minus the interest rate 1.6 % credited in the annuitization divisor. Real pensions will grow (decrease) by the margin (shortfall) of real growth in average income and 1.6 percent. In the illustration the assumed growth in real average income is 1.6 percent, which will result in a fixed inkomstpension in real terms. If the balance mechanism is activated real pensions will grow (decrease) by the margin (shortfall) of an approximation of the real internal rate of return in the system.

Life Long Pensions



is deducted from the pension qualifying income when pension credit is calculated.

This means that the maximum pension qualifying income is 93 percent of 8.07 income base amounts, or 7.5 income base amounts. The highest total pension contribution payable by or for an individual in a given year is thus 18.5 percent of 7.5 income base amounts, equivalent in 2002 to SEK 53,835. Thus the maximum pension credit that an insured individual can earn this year is also SEK 53,835.

For example, if the sum of pension-qualifying income and amounts for an insured individual is SEK 100 after deduction of the employee pension contribution, the individual's pension credit, and the contribution paid on his/her behalf, is SEK 18.5. The pension credit consists of SEK 16 in the pay-as-you-go system and SEK 2.5 in the premium-pension system. In addition, SEK 16 of the contribution is transferred to the *buffer fund* of the pay-as-you-go system, while SEK 2.5 is deposited in the *premium-pension fund* chosen by the insured.

Interest on Savings during the Accumulation Phase

Money deposited in the bank earns a return in the form of interest. In the pension system, too, a return is earned on paid-in contributions. In the pay-as-you-go inkomstpension system, the rate of return equivalent to interest on bank savings is determined as a rule by the development of the average income in Sweden. Thus, if the average income increases by 3 percent, the return earned on all pension credit will also be 3 percent. The development of the average income is measured by the *income index*, and the return on pension credit is called indexation.

In the premium-pension system, the equivalent to interest on bank savings is the change in the value of the shares of the chosen premium-pension fund. In both the pay-as-you-go system and the premium-pension system, the return, or interest-equivalent, is dependent on the development of the economy. The interest in the pay-as-you-go system depends on the growth of wages, while the interest in the premium pension system depends on the return on the capital invested. Thus, the interest is not guaranteed in either system; it may even be negative.

In the inkomstpension system, the sum of total pension credit, i.e. the contributions paid in by and on behalf of the insured, and the return earned thereon is called the *pension account balance*. In the premium-pension system, the sum of total pension credit and the change in its value is called the *pension capital*.

Annually the pension-account balances and pension capital, of persons who have died are distributed to the surviving insured as so-called *inheritance gains*. The inheritance gains constitute a form of additional interest on savings. Administrative costs are subtracted from pension account balances by a common percentage, and from the pension capital with a percent which depends, in part, on the charges of the funds chosen by the insured.

Buffer Fund and Premium Pension Funds

In the *inkomstpension* system, pensions are financed primarily by the current contribution revenues of the system. Thus, for society as a whole, there is in principle no capital accumulation in the pay-as-you-go system. For the insured individual, on the other hand, pension contributions can just as well be regarded as a form of capital accumulation or saving.

In the *inkomstpension* system, contributions are paid into the buffer funds of the system. The pay-as-you-go system has five buffer funds: the First, Second, Third, Fourth and Sixth National Pension Fund. The First–Fourth National Pension Funds each receive one fourth of the contributions paid in, and each of these funds finances one fourth of pension payments. The Sixth National Pension Fund does not receive any contributions, nor does it finance any pensions. The total buffer fund is much smaller than aggregate commitment of the pay-as-you-go system – only 10.4 percent as of December 2001.

In the premium-pension system, pensions are financed from the funds accumulated by the insured. The insured can choose up to 5 different funds. The funds can be changed without any costs to the insured and there are virtually no restrictions on the number of changes. As of December 31, 2001, the premium-pension system included 575 premium-pension funds, administered by 83 different investment managers. The contributions of insured individuals who decline to choose a premium-pension fund are transferred to the *Seventh National Pension Fund*, which is thus a part of the premium pension system.

At about this point, the analogy to bank savings ceases to apply.

Pension Insurance

One typical feature of a pension system, or pension insurance, is that it is untouchable during the saving phase; it is not possible to make withdrawals on one's pension claim in whole or in part before reaching a specified minimum age. In the pay-as-you-go and premium pension systems, this age is 61 years. After that age, savings can be "withdrawn," though not all at once, but only as a monthly pension for the lifetime of the insured.

Another characteristic of pension insurance is that they reallocate saving from individuals who live shorter lives than average to those who live longer. During the savings phase this takes place through the distribution of *inheritance gains*. Also after withdrawal of pension begins, the pension balances of persons dying at a younger than average age can be considered to be distributed to the surviving insured. This is done by converting the pension account balance and premium pension capital, respectively, to annuities, i.e. life-long pensions, on the basis of an average life span, but paying it out to the insured individuals as long as they live. Consequently, total pension payments to those dying short of the average age are less than the amounts saved by them, and total payments to persons living beyond the average age exceed the amounts that they have saved.

Calculation and Indexation of Pensions

The pension from the pay-as-you-go system, i.e. the inkomstpension, is calculated by dividing the pension account balance by an *annuitization divisor*. For example, if a pension balance of SEK 1,920,000 is divided by a divisor of 16.00, the annual pension will be SEK 120,000, and the monthly pension will be SEK 10,000. The divisor is calculated from measurements of the average life span for men and women, with consideration given to a interest rate, or *norm*, of 1.6 percent. Without this interest rate, the divisor would equal the remaining unisex life expectancy at the age when the pension was first withdrawn. With the norm, the divisor is always less than the average life span.

The inkomstpension is recalculated annually on the basis of the change in the income index minus the norm. It is somewhat misleading to use the word "minus"; the ratio between the new and the old income index is actually *divided by* 1.016. Beginning in 2002, this form of indexation is also applied to ATP-pensions.

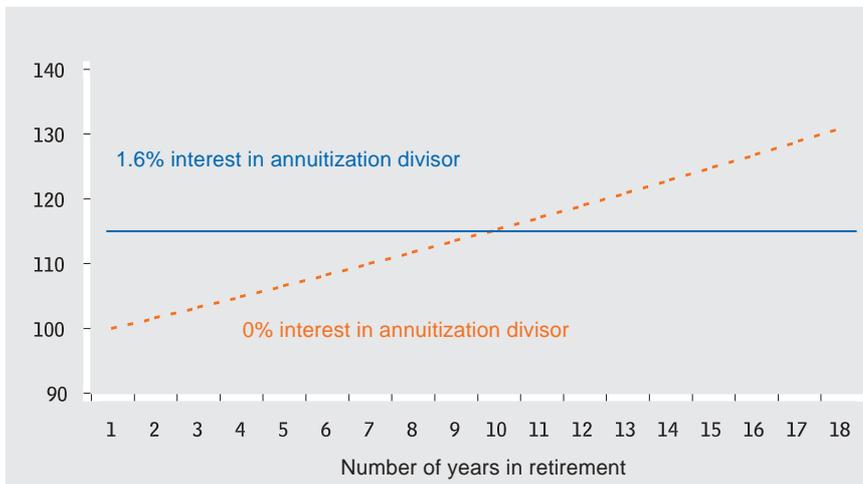
The aim of the legislator has been to maximize the inkomstpension at the time of retirement and to maintain its real value at the same level, or preferably to achieve a slight increase, during the period of disbursement. However, the calculation and indexation of inkomstpensions must be done without risk of financially destabilizing the pay-as-you-go system. The two objectives and the financial limitation may be mutually inconsistent, particularly when the rate of growth in average income is low. This problem has been addressed by adding the interest rate, the norm, of 1.6 percent in the divisor and deducting this interest in the annual recalculation of the inkomstpension by the change in income index. Owing to this procedure, the divisor is lower than it otherwise would have been, thus raising the value of the initial pension to a level that will be maintained in real terms *provided* the average income increases by the exact rate of 1.6 percent. If the average income increases by more than 1.6 percent, the real value of pensions will increase by the difference between the growth rate in average income and 1.6 percent. Conversely, if the average income

increases by less than 1.6 percent, pensions will decrease by the difference.

In the premium pension system, the insured may choose at retirement to withdraw his/her pension in the form of either *fund insurance* or *conventional insurance*.

With fund insurance, the savings of the insured are kept in the funds. The monthly pension is then

Initial Pension and Growth in its Value, Two Alternative Designs
1.6 Percent Assumed Growth in Average Income



recalculated annually based on the value of fund shares in December of each year. In the following year, fund shares in the number required to maintain the calculated monthly premium pension are sold each month. If the value of fund shares increases, fewer shares are sold; if their value decreases, more are sold. The variation in share prices thus affects the value of the premium pension in the following year. If the premium pension is withdrawn as a conventional insurance the insureds premium pension capital is sold by the Premium Pension Agency, (PPM). The assets are transferred to PPM, who invests them to finance the guaranteed annuity offered by PPM conventional insurance.⁵

Whether in the form of fund insurance or conventional insurance, the premium pension insurance, at the option of the insured, may cover the lives of two persons – spouses or cohabitants. After the death of one of them, the premium-pension will continue to be paid for the lifetime of the survivor. If this option is elected, the monthly pension will be somewhat lower.

⁵ In principle the legislation lets PPM design this annuity, however, annuities must be gender-neutral.

Automatic Balancing in the Pay-as-you-go System

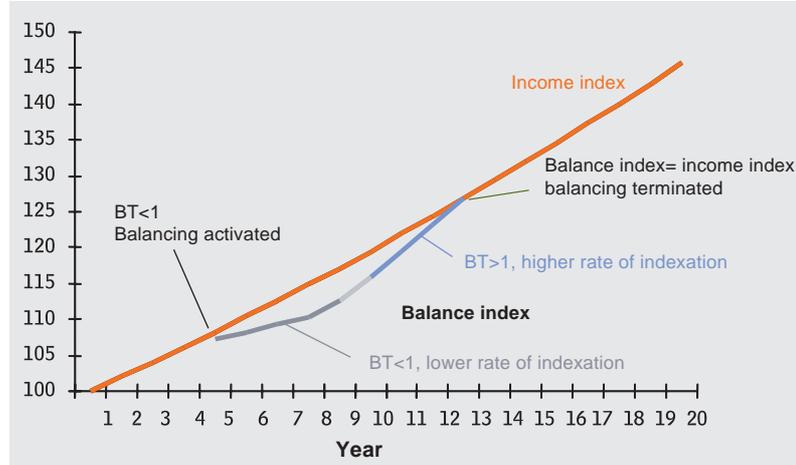
One aim of the Swedish pay-as-you-go system is to maintain a fixed contribution rate of 16 percent. Another, as indicated above, is to index the commitment of the system to the growth in average income. In addition, the value of a pension is not affected by changes in average life span once the insured has reached 65 years of age. However, certain demographic and economic developments may lead to a situation where it is impossible to index the pension liability to the change in average income while maintaining a fixed contribution rate. In the event of such a conflict, the fixed contribution rate has been given priority over indexation to the average income. A procedure termed automatic balancing determines if, when and how departures from indexation by changes in average income are to be made. It includes rules for calculating the assets and liabilities of the pay-as-you-go system.

The assets of the pay-as-you-go system consist partly of the value of the contributions collected by the system, the *contribution asset*, and partly of the assets in the buffer funds of the system. The value of the contributions is calculated as the pension liability that could be financed by the contributions given the economic and demographic conditions at the time of valuation. This hypothetical liability equals contributions times the expected duration of the average pension credit in the pay-as-you-go system, from the time when pension credit is earned until the time when the pension is disbursed. That expected interval of time is referred to as *turnover duration*. The current turnover duration is about 32 years, consisting of 22 years of pay-in duration and 10 years of pay-out duration. Buffer fund assets valued according to the market prices at the balance sheet date.

The *pension liability* of the pay-as-you-go system consists of pension account balances and the value of the pensions to be paid. During the phase-out of the ATP system, the pension liability also includes the value of the ATP-points earned by the economically active.

By dividing the assets of the system by the pension liability, we obtain a measure of the financial position of the pay-as-you-go system, called the *balance ratio*. If the balance ratio exceeds one (1), assets are greater than liabilities; if the balance ratio is less than one, liabilities exceed

Automatic Balancing



assets. If the balance ratio is allowed to be less than one, the buffer fund will eventually be exhausted, and pensions cannot then be financed by a contribution of 16 percent. In order to contain this risk, indexation of pension account balances and pensions is reduced if the balance ratio falls below one. In such a case, *balancing* is activated. Pension account balances and pensions are then indexed by the change in a *balance index* instead of the change in the income index.

A balance index is calculated only if the balance ratio has fallen below one at some time. In the first year for which a balance index is calculated, it is equal to the income index for that year times the balance ratio for the same year. For the following years, the balance index is determined by multiplying the balance index for the preceding year by the ratio between the new and the old income index times the new balance ratio. Indexation by the balance index continues until the latter reaches the level of the income index. At first, the balancing procedure can only reduce pensions, but subsequently it can restore them to previous levels.

Analyses of Certain Items in the Income Statement and Balance Sheet

This section provides supplementary information on certain items in the income statement and balance sheet of the pay-as-you-go system. To put the extent of the pay-as-you-go system in perspective, the income statement and balance sheet of the system are shown in percentages of GDP. Then a number of items are shown, including the median and quartiles – by gender and age – in regard to pension credit earned, pension balances, and pensions. Finally, additional information is provided on the effect of changes in average life span on net income.

Income Statement of the PAYGO System for 2001

In Percent of GDP¹

Pension contributions	7.2
Pension payments	-6.6
Return on funded capital	-1.2
Costs of administration	-0.1
<i>Total change in fund assets (a)</i>	<i>-0.6</i>
Value of change in contribution revenue	18.7
Value of change in turnover duration	0.7
<i>Total change in contribution (b)</i>	<i>19.5</i>
New pension credit & ATP-points	-6.4
Pension payments	-6.6
Indexation	-5.4
Value of change in average life span	-0.9
Inheritance gains arising	0.3
Inheritance gains distributed	-0.3
Deduction for costs of administration	0.0
<i>Total change in pension liability (c)</i>	<i>-6.0</i>
Net income (a) + (b) + (c)	12.9

¹ In March, 2002, the National Institute of Economic Research estimated GDP for 2001 at SEK 2,169 billion.

Balance sheet of the PAYGO System as of 31 December, 2001

In Percent of GDP

Capital in buffer funds	26.1
Contribution asset	234.6
Total assets	260.7
Opening balance	-2.8
Net income	12.9
<i>Closing balance</i>	<i>10.1</i>
Pension liability	256.6
Total pension liability and surplus	260.7

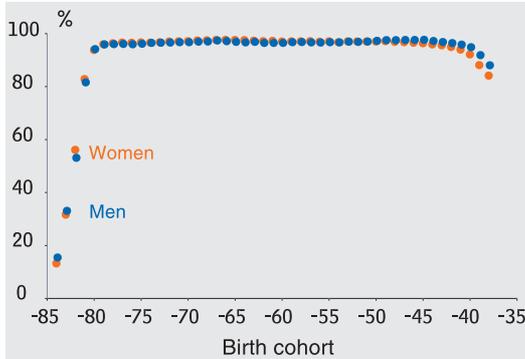
Pension Credit, Pension Balance, and Pensions

The RFV records on pension credit earned contain information on the pension credit earned by individuals in 2000. The pension credit earned in 2001 will not be established until the final tax settlement for that year. This will be in December of the current year.

In the pay-as-you-go system, pension credit is earned at 16 percent of pension-qualifying income and so-called pension-qualifying amounts. In the premium-pension system, pension credit is earned at 2.5 per-

cent of the same basis. The maximum pension-qualifying basis, the so-called ceiling, is 7.5 base amounts – income-related base amounts beginning with 2001. In 2000, the maximum pension credit that could be earned was SEK 44,760 in the pay-as-you-go system and SEK 6,993 in the premium pension system.

Diagram 1. Percentage of the Population in Sweden Earning Pension Credits in 2000



² The operations in this section were performed on the extracts from the records of pension credit earned that were used as a basis for the pension statements sent to all insured persons in 2002.

³ Persons born between 1938 and 1953 earn only part of their pension in the reformed system. In the diagram, the proportion earned by these annual cohorts has been scaled up to the full-credit equivalent. For example, the pension credit earned by persons born in 1938 has been multiplied by 20/4, continuing in like manner until reaching the annual cohort born in 1953, whose pension credit has been scaled up by 20/19.

⁴ If the pension credit for all individuals is ranked from lowest to highest, the 25th percentile is the value beneath which the lowest quarter of these values are to be found. The median is the individual pension credit at the middle of the values thus ranked. The 75th percentile is the value below which the lowest three quarters of the values of individual pension credit are to be found.

Diagram 1 shows the proportion of the population in Sweden that earned pension credits in 2000.

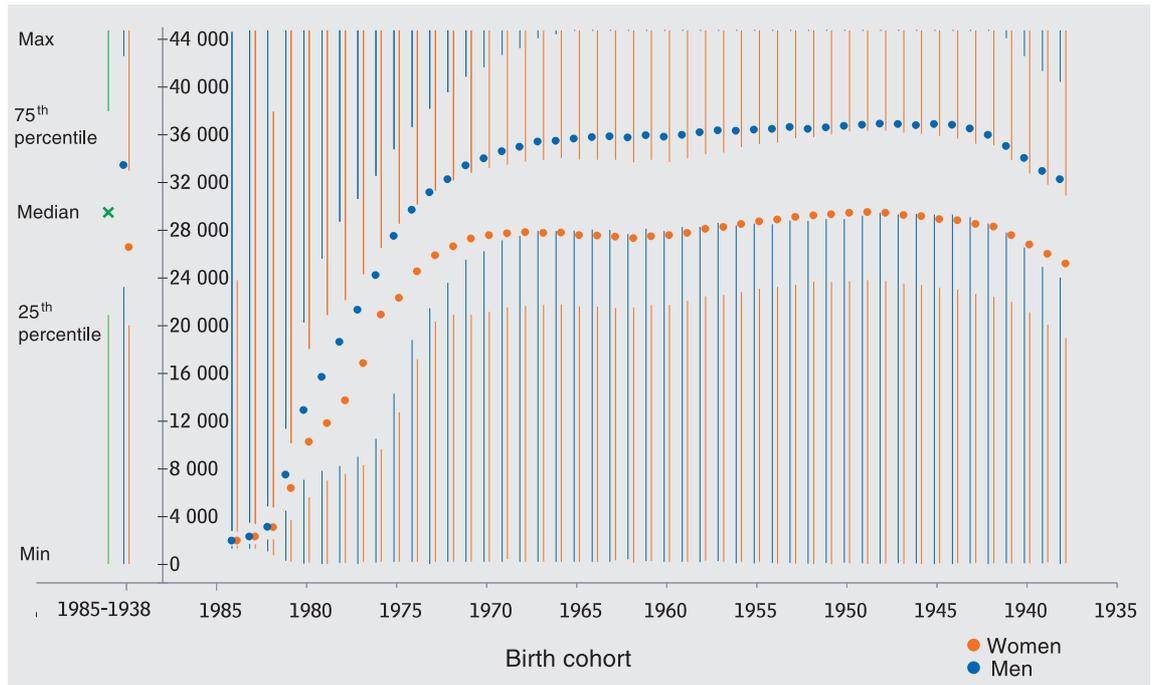
Note that only persons born in 1938 or later can earn pension credit in the reformed system; the cohort born in 1937 and reaching age 63 in 2000 can only earn ATP-points. The same is true of the cohort born in 1936, which in 2000 was the oldest cohort to earn ATP-points.² Pension credit has been earned by only a few individuals in the youngest cohorts, but by 95 percent of those in the normally active age groups. One reason for the high proportion in the latter case is that all taxable social and

unemployment insurance benefits are pension-qualifying. For such benefits, the individual pays a pension contribution, 7 percent, while the central government pays a pension contribution equivalent to that of employers, i.e. 10.21 percent. The central-government old-age pension contribution, however, is paid only on incomes up to the ceiling.

The inkomstpension credit earned in 2000 by each annual cohort of women and men, respectively, is shown in Diagram 2³. The median credit earned in 2000 for all insured is shown by a green cross at the far left of the diagram, the blue dot represents the median for men and the red dot the median for women. For each annual cohort, the lower line goes from the minimum value to the 25th percentile, while the upper line goes from the 75th percentile to the maximum value, SEK 44,760.⁴

The pension credit earned by women is systematically lower than that earned by men. The difference is about the same regardless of age, except for the very youngest age groups, born 1984–1982, which earned very little pension credit. Beginning with the cohort born in 1970 – that is, persons aged 30 – the 25th percentile for men is at virtually the same level as the median for women. For the same age groups, the 75th percentile for women is equal to, or less than, the median for men. The fact that there is only a very faint dip in pension credit earnings for woman in child-bearing years indicate that the pension qualifying amounts for child-care years rather well serves its intended function.

Diagram 2. Pension Credit Earned in 2000, Median and Quartiles⁵



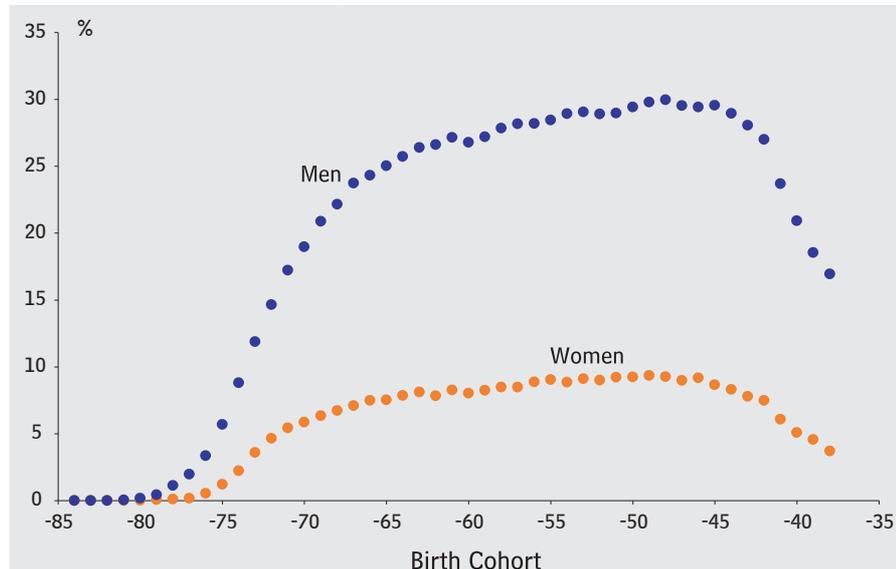
For men born 1942-1965, the 75th percentile is at or above the maximum income for which pension credit can be earned in the public pension system; in other words, for more than 25 percent of this group, pension qualifying income exceeded the ceiling. This explains the absence of a line from the 75th percentile to the maximum value.

⁵ The diagram follows a redesign of the box plot diagram suggested by Edward R. Tufte in *The Visual Display of Quantitative Information*, second edition, pages 123-125

Table 1. Pension Credit Earned in 2000, Statistical Summary

	Women	Men	Total
25th percentile	20,032	23,264	20,912
Median	26,579	33,424	29,488
75th percentile	32,992	42,608	37,968
Mean value	25,827	30,921	28,417
Standard deviation	10,988	12,645	12,130

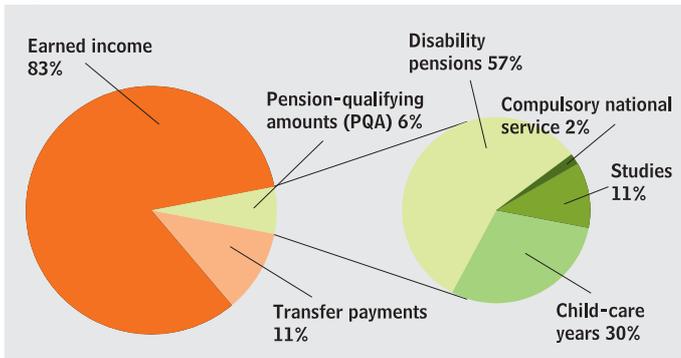
Diagram 3. Percentage of Individuals Earning Pension Credit in 2000 with Income at or Above the Ceiling



Men born in 1948 is the cohort with the highest percentage of individuals with income at or above the ceiling, 30 percent in this cohort had such income. As can be seen, considerably more men than women have incomes above the ceiling. For women, the cohorts born in 1948 and 1949 show the highest proportion above the ceiling, 9 percent. A relatively large share of those in this group has incomes just barely above the ceiling on earned pension credit. This explains why the total of incomes above the ceiling is only some 10 percent of the total of all incomes.

In the period 1960–2001, the ceiling in the ATP system has been unchanged in constant prices. Since annual earnings have risen more rapidly than prices, a growing share of total income has exceeded the ceiling. To a large extent, these portions of income have automatically been included in the coverage provided by negotiated collective agreements on supplementary pensions. Beginning January 1, 2002, the ceiling is adjusted by the income index. Thus, the proportion of incomes above and below the ceiling will be stable.

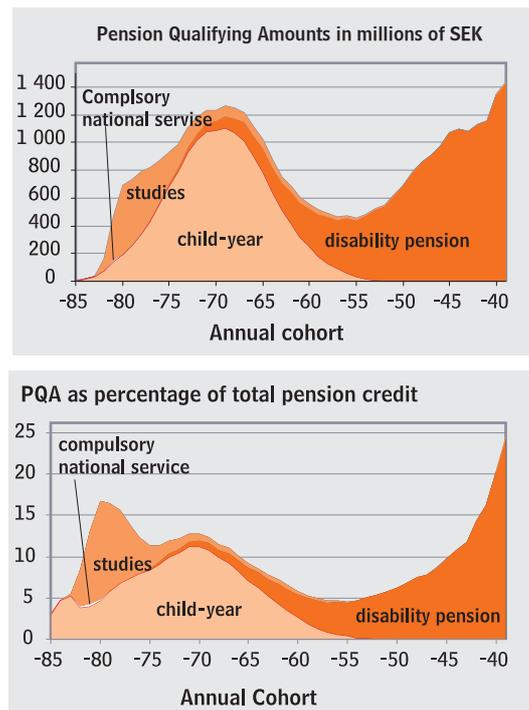
Diagram 4. Pension Credit Base, 2000



Pension-qualifying Amounts

Approximately 6 percent of the pension credit earned in 2001 is based on pension-qualifying amounts. Pension-qualifying amounts differ from other bases for pension credit in that they represent neither earned income nor transfer payments received. Earned income constitutes some 83 percent of the pension-credit base. Transfer payments from social and

Diagram 5.1 Pension Credit for Pension-qualifying Amounts in 2000, women



unemployment insurance constitute about 11 percent of the pension-credit base. Pension-qualifying amounts (PQA) for disability pension account for 4 percent of total pension credit earned in 2000. This share of attributed pension credit rises sharply with age and constitutes 22 percent of total pension credit earned by the oldest age groups in 2000. PQA for child-care years account for 2 percent of all attributed pension credit; it is most frequent for ages 30–31, where they account for 5.7 percent of total pension credit earned by this age group. PQA for studies provide 0.8 percent of the total pension credit earned and are most common for age 21, where they make up 9.2 percent of the modest pension credit earned. PQA for compulsory national service, finally, account for 0.13 percent of total pension credit earned, with a maximum of 8.1 percent for 20-year-olds. The age distribution of women’s pension credit for child-care years rather closely follows a fertility curve. Compulsory national service for women is so rare that the PQA for

this service do not show up in Diagram 4.1, though they are included. In the corresponding diagram for men, the PQA for compulsory national service appear as a spike at the ages of 19–20. Pension credit for child-care years is much lower than for women. Amounts for studies and disability pension are similar to those for women, but women have somewhat more.

Pension payments

The median and the distribution of monthly pension amounts in December, 2001, are shown in Diagram 6. The pensions concerned are public earnings-related pensions; thus, the so-called pension supplement is not covered, nor is the special tax deduction for retirees. Consequently, the diagram shows only pension benefits, for the earnings-related old-age pension systems. Note that all persons with any pension from the Swedish system are included in that diagram. Among those with extremely small pensions are persons who have earned pension credit for only a few years in Sweden. The higher the age of the individual, the lower is his or her pension. One of the reasons why the pension of both men and women decreases for older persons is that with economic growth each new age group will normally retire with a higher initial pension, since their earnings were higher. One contributing factor in this case is that many members of the cohorts described were not able to earn full pension credit in the ATP system. This required 20 years of coverage from 1960 for the cohort born in 1914, 21 years for the cohort born in 1915, etc until the cohort born in 1924 or later, which required 30 years of coverage from 1960. Thanks to these generous transition rules, however, more ATP-points were credited than if the rules of the fully functioning system had been

Diagram 5.2 Pension Credit for Pension-qualifying Amounts in 2000, Men

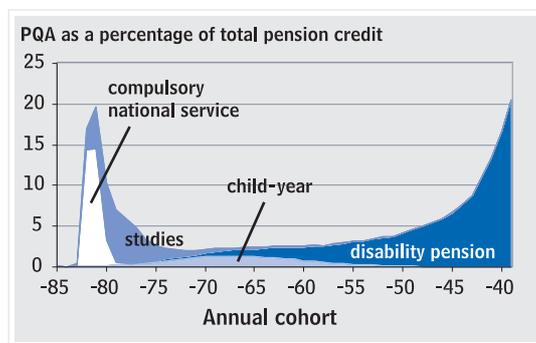
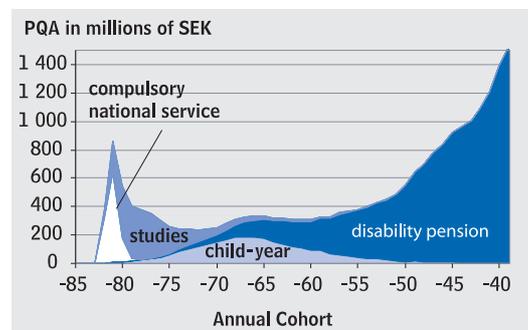
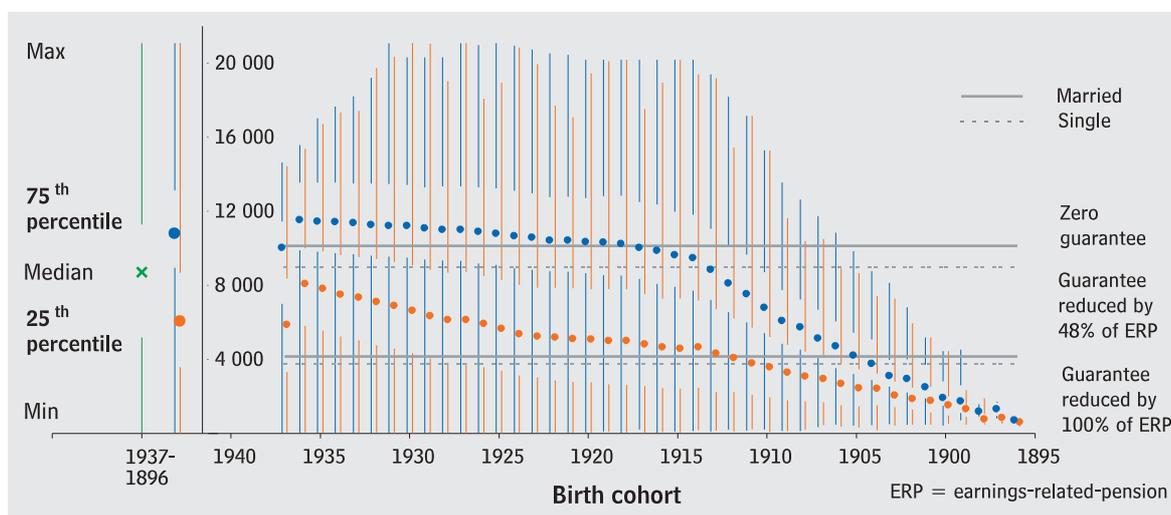


Diagram 6. Pension Benefits in December, 2001, Median and Quartiles SEK



exclusively applied. The median pension decreases more rapidly for women than for men in the cohorts of 1936-1927.

The reason is that the women in the annual cohorts shown in the diagram have done less market work than men, thereby earning less ATP-points. Note, however, that widow's benefits are included in the diagram.

Pension amounts differ considerably between women and men. In most cohorts, the 25th percentile for men lies above the 75th percentile for women.

As of 2003, the guaranteed pension will replace a certain part of the national basic pension, the pension supplement, and the special tax deduction for retirees. The guaranteed pension may be received only from age 65 and only by persons born in 1938 or later. Older pensioners are eligible for a so-called transitional guaranteed pension, which is subject to other rules but provides roughly the same levels of basic protection. The guaranteed pension is fully taxed.

The guaranteed pension is based on what the public earnings-related, i.e. ATP, inkomstpension and premium pension is when claimed at age 65; no other income is considered. To receive a "full" guaranteed pension, an individual must in principle have resided in Sweden for 40 years after reaching age 25. Thus, for someone who has lived in Sweden for 39 years, the guaranteed pension is 39/40 of the "full" guaranteed pension. As a general rule, the guaranteed pension is paid only residents of Sweden; however, there are exceptions, for example to comply with various EU provisions.

The lowest sum of earnings-related and guaranteed pension is 1.9 price-related base amounts⁵ for a married or cohabiting person, and 2.13 for a single person. The lower solid line marks the level of earnings-related pension up to which the guaranteed pension is reduced successively by 100 percent for cohabitants, 1.14 price-related base amounts per year. The lower dashed line indicates the level with the same effect for persons living alone, 1.26 price-related base amounts per year. Within the bracket topped by the two upper lines, 2.72 price-related base amounts per year for cohabitants and 3.07 for persons living alone, the guaranteed pension is reduced by 48 percent of the earnings-related pension. At these limits, the guaranteed pension has been reduced to zero.

Since no residency requirements are considered in the diagram, it gives a somewhat exaggerated impression of the future importance of the guaranteed pension. Nevertheless, it is clear that many people will receive a guaranteed pension. This situation reflects the fact that today there are many who receive the pensions supplement and who benefit from the special tax deduction for retirees, benefits that the guaranteed pension will replace. The guaranteed pension provides basic financial protection for persons with low lifetime incomes. However, this means that the link between contribution paid and total pension received – i.e., earnings-related pension plus guaranteed pension – is weakened. Thus, an element of taxation is injected into

⁵ In year 2001 SEK 70,110, or SEK 5,842 per month.

the pension contribution for groups with low lifetime incomes. The tax element is augmented by other support systems, such as housing assistance to pensioners. With the guaranteed pension linked to the price-related base amount, the guaranteed pension as a share of the total pension will decrease with positive growth, provided the rules are unchanged. This assumes, however, that it is politically acceptable that the lowest pensions decrease relative to average income.

Pension Account Balances

Diagram 7 shows the pension balances for the annual cohorts that are covered completely by the new system – in other words, the cohorts born in 1954 and thereafter. The larger pension balances of men reflect their higher incomes and greater pension credit as shown in

Diagram 7. Pension Balances on December 31, 2001, Median and Quartiles SEK

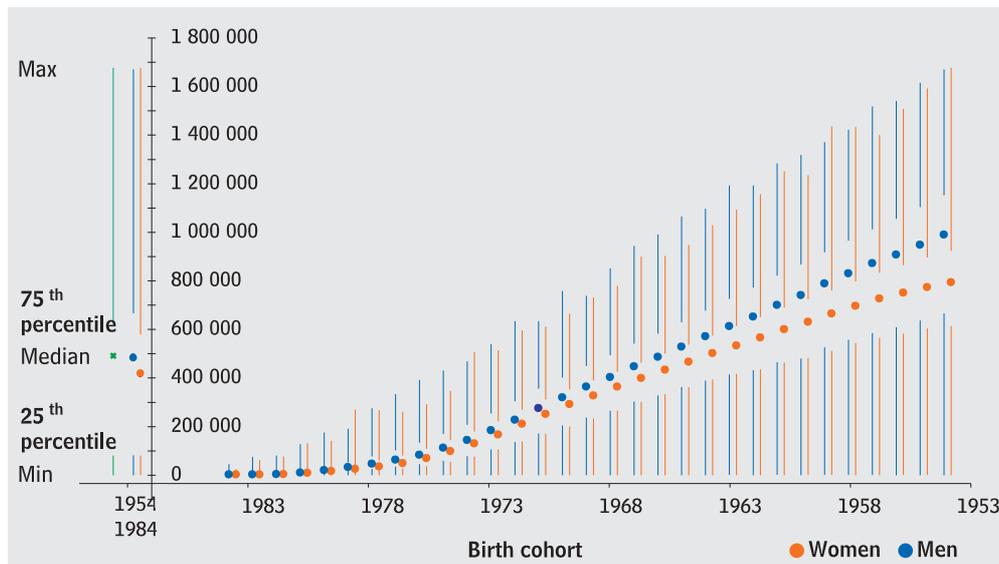
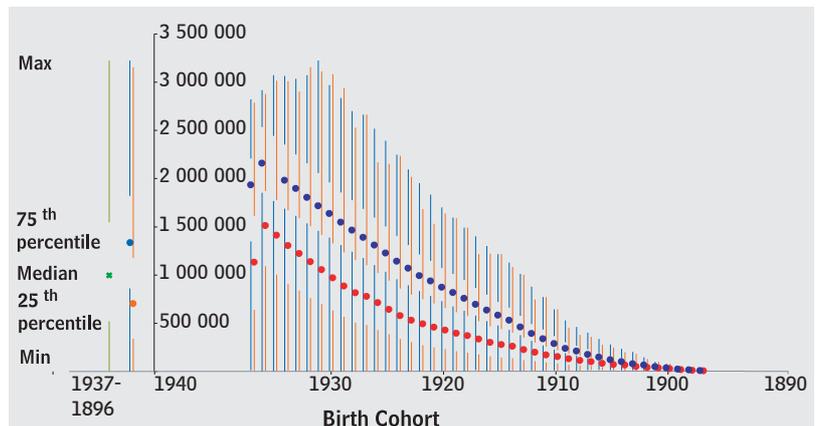


Diagram 2. By adding together the December pensions of each birth cohort in 2001, multiplying the monthly amount by 12, and multiplying this annual amount by the cohort’s economic annuitization divisor, we obtain the pension liability of the system to each of the retired cohorts. The economic annuitization divisor of an birth cohort reflects the expected remaining disbursement time in years for persons of that age, taking into account the norm of 1.6 percent. The median pension liability is approximately SEK 2.2 million for newly retired men and SEK 1.5 million for women. The older the annual cohort, the less the pension liability. The liability of the system to retired persons has in Diagram 8 been calculated using gender-neutral divisors.

Diagram 8. Pension Liability on December 31, 2001, Median and Quartiles SEK



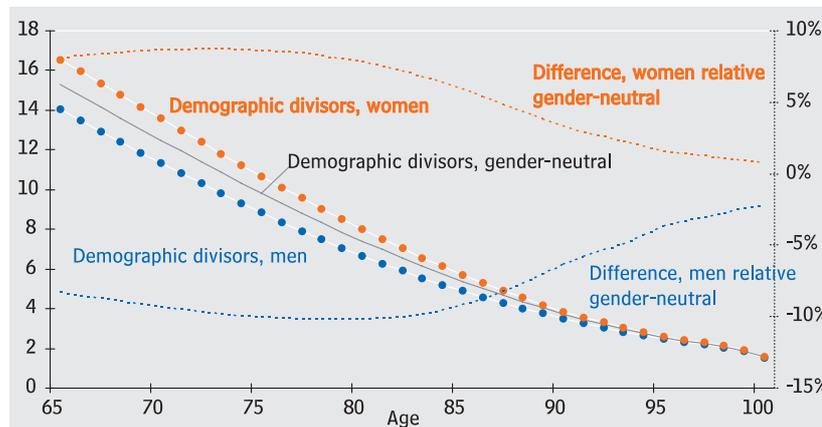
With the liability of the system calculated separately for men and women, the diagram is in a way improper, since women on average live longer than men and will therefore receive a pension over a longer time, given the current mortality pattern.

Pensions and Life Expectancy by Gender

The inkomstpension benefit is calculated by dividing the pension account balance by an annuitization divisor that reflects a gender-neutral calculated average life span and the norm, the interest rate of 1.6 percent. For each birth cohort, a definite divisor is established when the cohort reaches age 65. For individuals who have withdrawn their pension before age 65, the amount is adjusted in the year when they reach 65 in relation to any changes in average life span since they took their pension. For individuals who begin to withdraw their pension after age 65, for example at age 67, the divisor used is the one that was calculated and established for 67-year-olds two years earlier. Each annual cohort will thus have a unique set of divisors for ages 61 and above. There is no upper limit to the age at which an individual may begin to withdraw a pension.

The Statistics Sweden calculation of observed average life span in the latest five-year period provides the basis for the annual determination of average life span used in generating the annuitization divisors. Since this average life span is gender-neutral, the divisor is established on the basis of the average life span for men and women taken together. As women on average live longer than men, the gender-neutral divisor will be lower, and the pension higher, for women than would be the case with a gender-specific divisor. The opposite is true for men, who stand to lose by a gender-neutral divisor. Diagram 9 shows the divisors for each sex and age from 61 on. The dotted curve read at the right axis shows how much women "gain" and men "lose" by the use of a gender-neutral rather than gender-specific divisor. However, the average remaining life expectancy for men and women, whether taken separately or jointly, is in principle irrelevant for calculating the pension liability. The relevant question is how long an average pension amount is expected to be paid out. Further, it is necessary to

Diagram 9. Annuitization Divisors, for Women, for Men, and Gender-Neutral
Right axis: difference in percent.



consider that the value of these pension amounts will diminish in relation to the average income by 1.6 percent per year, since pensions are adjusted by the change in the income index, or balance index, minus 1.6 percent. The expected remaining number of yearly payments, adjusted by the norm of 1.6, is what is termed the *economic annuitization divisor* in this report.⁶

In order to distinguish clearly between the divisors used in calculating pension liability and those used in calculating pensions, we use the term *demographic divisors* for the latter. The calculation of the economic divisors is performed using the data in the RFV records on pension payments. Statistics Sweden measures the mortality of the population in Sweden, whereas

RFV pays pensions to individuals who have earned a pension in Sweden, no matter where in the world they live. This means that "economic" mortality refers to a somewhat different population than the demographic mortality measured by Statistics Sweden. Diagram 10 shows that the gender-neutral demographic divisors currently used in determining pensions are somewhat higher than the economic divisors, approximately 2 percent higher, at age 65. The reason is that individuals with low

pensions live longer on average than those with high pensions, contrary to what is often maintained.⁷

As the demographic divisors are higher than the economic divisors there is at present a surplus tendency in the system. Inkomstpensions are approximately two percent lower than if they had been calculated using economic divisors. This situation may well change. One reason is that women's incomes could approach that of men's; another is that the average life span of men now appears to be increasing somewhat more rapidly than that of women.

⁶ The method for calculating of these divisors is shown in the Technical Appendix Equation 4.3.

Diagram 10. Demographic Divisors Compared with Economic Divisors
Right axis: difference in percent between demographic and economic divisors

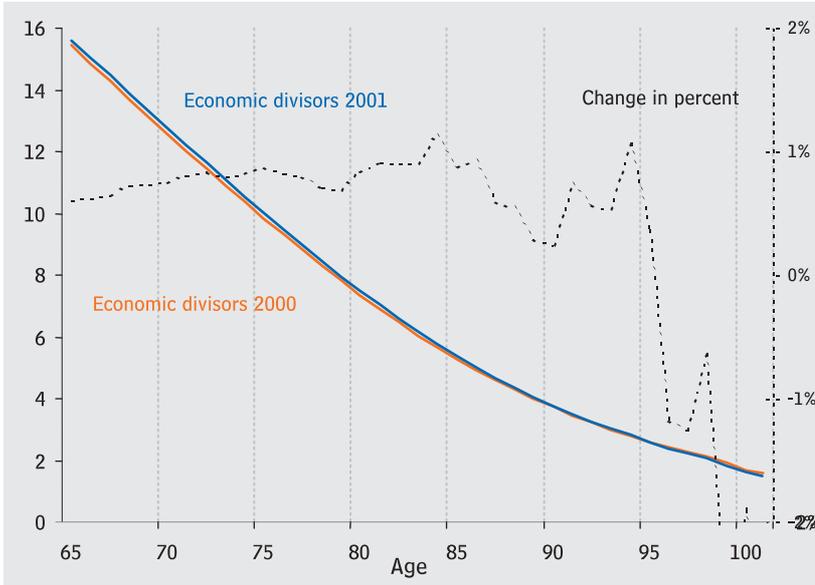


⁷ See, for example, Martin Feldstein in *Social Security Pension Reform in Europe*, p. 81, NBER, The University of Chicago Press. It is a common mistake to, from the observation that within each sex high income earners have higher life expectancy than low income earners, draw the conclusion that pension systems redistribute incomes from "poor to rich". The lower incomes of women and their higher life expectancy will in most populations be the stronger effect and imply a progressive income redistribution in pension plans that do not distinguish between sexes.

The Income Statement showed the cost, the increase in liability, resulting from the increase in (economic) average life span to be SEK 18.7 billion in 2001, equivalent to 0.9 percent of GDP. If the reformed system had been fully phased-in, this cost would have been limited to some SEK 11 billion. If the ATP system had been retained, the cost would have been roughly SEK 40 billion. The apparently

slight shift in economic divisors between 2000 and 2001 is the reason for the increase in the liability of the system. However, the percentage increase was substantial, almost 1 percent for the most significant age groups, see Diagram 11.

Diagram 11. Economic Divisors, 2000 and 2001
Right axis: change in percent



Projections for the Pension System 2002–2077

The Government directive (2002:135) on annual reporting of the financial position and development of the earnings-related old-age pension system states that a projection of the future financial development of the system shall be prepared as a supplement to the report.

Such calculations are reported here for three scenarios.¹ In each scenario, the assumptions about relevant variables are in principle constant for the entire calculation period. Thus the uncertainty in the assumptions is not addressed explicitly, but the variation in the outcomes of the three scenarios provides an indication of this uncertainty. Nor are normal cyclical variations in the economy, nativity, and other factors reflected in the projections. Since balancing may be activated due to this type of variations, the calculations do not provide a good indication of the risk of activating the balance mechanism. If balancing is activated for some cyclical reason, balancing will also restore pension levels as soon as permitted by the course of the cycle. In its coming projections RFV intends to develop its methods to describe their uncertainty.

The scenarios are referred to as the base, optimistic, and pessimistic scenario. Whether a phenomenon is characterized as optimistic or pessimistic is determined solely by its effect on the financial position of the pay-as-you-go system. The base scenario can be said to describe the RFV estimate, or best guess, concerning the development of the system in the base scenario of the 2001 population forecast by Statistics Sweden.²

For the period 2002–2006, RFV has adopted the March 2002 economic forecast by the National Institute of Economic Research. Only thereafter does the economy develop as assumed in the scenarios. The assumptions concerning the return on the fund, however, apply from 2002 onward.

The guaranteed pension is assumed to be price-indexed for the entire calculation period; as a result, persons with the lowest pensions will receive a pension that is continually decreasing in relation to the average income, and the tax element of the pension contribution for persons with low incomes will diminish. Over a 75-year period, this effect is very powerful.

Base Scenario

The demographic development in the base scenario follows the 2001 population forecast by Statistics Sweden. In that forecast, it is assumed that nativity will increase from its present level of about 1.6 children per woman to 1.8. It is further assumed that the average life span for individuals reaching age 65 will rise by an average of 25.3 days per year until 2050, after which it will flatten out. Net immigration to Sweden will be 18,000 per year, it is assumed, corresponding to the

¹ The previous projection by RFV was published in RFV Analyser 2002:2. The calculations there were performed in October 2001.

² The 2002 population forecast by Statistics Sweden was published in May, when projections by RFV had already been made. The main difference between the 2001 and 2002 forecasts by Statistics Sweden is that in the more recent forecast Statistics Sweden has raised the assumed level of net immigration after 2012 to 20,000 (18,000) and has made minor adjustments in the assumed risks of death for the first years of the forecast.

³ In 2000, the proportion of persons aged 16–64 with an income exceeding one base amount was 78 percent.

average for the period 1980–2001. Annual net immigration in 1990–2001 was 21,500. The assumed net immigration of 18,000 per year may nevertheless be considered high in view of the fact that an annual cohort in Sweden consists of about 100,000 persons, +/- 30,000. The proportion of persons aged 16–64 with a calendar-year income exceeding one (1) income base amount is assumed in the base scenario to be 77 percent, roughly the same as the employment ratio by the definition used in the Labour Force Surveys.³ The real rate of annual growth in average income is assumed to be 1.8 percent, and the real annual return of the buffer fund, 3.25 percent.

Optimistic Scenario

The demography of the optimistic scenario is identical with that of the base scenario; the two scenarios differ only in respect to economic factors. In the optimistic scenario, the proportion of persons aged 16–64 with a calendar-year income exceeding one income base amount is 80 percent; the real annual rate of growth in average income is 2.8 percent, and the annual real return on the buffer fund is 5 percent. The optimistic scenario is intended to provide a general picture of a possible surplus situation in the system.

Pessimistic Scenario

Nativity is assumed to be 1.5 children per woman, i.e. roughly the level that has prevailed for about 10 years. Net immigration is assumed to be 12,000, the basic assumption by Statistics Sweden in its population forecasts in the 1990's. The average life span is assumed to develop in the same manner as in the other two scenarios, an average increase of 25.3 days per year until 2050, after which it will flatten out. The assumed rate of labour-force participation is the same as in the base scenario, 78 percent. Real growth in average income is 1 percent, and the real annual return on the buffer fund is also 1 percent.⁴ Under the assumptions of the pessimistic scenario, contribution revenue will increase more slowly in relation to average income. The pessimistic scenario is intended to portray the risks to be addressed by balancing and the effects on the size of pensions of a prolonged negative demographic and economic development.

⁴ When the rate of return equals the rate of growth in average income, the buffer fund does not contribute to the long-term financing of pensions.

Table 2. Specification of the Assumption in the Scenarios

	Base	Optimistic	Pessimistic
Nativity, children per woman	1.8	1.8	1.5
Annual growth in average life expectancy from birth, days	25.3*	25.3*	25.3*
Proportion of persons aged 16-64 with an income exceeding one income base amount	0.78	0.80	0.78
Annual net immigration, persons	18,000	18,000	12,000
Annual growth in average income	1.8%	2.8 %	1 %
Annual real return on the buffer funds/PPM funds	3.25 %	5.00%	1.00 %

*In the population forecast by Statistics Sweden, the average life span will stop increasing in 2050. Therefore, the annual average growth indicated is for the period 2002-2050.

Table 3. Summary of Selected Results of the Projections

	Period 2002-2021			Period 2022-2051		
	Base	Optimistic	Pessimistic	Base	Optimistic	Pessimistic
Annual inflow of 16-year-olds	108,000	108,000	103,000	108,000	108,000	90,000
Number of persons aged 16-64 that live or have lived in Sweden	6,068,000	6,068,000	6,020,000	6,121,000	6,121,000	5,726,000
of which live in Sweden	5,339,000	5,339,000	5,249,000	5,225,000	5,225,000	4,772,000
of which with pension-qualifying income	4,869,000	4,996,000	4,796,000	4,739,000	4,873,000	4,359,000
Number of persons with pension	2,081,000	2,081,000	2,080,000	2,845,000	2,845,000	2,829,000
Number of persons with an income/ number of persons above 64	2.34	2.40	2.31	1.67	1.71	1.54

Checkpoint in 2004 and Management of a Surplus in the Pay-as-you-go System

In the Government bill 1999/2000:46, "The National Pension Funds in the Reformed Pension System," it was proposed that there be a "checkpoint" in 2004. This means that there is to be a new analysis of the possibility of compensating the central-government budget for the initial costs of the pension reform to the central government. Only after this analysis will the definite amount to be transferred from the National Pension funds to the central-government budget be established. If the financial position of the pension system permits an additional transfer to the central-government budget, this transfer is to be made on January 1, 2005. The review is to be performed in accordance with the base scenario in the latest Statistics Sweden population forecast and with the assumptions of 2 percent annual real growth in pension-qualifying income per person and a real return of 3.25 percent on the assets of the buffer fund. However, the total definitive transfer is not to exceed an amount that in terms of the balance of the funds corresponds to a one-time transfer of SEK 350 billion on January 1, 1999. The transfers made so far amount to a nominal total of SEK 245 billion. In the present projections, the

possibility of a further transfer to the central-government budget has not been taken into account.

In the Balancing Bill, it was noted that in certain circumstances a surplus would arise in the pay-as-you-go system. The Government's proposal to the Riksdag provided as a guideline that any distributable surpluses be allocated to the insured by supplementary indexation corresponding to the distributable surplus. The Riksdag adopted this guideline. However, there is yet no law, nor proposal, for the definition of distributable surpluses or the exact manner of allocating them. In the present calculations, RFV has not considered future rules for managing a surplus.

Results of the Projections

The contribution revenue of the pay-as-you-go system is 16 percent of the contribution base. Pension payments are a function of the rules of the system and the manner in which these rules interact with the course of demographic and economic development. Since the different annual cohorts of the population vary in size and to some degree in the extent to which they have worked and earned pension credits, the contribution revenue and pension payments of the system will vary over time. In certain periods, contributions will exceed payments; at other times, the opposite will be true. The discrepancies between the revenue and expenditure of the system are managed by means of the buffer fund.

Contribution revenue less pension payments – the net contribution or primary saving of the system – will of course differ in the three scenarios. The more pessimistic the scenario, the more negative the net contribution. In the scenarios, the contribution rate is a constant 16 percent of the contribution base.⁵

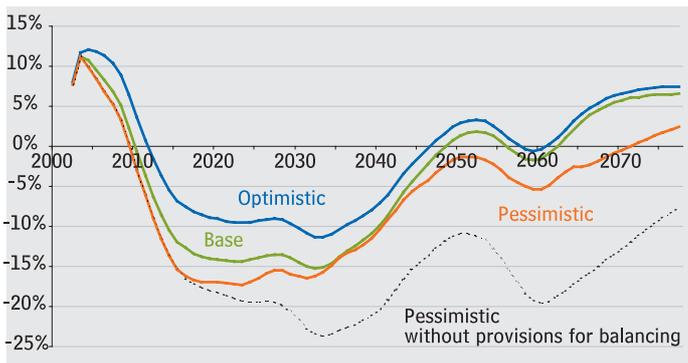
By dividing the net contribution by the contribution revenue for each scenario, we eliminate the volume effect of different growth rates on net contribution, thus permitting comparison of the net contribution in the scenarios. Contribution revenue in 2001 was SEK 156 billion; thus, a net contribution in percent of contribution revenue of 1 percent is roughly equivalent to SEK 1.6 billion at the 2001 income levels. As in the projections prepared by RFV throughout the work on the pension reform, the net contribution

will turn negative around 2010. The main reason is that the large birth cohorts born in the 1940's will be leaving the labour force and begin to receive their pensions at about that time.

Balancing is activated only in the pessimistic scenario. One way to express the size of the deficit that would have arisen without balancing is to show the net contribution with no provision for balancing. In the pessimistic scenario, the net

⁵ There is an effect from the phasing in of the new system that makes the contribution to the pay-as-you-go system slightly more than 16 percent, and the contribution to the premium pension system slightly less than 2.5 percent up until year 2018. The total contribution is however always 18.5 percent of the contribution base.

Diagram 12. Contribution Revenue Minus Pension Benefits
In percent of contribution revenue



contribution in 2050 is -1.7 percent of contribution revenue; without any provision for balancing, it would have been -10.8 percent. The reduction in pension levels due to balancing in this case is described below in the next section.

$$\frac{565,171}{143,565} = 3.9$$

In Sweden, the financial development of the pension system has traditionally been described in terms of fund strength. Fund strength shows how many years of pension payments can be financed by the fund. At the end of 2001, the fund strength was 3.9; in other words, the fund, without contribution revenue or return on assets, could have financed 3.9 years of pension payments⁶ of the same amount as in 2001. With the net contributions and the different assumptions about the rate of return in the three scenarios, the buffer fund will develop differently. In the optimistic scenario, with the combination of a substantial initial buffer fund, a high real rate of return on that capital (5 percent) in relation to the

compounding of the pension liability (2.8 percent), and the limited deficits in net contributions, fund strength will increase strongly. In 2050, fund strength will be 8.7; in 2077, it will be 18.8. In the optimistic course of development and with no changes in rules, the system would have a fund in 2077 equivalent to nearly 50 percent of the pension liability and about 125 percent of GDP.

In the base scenario, with its initially positive net contribution and relatively high rate of return, 3.25 percent, in relation to income index growth, 1.8 percent, the fund will grow until 2010.

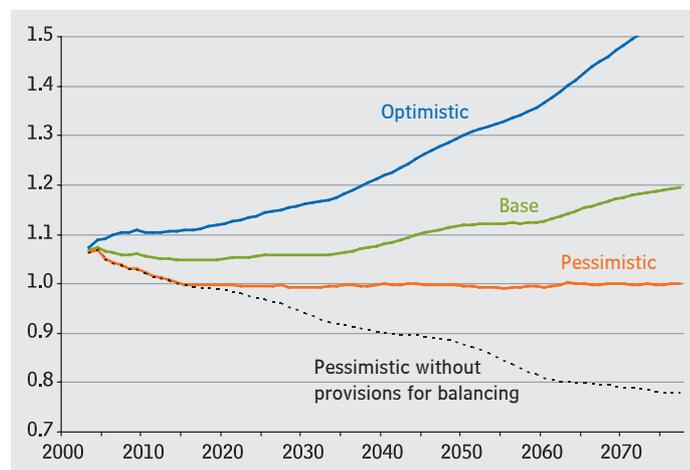
Thereafter, the contribution deficits will result in a gradual halving of fund strength by some time around 2040.

In the pessimistic scenario, the buffer fund will be exhausted by 2040 and will remain negative thereafter; fund strength will stabilize at a level of approximately minus 1. The fund will be exhausted and become negative even though balancing is activated in 2016. The design of balancing so as not to completely eliminate the risk of exhausting the buffer fund was deliberate. The Government's bill 1999/2000:46 provided that this risk would be addressed by authorizing the funds to borrow money. Parliament adopted the proposal. Any borrowing is to take the form of a loan from the National Debt Office.

The principal reason⁷ why balancing will not stabilize the fund at or just above zero is that the turnover duration is calculated as if the population-growth trend were zero. With a declining trend in the working-age population, the turnover duration will be somewhat overestimated under this assumption. Consequently, the contribution asset will also be somewhat overestimated. The size of the deficit will

Diagram 13. Fund Strength

Size of the buffer fund at year end divided by pension payments for the year



⁷ Another contributing cause is a delay, of about 6 months between the time when a deficit net financial position arises and the time when automatic balancing responds to that deficit.

be equivalent to the negative value of the overestimation of the contribution asset. When the population stops decreasing – as it must at some point if it is not to disappear entirely – the system will seek a fund strength no less than zero. In cases where the fund is negative, interest is paid on the loans; in Diagram 13, the rate of interest and the return in the pessimistic scenario are assumed to be equal at 1 per cent.

⁸ 18 years before it would have been exhausted with no provisions for balancing.

With balancing initiated so early, 24 years before the fund is exhausted,⁸ the annual reduction in pension levels relative to growth in average income will be very modest. In time, however, the effect on pension levels will be substantial – see the next section.

Diagram 14. Balance Ratio
(Contribution asset + Buffer fund) / Pension liability

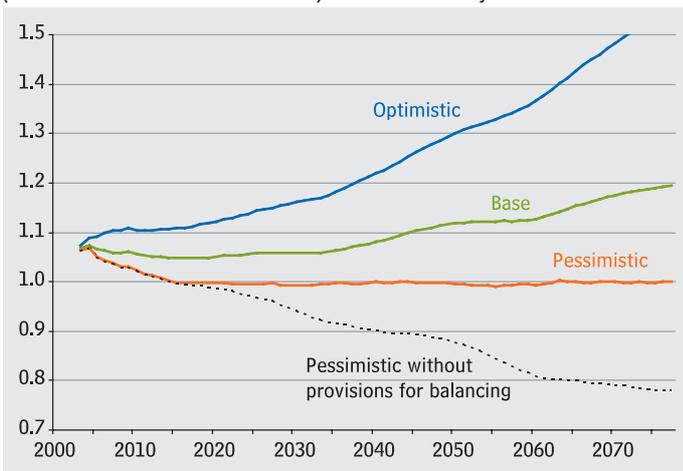


Diagram 14 shows the development of the financial position of the pay-as-you-go system in terms of balance ratios. With a balance ratio of 1, assets and liabilities of the system are equal; with a ratio of 2, assets are twice as great as the liabilities. In principle, a balance ratio of 2 means that the system is fully funded. In the optimistic scenario, the degree of solvency increases throughout the period,

and by 2077, as mentioned previously, the system will have a buffer fund equal to half the pension liability. In the base scenario, the balance ratio remains virtually constant during the first half of the present century at a level around 1.05, meaning that the estimated assets of the system will exceed its liabilities by about 5 percent.

In the pessimistic scenario, the balance ratio falls below 1 in 2016, and balancing is activated. With balancing, the liability of the system is compounded at the rate at which the assets of the system are growing, thus inevitably maintaining a virtually constant balance ratio of 1.

Development of the Pension Level in the Different Scenarios

In the pay-as-you-go system, for the pension level – defined here as the average pension in relation to the average income – to remain constant, either the average life span must stay constant, or the relationship between economically active time and time in retirement must be held constant by adjusting the age of retirement. Another requirement is that automatic balancing not be activated. In the projections, it is assumed that the average life span will increase rather strongly – by an annual average of 25.3 days until 2050, or a total of 3.3 years. As a result, the divisor will increase from about 15.6 for persons born in 1940 to 18.2 for persons born in 1990. The higher divisor decreases the monthly pension for the 1990 cohort by 14 percent in relation to the cohort born in 1940, provided the 1990 cohort

begins to withdraw their pensions at 65 despite the increase in their life expectancy. In order to compensate for the negative impact of the longer average life span on pension levels, the 1990 cohort must work for an additional 30 months – in other words, retire at the age of 67 ½. Table 4 shows the effect of the forecasted increase in average life span on the pension level as well as the retirement age required to neutralize this effect for different annual cohorts.

In the calculation of pensions, the only (simulated) individuals included are those who have earned pension credit for 30 or more years. The purpose is partly to eliminate the downward effect on the average pension that arises from the higher expected international mobility. Such mobility means that the number of persons with Swedish pensions derived from relatively few active years in Sweden increases. The income for purposes of comparison, the average income for the economically active, has also been calculated after excluding the incomes of individuals with less than 30 years of earnings in Sweden.

Diagram 15a illustrates the phase-out of the ATP-pension. Inkomstpension and premium pensions will successively replace the ATP-pension, and beginning with the birth cohort born in 1954, no new ATP-pensions will be calculated. In this projection, the average pension level at 65 years of age declines, from 69 percent for the birth cohort born in 1938 to 51 percent for the cohort born in 1990. Half of the reduction, or 9 percentage points, will be due to the expected increase in average life span. The remaining half will be the result of several different factors; the principal one is that the

Diagram 15a. Average Pension at 65 as a Percentage of the Average Income Base Scenario

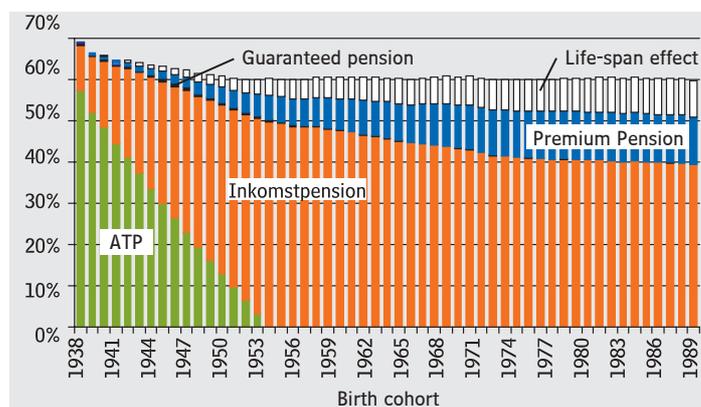


Table 4. Effect of projected increase in life expectancy on pension levels/pension age

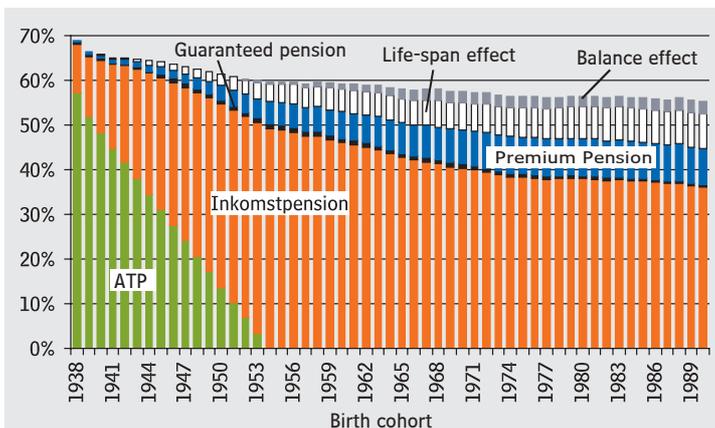
Birth cohort born	..reaches 65 year	Unisex life expectancy at age 65	Annuity divisor at 65	Effect of changed life expectancy on pensions	Retirement age needed to neutralize effect on pension from increase in life expectancy
1940	2005	18.5	15.62	0 %	Age 65
1945	2010	19.1	15.99	-2 %	+ 5 months
1950	2015	19.4	16.34	-4 %	+ 9 months
1955	2020	19.7	16.64	-6 %	+ 13 months
1960	2025	20.1	16.90	-8 %	+ 16 months
1965	2030	20.5	17.16	-9 %	+ 20 months
1970	2035	20.8	17.41	-10 %	+ 23 months
1975	2040	21.1	17.64	-11 %	+ 26 months
1980	2045	21.3	17.84	-12 %	+ 28 months
1985	2050	21.4	18.00	-13 %	+ 29 months
1990	2055	21.5	18.12	-14 %	+ 30 months

calculated pension level for the individuals selected for study here, all with 30 years or more of income, is high for the cohort born in 1938, due to more generous rules of the ATP system. If the average life span is unchanged, or the retirement age is raised, the pension level will stabilize at about 60 percent of the average income.

With the rate of return in the premium-pension system, 3.25 percent after costs of administration, assumed to be higher than the growth in average income, 1.8 percent, the premium pension will constitute a disproportionately large share of the public pension in relation to its share of contributions. For the cohort born in 1990, the average premium pension will be 11.5 percent of the average income, while the inkomstpension will be 39.4 percent of the average income. The premium pension will thus provide some 23 percent of the total earnings-related public pension, whereas the share of the contribution to the premium-pension system is only about 14 percent (2.5/18.5). The guaranteed pension for the selection of individuals with at least 30 years of earned income will be very small from the very outset. The average guaranteed pension within this selected group is only 0.5 percent of the average income for the cohort born in 1938. With the average income growing at the assumed rate of 1.8 percent per year, the guaranteed pension will be less than 0.1 percent of the average income for all annual cohorts born in 1970 and thereafter the average income, while the inkomstpension will be 39.4 percent of the average income. The premium pension will thus provide some 23 percent of the total earnings-related public pension, whereas the share of the contribution to the premium-pension system is only about 14 percent (2.5/18.5). The guaranteed pension for the selection of individuals with at least 30 years of earned income will be very small from the very outset. The average guaranteed pension within this selected group is only 0.5 percent of the average income for the cohort born in 1938. With the average income growing at the assumed rate of 1.8 percent per year, the guaranteed pension will be less than 0.1 percent of the average income for all annual cohorts born in 1970 and thereafter.

In the pessimistic scenario, the growth in average income is lower than in the base scenario, 1 percent instead of 2.5 percent; the rate of return is also lower, 1 percent instead of 3.25 percent. In principle, pension levels in the reformed system are not affected by the lower growth rate for average income, but they are affected by the relationship between the rate of return and the growth in average income. With the lower rate of growth, the guaranteed pension will be somewhat larger than in the base scenario. For the cohort born in 1990, the premium pension is 8.2 percent

Diagram 15b. Average Pension at 65 as a Percentage of the Average Income Pessimistic Senario



of the average income, compared to 11.5 percent in the base scenario, and inkomstpension is 36.1 percent of the average income. For this cohort, the effect of balancing on the inkomstpension is 2.9 percent of the average income. Without balancing, the inkomstpension for the cohort born in 1939 would be 39 percent of the average income. The increase in average life span will continue to be the factor exerting the greatest downward pressure on the pension level. The average guaranteed pension will be highest for the cohort born in 1954, 1.2 percent of the average income. For the cohort born in 1990, the average guaranteed pension will be 0.5 percent of the average income.

When the pension level is expressed as a percentage of the average income for the economically active, the optimistic scenario differs little from the base scenario. Disregarding the guaranteed pension, the only reason why pension levels differ in the optimistic and

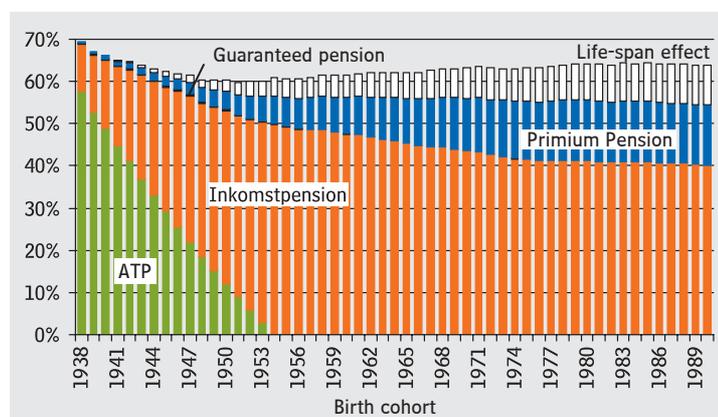
pessimistic scenarios is the higher assumed rate of return in the premium pension system (5 percent). For the cohort born in 1990, the premium pension averages 14.2 percent of the average income; for the inkomstpension, the percentage is 40.2. This means that the premium

pension provides about 26 percent of the total public pension. Owing to the relatively high rate of return in the premium pension system, the decline in the pension level is less steep; for the cohort born in 1990, the pension level is 54.4 percent, compared to 51.0 percent in the base scenario. If the average life span is unchanged, or if the retirement age is raised, the pension level will stabilize at around 64 percent. The surplus accumulated in the buffer fund will have no effect on the pension level in the pay-as-you-go inkomstpension system, as long as no provisions have been made for distributing surpluses in that system. Moreover, with the rate of growth in the average income assumed to be so high (2.5 percent), the impact of the guaranteed pension on the level of the average pension will rapidly become insignificant.

Balancing, Buffer Fund Return, and Guaranteed Pension

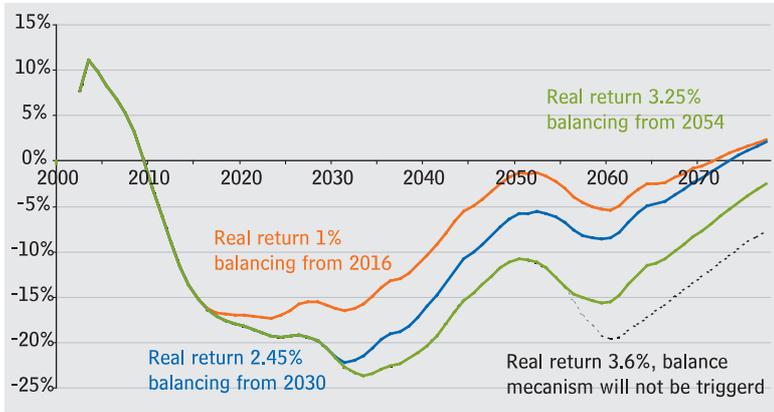
A for the financial strength of the pension system negative demographic, economic or behavioral development can be offset by a sufficiently high real return on the buffer fund. In the pessimistic scenario, balancing is not activated if this real return is at least 3.6 percent. Diagram 16 illustrates that at real return levels higher than 1.0 percent, but less than 3.6, balancing is activated, though later on,

Diagram 15c. Average Pension at 65 as a Percentage of the Average Income
Optimistic Scenario



and that such higher buffer fund return will lead to higher pension expenditure. A higher real rate of return means that the system can afford a larger negative net contribution. A constant yearly 3.6 percent real rate of return on the buffer fund – a relatively reasonable average by historical standards⁹ – is enough to avoid activation of balancing. At

Diagram 16. Contribution Revenue, Minus Pension Benefits
In percent of contribution revenue for different rates of return in the pessimistic scenario



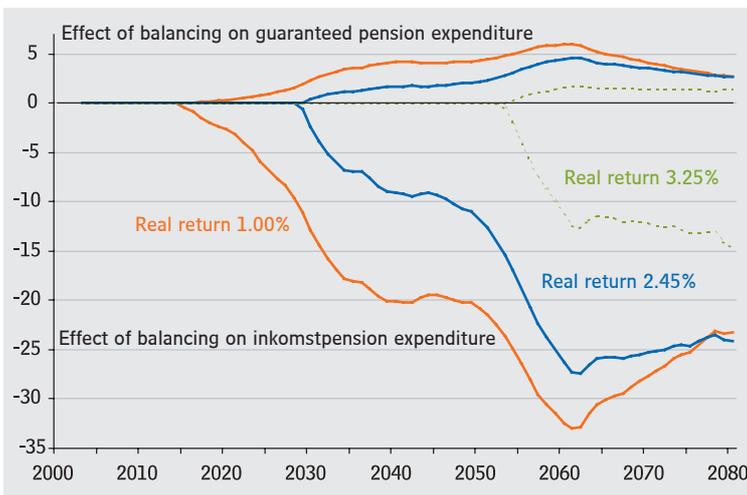
⁹ A study by Elroy Dimson, Paul Marsh, and Mike Staunton, "Triumph of the Optimists", shows that the weighted-average annual return on capital for the period 1900-2000 was 3.96 percent in real terms for a portfolio of 60 percent equities and 40 percent bonds invested in a "weighted world portfolio" on the 16 different capital markets covered by the study. In this study the annual real return on the "weighted world equity portfolio" was 5.6 percent and on the "weighted world bond portfolio" 0.6 percent.

a growth rate of 1 percent in average income, there will be sufficient compensation for the stress on the system from a birth rate of 1.5 children per woman and the rather substantial increase in average life span in all three scenarios. With an assumed return of 3.25 percent on the buffer fund, balancing will be activated in 2055 and will then reduce expenditure by some 4 percent of contribution revenue. With a return of 2.45 percent, balancing will be activated in

2030, and pensions will decrease at most by 6-7 percent of contribution revenue. With a return of 1 percent, balancing will be activated in 2016, and in this case, too, pensions will decrease at most by 6-7 percent of contribution revenue.

If balancing is activated, indexation is reduced, as is the pension level in relation to growth in average income. Through the design of the guaranteed pension, individuals with pensions of 0-1.26 base amounts (0-1.14 for married persons) will be held harmless since the guaranteed pension will fully compensate for the lower inkomstpension due to balancing. Pensioners in the income bracket between 1.26 and 3.07 base amounts (1.14 - 2.72 for married persons) will receive 48 percent compensation for the reduction in their inkomstpension caused by balancing. Other categories will receive no compensation at all. With the selective compensation provided by the guaranteed pension, the central-government budget, i.e. taxpayers, will partly bear the burden of a negative tendency. Thus, with developments that normally involve

Diagram 17. Effect of Balancing on Inkomstpension & Guaranteed Pension
Pessimistic Scenario, Billions of SEK, constant prices



a contraction in the resources of the economy, there will be a larger element of income redistribution in the overall public pension system. The increased cost of the guaranteed pension is equivalent to 10 to 20 percent of the saving by the pension system when it is balanced. As mentioned previously, the increased cost of the guaranteed pension is borne by the central-government budget, not by the pay-as-you-go system.

List of Terms

annuitization divisor – the gender neutral remaining life expectancy at retirement, taking into account an ”interest” rate of 1.6 percent. In the calculation of the *inkomstpension* the individual’s pension account balance is divided by the annuitization divisor. Because of the compounding at 1.6 percent, the annuitization divisor is always less than the remaining average life expectancy at the time of retirement.

ATP – Allmän TilläggsPension, (National Supplementary Pension), the earnings-related, pay-as-you-go financed pension introduced in 1960. It was/is supplementary to the flat rate *folkpension* (National Basic Pension). In this report *folkpension* is considered to be included in ATP. It is being successively phased out by the new pension system after 2017, when the birth cohort born in 1953 turns 64, no new ATP-points will be credited.

ATP-point – the annual pension qualifying income minus one price-related base amount divided by the price-related base amount. The first base amount of pension qualifying income is insured by the *folkpension*. Maximum ATP-points for one year has since the ATP-system was set up in 1960 been 6.5.

ATP-pension – calculated as 60 percent times the average of the top 15 ATP-points times the ratio of number of years with ATP-points over 30. This ratio can not exceed 1.

automatic balancing – method of indexing the pension liability in order to ensure that the payments of the pay-as-you-go system will not exceed its revenue in the long run. If balancing is activated, the pension liability increases at a compounding rate approximately equal to the system’s internal rate of return.

average income – refers in this report to the income measured by the *income index*. Starting in 1999, it consists of pension-qualifying income, including income in excess of the ceiling on pension-qualifying income and the amount for disability pension, earned by persons aged 16–64, minus the pension contribution paid by the employee, divided by the number of persons with such income.

balance ratio – the assets of the pay-as-you-go system – i.e. the *contribution asset* and the *buffer fund*, divided by the *pension liability* of the system. The balance ratio of the pay-as-you-go system corresponds to the *consolidation ratio* of a funded system.

buffer fund – absorbs interperiod discrepancies between pension contributions and pension expenditure in a pay-as-you-go system. The primary purpose of a buffer fund is to stabilize pension levels and/or pension contributions in relation to economic and demographic fluctuations.

the buffer fund - comprises the First, Second, Third, Fourth, and Sixth National Pension Funds. Legally and administratively, the buffer fund of the pay-as-you-go system thus consists of five different funds. Pension contributions are apportioned equally to the First-Fourth National Pension Funds, which also contribute equally to the payment of pensions. The Sixth National Pension Fund receives no pension contributions and pays no pensions. From the standpoint of the pay-as-you-go system, the five buffer funds may be regarded as a single fund.

compounding rate - in this report, synonymous with *indexation* - that is, annual recalculation of pension account balances by the ratio of new over old income or balance index and the recalculation of pensions by the same ratio divided by 1.016.

contribution asset - the present value of the contributions to the *pay-as-you-go system*. It is calculated by multiplying contribution revenue by *turnover duration*. Thus, the inverse of the turnover duration is the factor by which the contribution flow is discounted to get its present value.

contribution base - the pension qualifying income and amounts for which a pension contribution is to be paid. Consists primarily of earned income, but also of transfers, i.e. sickness benefits, unemployment compensation, etc., and pension-qualifying amounts for disability pensions, child-care years, studies, and compulsory national service.

earnings-related old age pension - ATP, *inkomstpension* and premium pension.

fund strength - the market value of the buffer fund in SEK at the end of a given year divided by the pension payments of the same year. A measure of the size of the buffer fund in relation to the flow of payments.

guaranteed pension - a basic economic retirement protection for low income earners. Guarantee pension can be received from age 65 and the recipient must be a Swedish resident or of another EU/EEA country with, or a country which Sweden has signed a convention. To be eligible for a full guarantee pension the person must, in principle, have lived 40 years in Sweden from age 25. The guaranteed pension is calculated as a supplement to the public earnings-related pension, ATP, *inkomstpension* and premium pension. For single persons with zero public earnings-related pension the guarantee pension is 2.13 price base amounts (for married couples it is 1.90 price base amounts per person). The guaranteed pension is reduced by 100 percent of the public earnings-related pension up to 1.26 price base amounts (for married 1.14). The reduction of the guaranteed pension is reduced to 48 percent of public earnings-related pensions over 1.26 price base amounts is thus zero for persons with a public earnings-related pension of 3.07 price base amounts, or more (2.72 for married couples).

income index - measures the growth in average income as defined above, as a three year moving average. With a simple three year moving average retirees would be fully compensated for an increase in the inflation rate only after three years. To make changes in inflation rate have a faster impact on pensions the change in consumer price during

the three year period is deducted from the change in average income and the change in inflation the last year added. The income index was set at 100.00 in year 1999.

income-related base amount – base amount annually adjusted by the income index. For 2001, the growth in income-related base amount was set to equal the price-related base amount (SEK 36,900) for that year. The income-related base amount for 2002 is SEK 38,800. The income-related base amount is used primarily to calculate the ceiling on pension-qualifying income. Before deduction of the pension contribution, this ceiling is 8.07 times the income-related base amount; after deduction of the general pension contribution, the ceiling is 7.5 times the income-related base amount. The income-related base amount is *not* used to recalculate pension balances or pensions.

indexation – the revaluation of pension account balances and pensions. In this report the concepts of indexation and *compounding rate* are used synonymously.

inkomstpension – pension from the pay-as-you-go system calculated according to the new rules, i.e. pension from the notional defined contribution system. Yearly contributions to the system by and for each individual are added to his/hers pension account. The pension account balance is revalued yearly according to the change in income (or balance) index and inheritance gains are added while administrative costs are deducted. The *inkomstpension* is calculated by dividing the pension account balance with the annuitization divisor and it is revalued annually with the change in income (or balance) index "minus" the norm, 1.6 percent.

norm – here; the interest rate of 1.6 percent used when calculating the annuitization divisor and which subsequently is deducted when recalculating pensions with the growth (change) in income (or balance) index.

pay-as-you-go pension systems – a pay-as-you-go system is normally defined as pension system in which contribution revenue always is used directly to finance pension payments, i.e. there is no funded assets. This definition excludes pension systems with buffer funds from the pay-as-you-go category. A way to solve this "problem" is to define pay-as-you-go pension systems as schemes which do not legally or by other means require that the pension liability be backed by any amount of funded assets.

the pay-as-you-go system – in this report; the set of legal provisions for earnings-related pension financed via the buffer fund – that is, ATP and *inkomstpension*. When the ATP have been phased out, the pay-as-you-go system will consist entirely of *inkomstpension*.

pension account balance – the sum of the annually determined *inkomstpension* credit, which is annually recalculated in accordance with the income index, or alternatively the balance index, inheritance gains, and costs of administration.

pension liability – in this report, the financial commitment of the pay-as-you-go system and premium pension system, respectively, at the end of each year. The pension liability to economically active persons is calculated as the sum of the pension balances and premium pension capital of all these individuals. In addition to the pension liability to the economically active, there is the pension liability to each retired annual cohort. The latter liability is calculated by multiplying the amount of the pension of each annual cohort by the average remaining (economic) life expectancy of that cohort. Until 2018 a pension liability will also be calculated for ATP-points earned by the economically active.

premium pension – *premiépension*, the pension received from the premium pension system. Yearly contributions to the system by and for each individual are transferred to the mutual pension funds the individual has chosen. The premium pension capital changes according to the return on the capital in the chosen funds, and inheritance gains are added while administrative costs are deducted. The premium pension can be drawn either as a guaranteed annuity (with profits) or as a variable annuity.

primary saving – pension contributions minus pension payments.

price-related base amount – an amount used to calculate ATP-points and index ATP-pensions, yearly recalculated according to the change in consumer price index. For financial reasons exceptions from this rule have occasionally been made.

turnover duration – the expected time elapsing from pension credit has been earned until the pension is paid out in the pay-as-you-go system, measured as an average that is weighted for pension credits and pension amounts. Turnover duration is calculated annually and is used for valuation of the flow of contributions. Turnover duration depends on the provisions for earning pension credit and disbursement of pensions and on the relative income and labor-force participation and mortality of each age group.

Formulas for Calculation of the Assets and Liabilities of the Pay-as-you-go System, and the Balance Ratio

1. The balance ratio, BR , is calculated as

$$BR(t) = \frac{CA(t-2) + F(t-2)}{D(t-2)} \quad (1.0)$$

$$CA(t) = \bar{C}(t) \times \bar{T}(t) \quad (1.1)$$

$$\bar{C}(t) = \frac{C(t) + C(t-1) + C(t-2)}{3} \times \left(\frac{C(t)}{C(t-3)} \times \frac{CPI(t-3)}{CPI(t)} \right)^{1/3} \times \left(\frac{CPI(t)}{CPI(t-1)} \right) \quad (1.2)$$

$$\bar{T}(t) = \text{median}T[T(t-1), T(t-2), T(t-3)] \quad (1.3)$$

where

- t = calendar year if the variable refers to flows, end of calendar year if the variable refers to stocks
- CA = contribution asset
- F = buffer fund, the aggregate market value of the assets of the First-Fourth and the Sixth National Pension Funds. By market value is meant the value which in accordance with Ch. 6, 3 §, of the National Pension Funds Act (2000:192) and Ch. 4, 2 §, of the Sixth National Pension Fund Act (2000:193), is to be shown in the annual reports of these funds
- D = pension liability
- \bar{C} = smoothed value for the contribution to the pay-as-you-go system
- \bar{T} = smoothed value for turnover duration
- C = contributions to the pay-as-you-go pension system, in accordance with accounting practice.
- T = turnover duration
- CPI = consumer price index from June

2. The average retirement age, \bar{R} , is calculated as

$$\bar{R}(t) = \frac{\sum_{i=61}^{R^*(t)} P_i^*(t) \times G_i(t) \times i}{\sum_{i=61}^{R^*(t)} P_i^*(t) \times G_i(t)}, \quad \bar{R} \text{ rounded off to nearest whole number} \quad (2.0)$$

where

- i = age at end of year t for persons born in the same calendar year, or age group
- $R^*(t)$ = the oldest age group for which pensions have been granted in year t

$P_i^*(t)$ = total of pensions granted monthly in year t to persons in age group i

$G_i(t)$ = annuitization divisor in year t for age group I

3. Turnover duration, T , is calculated as

$$T(t) = ID(t) + OD(t) \tag{3.0}$$

3.1 Pay-in duration, ID , is calculated as

$$ID(t) = \frac{\sum_{i=16}^{\bar{R}(t)-1} \bar{E}_i(t) \times L_i(t) \times (\bar{R}(t) - i - 0,5)}{\sum_{i=16}^{\bar{R}(t)-1} \bar{E}_i(t) \times L_i(t)} \tag{3.1.1}$$

$$\bar{E}_i(t) = \frac{E_i(t) + E_{i+1}(t)}{N_i(t) + N_{i+1}(t)}, \text{ for } \bar{E}_{\bar{R}(t)-1}(t) = \frac{E_{\bar{R}(t)-1}(t)}{N_{\bar{R}(t)-1}(t)} \tag{3.1.2}$$

$$L_i(t) = L_{i-1}(t) \times h_i(t) \text{ for } i = 17, 18, \dots, \bar{R}(t) - 1 \text{ där } L_{16}(t) = 1 \tag{3.1.3}$$

$$h_i(t) = \frac{N_i(t)}{N_{i-1}(t-1)} \text{ for } i = 17, 18, \dots, \bar{R}(t) - 1 \tag{3.1.4}$$

where

- E = the sum of 16 percent of pension-qualifying income calculated in accordance with Ch. 2 of the National Income Replacement Pension Act (1998:674) and 16 percent of pension-qualifying income calculated in accordance with Ch. 3 of said act
- $N_i(t)$ = number of individuals in age group i who at any time have been credited with pension-qualifying income or imputed income and who have not been registered as deceased

3.2 Pay-out duration, OD , is calculated as

$$OD(t) = \frac{\sum_{i=R(t)}^{R(t)} 1,016^{-(i-\bar{R}(t)+0,5)} \times L_i^*(t) \times (i - \bar{R}(t) + 0,5)}{\sum_{i=R(t)}^{R(t)} 1,016^{-(i-\bar{R}(t)+0,5)} \times L_i^*(t)} \tag{3.2.1}$$

$$he_i(t) = \frac{P_i(t)}{P_i(t) + Pd_i(t) + 2 \times Pd_i^*(t)} \text{ för } i = 61, 62, \dots, R(t) \tag{3.2.3}$$

where

- $R(t)$ = age of the oldest person receiving a pension in year t
- $P_i(t)$ = total pension disbursements in December of year t to age group i
- $Pd_i(t)$ = total monthly pension disbursements to persons in age group i made in December of year $t-1$ and ceasing in year t
- $Pd_i^*(t)$ = total monthly pensions to persons in age group i with pensions granted in year t and ceasing to be disbursed in year t

4. Pension liability, D , is calculated as

$$D(t) = AD(t) + DD(t) \quad (4.0)$$

$$AD(t) = K(t) + E(t) + ATP(t) \quad (4.1)$$

$$DD(t) = \sum_{i=61}^{R(t)} P_i(t) \times 12 \times \left(\frac{Ge_i(t) + Ge_i(t-1) + Ge_i(t-2)}{3} \right) \quad (4.2)$$

$$Ge_i(t) = \frac{\sum_{j=i}^{R(t)} \frac{1}{2} \times (L_j^*(t) + L_{j+1}^*(t)) \times 1.016^{i-j-1}}{L_i^*(t)} \quad (4.3)$$

where

- AD = pension liability in regard to pension commitment on which disbursement has not yet commenced (pension liability to "economically active" individuals)
- DD = pension liability in regard to pensions currently being disbursed (pension liability to retired persons in the pay-as-you-go system)
- K = total pension balances in accordance with Ch. 5, 2 §, of the National Income Replacement Pension Act (1998:674)
- E = pension credit for *inkomstpension* in accordance with Ch. 4, 2–6 §§, of said act
- ATP = estimated value of the National Supplementary Pension and so-called Basic Income Replacement Pension for persons who have not yet begun to receive these two pensions.



The Swedish Pension System

Annual Report 2001

National pension systems of the pay-as-you-go type probably represent the largest financial transaction systems in the world. In view of their size and importance for individuals and society at large, in conjunction with demography - an ageing population in many countries - their existence and design have been a much debated economic and political issue throughout the 1990's. During this period several countries, including Sweden, have made substantial changes in their public pension systems.

One distinguishing feature of the new Swedish pay-as-you-go pension system is its financial stability; regardless of demographic or economic developments, the system will be able to finance its obligations with a fixed contribution rate and fixed rules for calculating benefits. This type of financial stability, however, entails an inevitable risk that pension benefit levels will vary over time.

The task of minimizing the risks to which the pension benefit level is exposed, while maintaining a fixed contribution rate, has required some innovative financial engineering. The method developed clearly quantifies the financial impact of demographic and economic risk factors on the pension system. It provides something as prosaic, but useful, as an income statement and a balance sheet for the pay-as-you-go pension system.

The Annual Report 2001 sets the standard by which the Swedish Pension System will be reported and analyzed each year. The report marks the transition from a period of pension reform, to a phase of active management of the new system. The ambition of *Riksförsäkringsverket* is to manage the system as efficiently and transparently as possible. Annual reports like this one are part of our effort to fulfill that ambition.



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