



ORANGE REPORT 2017

Annual Report of the Swedish Pension System

PENSIONS
MYNDIGHETEN

What is the Orange Report?

The Orange Report 2017 describes the financial status of the *national* income-based pension at year-end 2017, developments during 2017, and three future scenarios.

In addition to the national pension's inkomstpension and premium pension there are occupational pensions and private pensions. Data is only available for the latter up to the end of 2016. The table below shows deposits and payments made in 2016 as well as funded capital at the end of 2016 for all three pension schemes. However, the amounts for premiums and capital is approximate for occupational pensions and private pensions. For occupational pensions secured by pension insurance the amounts in the table are complete, while for other forms of insurance the amounts are incomplete. The amounts for private pensions, including payments, refers only to the private pension schemes that were tax-deductible.

Total annual fees and premiums for national pension, occupational pensions, and private pensions are estimated at SEK 471 billion, of which the national pension's SEK 297 billion represents 63 percent. The wage bill in Sweden amounted to approximately SEK 1,709 billion in 2016 (including earnings of the self-employed). This means that we set aside an amount equal to 28 percent of our salaries for various pensions.

Funded capital in the national pension amounted to SEK 2,346 billion on 31 December 2016. This corresponds to approximately 43 percent of total funded pension capital in Sweden at one time. The Swedish Pensions Agency paid out SEK 289 billion in income and premium pension in 2016. It equates to 70 percent of the total amount paid out that same year. See the table below.

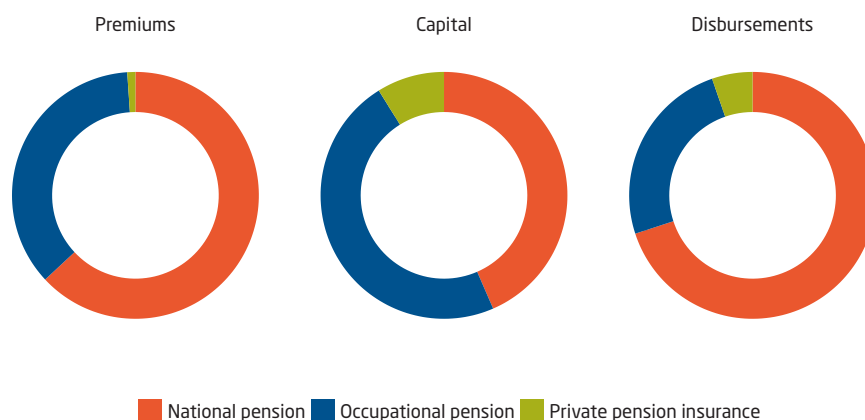
The Orange Report thus accounts for significantly more than half of Sweden's pension activities involving contributions and disbursements. The fact that it reflects a lower proportion of funded capital is due to the fact that inkomstpension is a distribution system with a buffer fund and not a fully funded pension system.

In 2016, in addition to inkomstpension and premium pension, the Swedish Pensions Agency paid out guaranteed pension to the amount of SEK 14 billion. Other pension-related benefits paid by the Agency during the year to elderly persons include income-based widow's pension of SEK 11 billion, housing supplement of SEK 8 billion and maintenance support for the elderly of SEK 0.9 billion. These benefits are financed from the state budget and are not reported in the Orange Report.

Swedish Pensions 2016* billions of SEK

	Premiums	Capital	Disbursements
Income-based pension	297 (63 %)	2,346 (43 %)	289 (70 %)
Occupational pension	169 (36 %)	2,571 (48 %)	102 (25 %)
Private pension	5 (1 %)	478 (9 %)	22 (5 %)
Total	471 (100 %)	5,395 (100 %)	413 (100 %)

* Disbursements for occupational pension and private pension refer only to persons aged 65 or over.



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Swedish Pensions Agency

Stockholm 2018

Further information on the Swedish national public pension system is available at the Swedish Pensions Agency's website:
www.pensionsmyndigheten.se.

For information on the National Pension Funds, please see the websites of the respective funds:
www.ap1.se, www.ap2.se, www.ap3.se, www.ap4.se, www.ap6.se and www.ap7.se (premium pension).

We at the Swedish Pensions Agency thank the readers of Orange Report for their questions and views, which have helped enhance the quality of the report.

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The cover shows the distribution of savers' account values within the premium pension per cohort. On the front cover women are shown, and on the back cover men. Each row is a cohort and the lateral spread shows the account value. Men's distribution is shown in reverse.

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A Pension System Changing with the Times

More things are happening today in the field of pensions than for a long time. A major deal has been reached in the parliamentary pension group, requiring an overhaul of certain aspects of the Swedish pension system. It concerns basic protection, which is to be reinforced while providing greater incentives to go on working. It concerns the retirement ages of 61 and 65, which are to be successively adjusted upwards from 2020 to better reflect life expectancy in today's society. It concerns the right to work after the age of 67, which will also be adjusted upwards for the same reason. And it concerns changes to the premium pension, enabling us at the Swedish Pensions Agency to place higher demands on those operating within or wishing to enter the fund market, while a wholly new system with fewer, procured funds, modelled on the occupational pensions market, will be investigated.



These are some of the most important elements of the agreement, driven largely of course by the pension age survey, the debate about basic protection for people with low or no pensions, and the turmoil in the Swedish Pensions Agency's fund market where we are convinced there have been cases of fraud, with some of pensioners' money ending up in the wrong hands.

One of the key assignments of the Swedish Pensions Agency is to provide our democratically elected decision makers with facts, statistics, projections and analyses about the functioning of the pension system now and in the future. Decisions concerning the pension system and any changes made to it are long-term and affect many citizens for many years. They also represent a contract between decision makers and citizens, making it possible to reasonably predict what rules will apply in the long term.

The task of the Swedish Pensions Agency is to ensure that the basis for such long-term decisions is as reliable as possible. It is also the Agency's responsibility, using facts and analyses of how the system works, to propose changes to decision makers. For example, we have done this in regard to preliminary changes to the premium pension, aimed at rapidly strengthening consumer protection. In the past, we have also proposed a softer balancing, since we noticed how the effects on pensioners from one year to another was too dramatic.

Some of the work we carry out to give decision makers background and facts and ourselves ideas for proactive proposals, can be found in the publication you hold in your hand – the Orange Report. In addition to functioning as the annual report of the pension system, it contains answers to many interesting questions that decision makers – and also interested citizens – may ask. Is the money in the system sufficient to cope with the large birth cohorts? How far are the buffer funds up to the challenge? How high is the risk of new balancing periods? What is the total claim of retirement pension for Sweden's pension savers? What will the balance between liabilities and assets look like in 40 years?

The Swedish National Audit Office issued a report in 2017 with proposals for improvements to this publication, which both the Government and the Swedish Pensions Agency found valuable. In the Orange Report for 2018 – that is, next year – we will be introducing these improvements.

Maria Rydbeck
Acting Director General Swedish Pensions Agency

1 Results of the Pension System in Brief

Sweden's income-based pension consists of the inkomstpension and the premium pension. The inkomstpension referred to in this report includes the ATP (supplementary pension) which is being gradually phased out. The inkomstpension and the premium pension are defined-contribution, financially stable pension systems. With this design, liabilities and assets normally change by the same amount; in other words, the net income is more or less equal to zero. In principle, this is fully applicable to the premium pension system, whereas the inkomstpension allows substantial differences from year to year between the development of liabilities and assets, with the qualification, however, that accumulated deficits are not allowed to remain in the system.

Inkomstpension

The inkomstpension system is a pay-as-you-go system, and pension contributions paid in are used to pay retirees in the same year. The surpluses or deficits that arise when pension contributions are greater or less than pension disbursements are absorbed by the buffer fund, i.e. First – Fourth National Pension Fund.

The assets of the system are the value of future pension contributions, referred to as the contribution asset, and the buffer fund. The contribution asset is calculated as follows: contribution revenues are multiplied by the expected average time that one krona will remain in the pension system, referred to as turnover duration.

The pension liability consists partly of a liability to the economically active and partly of a liability to retirees. The liability to the economically active is mainly the sum of the pension balances of everyone (the last row in the account statement of everyone's Orange Envelope). The pension liability to retirees is the expected total of all pensions paid to today's pensioners for the rest of their lives. The pension liability changes primarily with the annual indexation of pensions and pension account balances. Indexation is determined by the change in the average income in Sweden, in combination with the balance ratio in years when balancing is activated.

The result of the inkomstpension system is affected by numerous key economic and demographic factors. In the short run the development of employment is the most important factor, but the effect of the stock and bond markets on the buffer fund is also of significance, particularly in case of major changes. In the long run demographic factors are most important.

The result for 2017 was SEK -29 billion. Together with a capital surplus of SEK 344 billion from 2016, this yields a capital surplus of SEK 315 billion at the end of 2017. The negative result for the year is by definition due to liabilities increasing more than assets in 2017. Assets exceed liabilities by just over 3 percent. The system's balance ratio is calculated at 1.0347. The system is not in a balancing period, and therefore the balance ratio will not affect the indexation of pensions and pension balance for the year 2019.

Assets increased in 2017 by 3.7 percent. The contribution asset increased by SEK 247 billion, or 3.2 percent. The turnover duration value changed by SEK -74 billion and the contribution revenue value by SEK 321 billion. The buffer fund, i.e. the First – Fourth and the Sixth National Pension Fund, increased by SEK 90 billion, or 6.8 percent. The yield was SEK 121 billion, or 9.1 percent relative to initial fund value. Like 2016, 2017 was a year when the funds' expenses, pension payments and administrative costs exceeded pension contributions paid into the inkomstpension system. The difference resulted in a negative contribution of SEK 30 billion. Inkomstpension assets increased in total by SEK 338 billion.

During 2017 pension liability increased by SEK 366 billion, or 4.2 percent. Liability recalculation, indexing, increased liability to the gainfully employed by SEK 248 billion and liability to pensioners by SEK 152 billion. In total, the effect was an increase of the pension liability by SEK 400 billion. The pension disbursements of the year exceeded pension credit earned for the year and ATP points, including certain adjustments, thus contributing to a reduction of the liability by SEK 18 billion. The liability to retirees is affected by changes in life expectancy. Compared to 2016, the average expected payout duration (economic life expectancy) for a 65-year-old has decreased by 8 days. Because of the shorter expected payout duration, the liability has decreased by SEK 16 billion. A change in the selection of data used in calculating the economic annuity divisors that was implemented in last year's financial report is a contributing factor to the year's decrease in economic life expectancy. For more details see the report "VER 2016-390 *Payment Age and Economic Annuity Divisors*".

Six-Year Review

billions of SEK

Calculation year	2012	2013	2014	2015	2016	2017
Balancing year	2014	2015	2016	2017	2018	2019
Buffer fund, mean value ¹	908	963	1,067			
Buffer fund	958	1,058	1,185	1,230	1,321	1,412
Contribution asset	6,915	7,123	7,380	7,457	7,737	7,984
Total assets	7,873	8,180	8,565	8,688	9,058	9,396
Pension liability	7,952	8,053	8,141	8,517	8,714	9,080
Surplus/Deficit	-80	127	423	171	344	315
Balance ratio ²	0.9837	1.0040	1.0375			
Balance ratio ³	0.9900	1.0158	1.0520	1.0201	1.0395	1.0347
Damped balance ratio				1.0067	1.0132	1.0116

1 Mean value of the fund as of December 31 for the past three years.

2 Previous definition of balance ratio (based on three-year average of the buffer fund's market value as of December 31 of each year)

3 Balance ratio (based solely on the buffer fund's market value as of December 31 each year, formerly called financial position)

Premium Pension

The premium pension system is a funded system where pension savers and pensioners themselves choose the funds in which to invest their premium pension moneys. The pension is disbursed from the proceeds of selling off accumulated capital. The assets consist of the investments in funds by pension savers and pensioners. The pension liability to the economically active and to retirees is related primarily to fund shares. Changes in the value of fund shares affect the assets of pension savers and pensioners in the system, directly and to an equal degree. With traditional insurance, the pension liability is the value of the remaining guaranteed disbursements. That value is calculated with assumptions about future return, life expectancy and operating costs. In the premium pension system all payments in and out of the system and all changes in value have in principle the same effect on system assets and liabilities. The positive result of the system belongs to pension savers and pensioners, and is invested in the consolidation fund as owner equity. The moneys in the consolidation fund for traditional insurance with profit annuity are disbursed as a bonus rate in connection with pension disbursements. Moneys in the consolidation fund for fund insurance are deducted from the following year's contributions to cover operational costs.

On December 31, 2017, the value of pension savers' and pensioners' premium pension assets amounted to SEK 1,141.3 billion, while in the temporary administration the value was SEK 56.3 billion. The increase in value for fund insurance was 7.1 percent.

Profit for the year 2017 amounted to SEK 3,212.6 million. The result for the entire insurance business improved by SEK 535 million. This is primarily due to the fact that premium income in traditional insurance increased by SEK 151.2 million and totalled SEK 4,560 (4,449) million. The increase in value of other investment assets for traditional insurance fell by SEK 636.7 million and totalled 1,622.9 (2,259.6), while paid insurance claims in traditional insurance increased by 164.1 million and operating expenses in traditional insurance increased by SEK 0.5 million to SEK 10.0 million.

Assets in 2017 increased during the year by SEK 156 billion. The change in insurance assets chiefly refers to newly-earned pension credit, positive changes in value, allocated management fees, and pension disbursements as noted above.

The pension liability in 2017 increased by SEK 156 billion. The change in the pension liability refers in principle to the same newly earned pension credit, positive changes in value, allocated management fees and pension disbursements as noted above.

Six-Year Review

millions of SEK

	2012	2013	2014	2015	2016	2017
Fund insurance	472,437	603,540	761,156	841,332	962,304	1,113,510
Traditional insurance	10,868	12,907	18,091	20,784	26,029	30,745
In temporary management	31,455	32,039	32,899	34,260	36,034	37,478
Insurance assets	514,760	648,486	812,146	896,376	1,024,367	1,181,733
Pension liability	511,522	643,889	805,187	889,386	1,015,464	1,170,466
Net income/loss for the year	1,052	1,684	2,491	1,003	2,686	3,213

2 Income Statement and Balance Sheet

Inkomstpension, Income Statement and Balance Sheet

Income Statement

millions of SEK

	Note	2016	2017	Change
Change in fund assets		91 196	90 406	-790
Pension contributions	1	256 700	267 407	10 707
Pension disbursements	2	-282 384	-296 001	-13 617
Return on funded capital	3	118 633	120 859	2 226
Costs of administration	4	-1 753	-1 859	-106
Change in contribution asset		279 326	247 482	-31 844
Value of change in contribution revenue	5	338 787	321 187	-17 600
Value of change in turnover duration	6	-59 461	-73 705	-14 244
Change in pension liability ¹		-197 409	-366 482	-169 073
New pension credit	7	-266 840	-277 819	-10 979
Pension disbursements	2	282 379	295 994	13 615
Indexation	8	-219 440	-400 112	-180 672
Value of change in life expectancy	9	7 324	16 236	8 912
Inheritance gains arising	10	12 452	12 721	269
Inheritance gains distributed	10	-14 875	-15 155	-280
Deduction for costs of administration	11	1 591	1 653	62
Net income/-loss for the year		173 113	-28 594	-201 707

1 A negative item (-) increases the pension liability, and a positive item () decreases it, by the amount shown.

Balance sheet

millions of SEK

	Note	2016	2017	Change
Assets				
Fund assets	12	1,321,490	1,411,896	90,406
Contribution assets	13	7,736,553	7,984,035	247,482
Total Assets		9,058,043	9,395,931	337,888
Liabilities and results brought forward				
Closing results brought forward		344,071	315,477	-28,594
Opening results brought forward		170,958	344,071	173,113
Net income/-loss for the year		173,113	-28,594	-201,707
Pension liability	14	8,713,972	9,080,454	366,482
Total Liabilities and results brought forward		9,058,043	9,395,931	337,888

Premium Pension, Income Statement and Balance Sheet

Income Statement

millions of SEK

	Note	2016	2017	Change
Change in fund assets		131,439	160,647	29,208
Pension contributions	1	39,855	40,881	1,026
Pension disbursements	15	-6,962	-8,585	-1,623
Return on funded capital	16	98,958	128,819	29,861
Costs of administration	17	-412	-468	-56
Change in pension liability ¹		-128,753	-157,434	-28,681
New pension credit	18	-39,855	-40,881	-1,026
Pension disbursements	15	6,962	8,585	1,623
Change in value	16	-96,402	-125,740	-29,338
Inheritance gains arising	19	2,346	2,561	215
Inheritance gains distributed	19	-2,346	-2,561	-215
Deduction for costs of administration	20	542	602	60
Net income/-loss for the year		2,686	3,213	527

1 A negative item (-) increases the pension liability, and a positive item () decreases it, by the amount shown.

Balance sheet

millions of SEK

	Note	2016	2017	Change
Assets				
Insurance assets	21	1,024,366	1,181,733	157,367
Fund insurance		962,303	1,113,510	151,207
Traditional insurance		26,029	30,745	4,716
Temporary management		36,034	37,478	1,444
Other assets	22	5,614	5,550	-64
Total Assets		1,029,980	1,187,283	157,303
Liabilities and results brought forward				
Closing results brought forward	23	8,522	11,239	2,717
Opening results brought forward ¹		5,836	8,026	2,190
Net income/-loss for the year		2,686	3,213	527
Liabilities		1,021,458	1,176,044	154,586
Pension liability	24	1,015,464	1,170,466	155,002
Other liabilities	25	5,994	5,579	-415
Total Liabilities and results brought forward		1,029,980	1,187,283	157,303

1 Opening results brought forward differs from Closing results brought forward last year, see Note 23.

Inkomstpension and Premium Pension, Income Statement and Balance Sheet

Income Statement

millions of SEK

	2016	2017	Change
Change in fund assets	222,635	251,053	28,418
Pension contributions	296,555	308,288	11,733
Pension disbursements	-289,346	-304,586	-15,240
Return on funded capital	217,591	249,678	32,087
Costs of administration	-2,165	-2,327	-162
Change in contribution asset	279,326	247,482	-31,844
Value of the change in contribution revenue	338,787	321,187	-17,600
Value of change in turnover duration	-59,461	-73,705	-14,244
Change in pension liability ¹	-326,162	-523,916	-197,754
New pension credit	-306,695	-318,700	-12,005
Pension disbursements	289,341	304,579	15,238
Indexation	-315,842	-525,852	-210,010
Value of the change in life expectancy	7,324	16,236	8,912
Inheritance gains arising	14,798	15,282	484
Inheritance gains distributed	-17,221	-17,716	-495
Deduction for costs of administration	2,133	2,255	122
Net income/-loss for the year	175,799	-25,381	-201,180

1 A negative item (-) increases the pension liability, and a positive item () decreases it, by the amount shown.

Balance sheet

millions of SEK

	2016	2017	Change
Assets			
Fund assets	1,321,490	1,411,896	90,406
Insurance assets	1,024,366	1,181,733	157,367
Other assets	5,614	5,550	-64
Contribution assets	7,736,553	7,984,035	247,482
Total Assets	10,088,023	10,583,214	495,191
Liabilities and results brought forward			
Closing results brought forward	352,593	326,716	-25,877
Opening results brought forward ¹	176,794	352,097	175,303
Net income/-loss for the year	175,799	-25,381	-201,180
Liabilities	9,735,430	10,256,499	521,069
Pension liability	9,729,436	10,250,920	521,484
Other liabilities	5,994	5,579	-415
Total liabilities and results brought forward	10,088,023	10,583,215	495,192

1 Opening results brought forward differs from Closing results brought forward last year, see Note 23.

3 Accounting Principles

The data on the financial position of the inkomstpension have been presented previously in the annual report of the Swedish Pensions Agency. Information concerning the premium pension has also been presented previously in the annual report of the Pensions Agency. The audit of the information in the balance sheet and income statement is performed in connection with the confirmation of the Pensions Agency's annual report. However, certain adjustments and simplifications of the information on the premium pension have been made to facilitate comparisons between the two systems.

Regulations and Guidelines

The Annual Report of the Pension System has been prepared in accordance with Chapter 55 § 4 of the Social Insurance Code (2010:110) on the Earnings Related Old Age Pension (SFB) and Regulation (2002:135) Annual Reporting of the Financial Position and Development of the Old-Age Pension System.

The income-related old-age pension system includes the benefits provided by the inkomstpension, the ATP and the premium pension.¹

The inkomstpension and the ATP are examples of benefits in a pay-as-you-go pension system. In such systems, contributions are not funded, but in principle are used directly to finance pension disbursements. The National Pension Funds are buffer funds that absorb differences between the inflow of contributions and the outflow of pensions. As elsewhere in the accounts, the term "inkomstpension" is used here in reference to the entire pay-as-you-go system; in other words, it often applies to the ATP as well. According to Chapter 58 § 14 SFB, the reported assets of the pay-as-you-go system consist of the contribution asset and the value of the assets of the First–Fourth and Sixth National Pension Funds. Formulas for calculating the contribution asset and the pension liability of the inkomstpension system are provided in the Regulations for Calculation of the Balance Ratio (2002:780). These formulas are also found in Appendix B.

The premium pension system is a fully funded pension system where contributions are invested and the proceeds of selling accumulated capital are used to pay pensions.

According to the Regulations for the Annual Report (2002:135), the Orange Report is to include a projection of the assumed long-term development of the pension system. See chapter 7 Three Scenarios for the Future of the Pension System.

The accounting principles of the National Pension Funds are set forth in their annual reports and are therefore not described in this report. The annual report of each national pension fund is available on the home page of the respective fund: www.ap1.se, www.ap2.se, www.ap3.se, www.ap4.se and www.ap6.se. As the annual report of the Swedish Pensions Agency describes the accounting principles used for the premium pension, these are only presented in summary form in this report.

Where Do the Figures Come From?

The accounting for the inkomstpension system is based on data from the records of the Swedish Pensions Agency on pension credit earned and pension disbursements, respectively.

¹The guaranteed pension, which is part of the national pension system, is not based on earnings and is therefore not included in the accounts.

In the Annual Report of the Swedish Pension System, information on the operations of the First-Fourth and Sixth National Pension Funds has been taken primarily from the annual reports of the respective funds.² The buffer funds prepare their annual reports according to the Law on National Pension Funds (2000:192). Furthermore, on the basis of applicable provisions for comparable financial companies, the funds have developed common principles for accounting and valuation.

In the Annual Report of the Swedish Pension System, information on the premium pension has been taken from the annual report of the Swedish Pensions Agency, which was prepared as provided in Regulation (2000:605) on Annual Reports and Supporting Documentation for Budgeting. Invested assets (and the corresponding liabilities) of the premium pension system have been valued according to the provisions of the Law (1995:1560) on Annual Reports of Insurance Companies and according to the regulations and general guidelines of the Swedish Financial Supervisory Authority for Annual Reports of Insurance Companies. The assets and liabilities of the premium pension systems are included in the consolidated balance sheet of the Swedish Pensions Agency, and the operations of the premium pension system are reported in a separate section of the income statement. Certain revisions, simplifications and consolidations have been made to facilitate comparison between the presentation and that of the inkomstpension.

Assets and liabilities included in the temporary management of pension contributions are reported in the Orange report as an insurance asset and pension liability. This is a deviation compared to the Swedish Pensions Agency annual report.

Reporting premium pension assets, liabilities and results has been simplified by reporting a net amount that is included in order to balance the balance sheet.

Principles for Valuation of Assets and Liabilities

The assets and liabilities are valued mainly on the basis of events and transactions that are verifiable at the time of valuation. For example, the fact that contribution revenue normally changes at the rate of economic growth is not considered in the calculation of the contribution asset. Nor is consideration given in the valuation of the pension liability to the fact that pension disbursements, through indexation and other factors, will change in the future.

Through the design of the inkomstpension, there is a strong link between the development of the system's assets and liabilities, respectively. When balancing is activated, there is basically an absolute link between the respective rates of change in liabilities and in assets.³

The way in which the assets and liabilities of the inkomstpension system are valued is based on the assumption that these will change at the same rate after each valuation. To put it another way, the method of valuation is based on the assumption that the system's future internal rate of return will be the same as the future change in the value of the pension liability, even though this is certain only if balancing is activated. When balancing is not activated, the internal rate of return may be either greater or less than the change in the value of the pension liability.

The valuation of the contribution flow and the pension liability is based almost exclusively on conditions prevailing at the time of valuation. This is not due to any belief that all these factors will remain totally constant. Rather, the accounting is designed not to include changed conditions until the changes are reflected in the events and transactions on which the accounting is based.

²The accounting of the inkomstpension system in the annual report of the Swedish Pensions Agency for 2017 is based on preliminary information in regard to the operations of the National Pension Funds.

³With the method for calculating turnover duration, there is an implied assumption that the size of the economically active population will remain constant. If the population decreases, there is consequently a risk that the accounts will (somewhat) overestimate the system's assets in relation to its liabilities. It is reasonable to take for granted, however, that the population decrease will end at some point. If events take this course, the underestimation, and the possible resulting deficit in the buffer fund, will be temporary. The buffer fund will in time return to a level of at least SEK zero.

Valuation of Inkomstpension Assets

The basis for valuation of the contribution asset is the size of the pension liability that the contribution revenue for the accounting year – i.e. paid-in pension contributions – could finance if the conditions prevailing at the time of valuation remained constant. The relevant determinants here, in addition to the rules of the pension system, are economic and demographic. The economic conditions consist of the average pension-qualifying income of each annual birth cohort and the sum of these incomes. The demographic factors relate to mortality at different ages. The relevant rules for the pension system are those that govern the calculation and the indexation of the inkomstpension, define the contribution and pension base and determine the contribution in percent. The contribution asset is calculated by multiplying the financial year's contribution revenue by the previous year's turnover duration.⁴ Turnover duration expresses how long it takes, on average, from the payment of SEK 1 in revenue into the system to the disbursement of a pension based on the pension credit arising at the time the pension credit was earned. Thus, turnover duration reflects the age difference between the average pension contributor and the average pensioner that would result if the economic, demographic and legal conditions were constant.

The fact that the valuation of the contribution flow is determined by multiplying the year's flow by the turnover duration is equivalent to valuing the contribution flow by an assumedly permanent stream of contributions, with the inflow each year equal to the contributions of the previous year, discounted by a rate of one (1) divided by the turnover duration. If the turnover duration increases, the rate of discount decreases, and the value of the contribution flow increases. If the turnover duration decreases, the rate of discount increases, and the value of the contribution flow decreases.

The assets of the National Pension Funds are valued at their so-called true value. This means that the assets are valued preferably at their latest price paid on the final trading day of the year, otherwise at their latest price bid.

Valuation of Inkomstpension Liabilities

The liability of the inkomstpension to persons who have not begun to draw an old-age pension is valued as the sum of the pension balances of all insured persons. Income earned in the year covered by the accounts has not yet been confirmed at the time of the report. For this reason, an estimate of the inkomstpension credit earned in the year of the report is added to the sum of the pension balances of the insured. This added amount equals about three percent of the total pension liability. The difference between estimated and confirmed pension credit is deducted in the accounts for the following year.⁵

The pension liability to retirees is calculated by multiplying the pensions granted (annual amount) by the expected number of years for which the amount will be disbursed. The number of years is discounted in order to reflect the indexation of disbursed amounts by the increase in the income index or balance index with a reduction of 1.6 percentage points.⁶ The expected number of pay-out years is calculated from measurements of the pay-out period of pension amounts according to Swedish Pensions Agency's records and is expressed in terms of so-called economic annuity divisors.⁷ An average of the preceding three years' economic annuity divisors is used in the calculation, leaving the previous year's values unchanged. Thus its impact is gradual. For more details, see the report "VER 2016-390 Payment

⁴The calculation of turnover duration is described in Appendix B, Formula B.3.1.

⁵See Note 14, Table A.

⁶The recalculation of inkomstpension is made using the ratio between the new and old income index divided by 1,016. For those years when balancing is activated, the income index is replaced by the balance index.

⁷See formula B.7.5 in Appendix B.

Age and Economic Annuity Divisors". In the years for which a balance index has been established the liability to pensioners is multiplied by the damped balance ratio established for the year $t + 1$ ⁸.

One accounting principle followed is that the report is based only on events or transactions occurring and recorded. Since credit for the ATP will be earned through 2017, this accounting principle cannot yet be fully applied. The reason is that the ATP liability to persons who have not yet begun to receive their pensions cannot be determined without making assumptions about future economic and demographic developments. According to the Regulation (2002:135) for the Annual Report, the ATP liability for the economically active is therefore to be calculated on the basis of certain assumptions about future developments. That liability is to be calculated according to the principles set forth by the Government in Bill 2000/01:70 on Automatic Balancing in the Old Age Pension System. These principles provide that the liability to the economically active is to be calculated on the assumptions of the same life expectancy used in determining the inkomstpension liability and of two-percent annual growth in the income index.

On these conditions, the ATP liability as of December 31 of the year covered by the financial statements is calculated by estimating the ATP to be received at age 65 by each annual birth cohort. This amount is multiplied by the established economic annuity divisor of the accounting year for persons aged 65. It is assumed that persons older than 65 who have not yet drawn their full pension at the time of calculation will do so in the following year. The present value of the future pension amounts is then calculated through discounting it by the assumed annual change of two percent in the income index from the year of retirement until the year of the accounts. That amount is reduced by the similarly discounted value of the expected contribution inflow of individuals until age 64. Pension credit for income earned after that age is calculated entirely according to the provisions for the inkomstpension.

Parliament has decided that pension credit will be adjusted downward during the balancing periods (SFS 2014:1548). Therefore the value of pension credit relating to the income year 2016 is adjusted downwards by the ratio of the established balance index for 2017 and the established income index for 2017. The estimated pension credit for the income year 2017 is not adjusted downwards since balancing ended in 2018.

Valuation of Premium Pension Assets and Liabilities

Premium pension assets are reported at their true value, or accrued acquisition cost, according to the regulations and general guidelines of the Swedish Financial Supervisory Authority (FFFS 2009:12) on Annual Reports of Insurance Companies. Assets reported at their true value as of the balance sheet date are valued at their price on the last trading day of the year. In the valuation of assets reported at accrued acquisition cost, the difference between acquisition cost and redemption price is periodized as interest revenue for the time remaining to maturity.

Temporary management consists of pension contributions paid in periodically during the year in which pension credit is earned; these are transferred to the premium pension system when the pension credit for the year has been confirmed. Assets under temporary management are reported at their accrued acquisition value.

Fund insurance assets refer to pension savers' investment in funds and are reported at the redemption price for fund assets. The pension liability for fund insurance consists of fund insurance assets and of liquid assets not yet converted into fund shares. Traditional insurance assets are invested in equity and interest funds and are reported at their true value.

The pension liability for traditional insurance with profit annuity is determined for each insurance policy as the capital value of the remaining guaranteed disbursements. That value is calculated on

⁸For this year's report the balancing effect in the indexation between 2017 and 2018 was used, amounting to 1.0106 (income index for 2017 divided by the balance index for 2017). For more details see VER 2018-99. This was because the balancing period ended in 2018.

assumptions about future returns, life expectancy and operating expenses. The return consists of an aggregation of the market interest rate on government bonds and guaranteed mortgage bonds of varying maturities. The market rate of interest is determined on the basis of the time remaining to maturity for guaranteed disbursements. The market valuation of the liability means that provisions set aside for life insurance are affected by changes in interest rates. Paid-in premiums are reported as lump-sum premiums and increase the guaranteed amount. Assumptions about life spans are based on the population forecast of Statistics Sweden from 2015, with 10 percent deductions to better fit the mortality observed in the Swedish Pensions Agency's stock. Operating expenses are assumed to be 0.1 percent of the insurance capital. Taken together, this means guaranteed commitments in traditional insurance have been valued carefully in accordance with established actuarial methods.

4 How the National Pension System Works

The principles of the inkomstpension and the premium pension are simple. A portion of your earnings each year is set aside in two different accounts. The pension is calculated on the basis of the amount of money you have in your account when you claim your pension, and how many more years you are expected to live from that point onwards. The purpose of this section is to provide those who so desire with somewhat more advanced knowledge than these elementary basic premises.

Almost Like Saving at the Bank . . .

The national pension system works much like ordinary saving at the bank. The comparison applies to both earnings-related parts of the system, the inkomstpension and the premium pension. Each year pension contributions are paid by the insured, their employers and in certain cases the central government. Contributions are recorded as pension credit in the “bankbook” of the insured – i.e., the respective accounts for the inkomstpension and the premium pension. Savings accumulate over the years with the inflow of contributions and at the applicable rate of “interest”. The statement sent out each year in the Orange Envelope enables the insured to watch their own inkomstpension and premium pension accounts develop from year to year. When the insured individual retires, the stream of payments is reversed, and the inkomstpension and premium pension are disbursed for the remaining lifetime of the insured.

. . . but Entirely a Form of Pension Insurance

With pension insurance savings are blocked; it is impossible to withdraw all or any part of them before the minimum age for receiving a pension. That age is 61 years for both the inkomstpension and the premium pension.

One purpose of pension insurance is to redistribute assets from individuals with shorter-than-average life spans to those who live longer. The pension balances of deceased persons – so-called inheritance gains (see Appendix A) – are redistributed each year to the surviving insured in the same birth cohort. Also after pension withdrawal begins, assets are redistributed from those with shorter-than-average life spans to those who live longer. This is done by basing the monthly pension on average life expectancy but disbursing it for as long as the insured lives. Consequently, total pension disbursements to persons who live for a relatively short time after retirement are less than their pension savings, and those who live longer than average receive more than the value of their own pension savings.

The balance of an insured’s pension account consists of the sum of her/his pension credit (contributions), accrued interest and inheritance gains. A charge for administrative costs is deducted from the account each year.

One Krona of Pension Credit for Each Krona Contributed

The pension contribution is 18.5 percent of the pension base. The pension base consists of pension-qualifying income and pension-qualifying amounts. In addition to earnings, benefits from the social insurance and unemployment insurance systems are treated as income. Pension-qualifying amounts are a basis for calculating pension credit but are not income, properly speaking. Pension credit is granted

for pension-qualifying amounts for sickness and activity compensation (disability pension), years with small children (child-care years), and studies. Up until 2010, pension-qualifying amounts were also granted for compulsory national service. As of 2018 it can be received again when compulsory military service is reintroduced. The maximum pension base is 7.5 income-related base amounts (SEK 461 250 in 2017). Pension credit is earned at 16 percent of the pension base for the inkomstpension and 2.5 percent for the premium pension.¹

Who Pays the Contribution?

The insured pays an individual pension contribution to the national public pension of 7 percent of her/his earnings and any benefits received from the social insurance and/or unemployment insurance schemes. The contribution is paid on incomes up to 8.07 income-related base amounts² and is paid in together with the withholding tax on earnings. The individual pension contribution of 7 percent is not included in the pension base. Annual earnings are pension-qualifying when they exceed the minimum income for the obligation to file a tax return, which as from 2003 is 42.3 percent of the current price-related base amount.³ When an individual's income has exceeded this threshold, it is pension-qualifying from the first krona.

For each employee, employers pay a pension contribution of 10.21 percent of that individual's earnings.⁴ This contribution is also paid on earnings exceeding 8.07 income-related base amounts. Since there is no pension credit for earnings above 8.07 income-related base amounts, these contributions are in fact a tax. They are therefore allocated to the central-government budget as tax revenue rather than to the pension system.⁵

For recipients of pension-qualifying social insurance or unemployment insurance benefits, the central government pays a contribution of 10.21 percent of these benefits to the pension system. For persons credited with pension-qualifying amounts, the central government pays a contribution of 18.5 percent of the pension-qualifying amount to the pension system. These central government contributions to the old-age pension system are financed by general tax revenue.

The total pension contribution is thus 17.21 percent, whereas the pension credit and the pension contribution are 18.5 percent of the pension base. The reason for the difference is that the contribution base is reduced by the individual pension contribution of 7 percent when pension credit is calculated.⁶ This means that the maximum pension base is 93 percent of 8.07, or 7.5 income-related base amounts. The maximum pension credit in 2017 was SEK 85,331.

Where Does the Contribution Go?

Of the pension contribution of 18.5 percent, 16 percentage points are deposited in the four buffer funds of the inkomstpension system: the First, Second, Third and Fourth National Pension Funds.⁷ Each fund receives one fourth of contributions and finances one fourth of pension disbursements. The monthly pension disbursements of the inkomstpension system thus come from the buffer funds. In principle, the same moneys that were paid in during the month are paid out in pensions to retirees.

¹Pension credit for the premium pension may be transferred between spouses. Transferred capital is currently reduced by 6 percent, since more transfers are made to women than to men and women on average live longer than men.

²In 2017: $8.07 \times 61,500 = \text{SEK } 496,305$.

³In 2017: $0.423 \times 44,800 = \text{SEK } 18,950$.

⁴Self-employed persons pay a national pension contribution of 7 percent and self-employment charge of 10.21 percent.

⁵This tax was SEK 19.4 billion in 2017; see Note 1.

⁶ $0.1721 / 0.93 \approx 0.185$

⁷In addition there is the Sixth National Pension Fund, which is an asset in the inkomstpension system but provides no contributions and pays no pensions.

The moneys allocated to the premium pension, 2.5 percent of the pension base, are invested in interest-bearing assets until the final tax settlement. Only then can it be determined how much pension credit for the premium pension has been earned by each insured. When pension credit has been confirmed, shares are purchased in the funds chosen by the insured. For those who have not chosen a fund, their moneys will be invested in the Seventh National Pension Fund, AP7 S fa, the government pension management alternative based on birth cohorts, which has a generation-fund profile. At the turn of the year 2017/2018, there were 831 funds in the premium pension system, administered by 103 different fund management companies. With each disbursement of pensions, enough fund shares are sold to provide the monthly amount.

Funds in the Premium Pension System in 2017 and Capital Managed 2013–2017

December 31, billions of SEK

	Number of registered funds 2017	Managed capital				
		2013	2014	2015	2016	2017
Equity funds	564	240	295	347	388	441
Mixed funds	93	63	77	67	69	70
Generation funds	35	90	114	128	147	166
Interest funds	138	27	27	25	127	26
AP7 S�fa/Premium Savings Fund	1	182	246	272	328	407
Total	831	602	759	839	959	1,110

Interest on Contributions That Gave Rise to Pension Credit

Savings in a bank account earn interest, and the national public pension works in the same way. The interest on the inkomstpension account is normally determined by the growth in average income. Average income is measured by the *income index* (see Appendix A). The equivalent of interest on the premium pension account is determined by the change in the value of the premium pension funds chosen by the insured.

Thus, the interest earned on pension credit depends on the development of different variables in the general economy. The inkomstpension account earns interest at the rate of increase in incomes – in the price of labour, to put it another way. The development of the premium pension account follows the tendency on financial markets, which among other things reflects the price of capital. Neither of these rates of interest is guaranteed; they may even be negative. Through apportionment of contributions to separate subsystems where the rate of return depends on somewhat differing circumstances, risks are spread to some extent. The average return of the inkomstpension system (income-/balance index) has been 3.0 percent since 1995.⁸ During the same period, the Premium Pension system has generated an annual rate of return of 7.1 percent.

A Rate of Interest Other Than the Income Index – Balancing

Under certain demographic and economic conditions, it is not possible to earn interest on the inkomstpension account and the inkomstpension at a rate equal to the growth in average income and at the same time to finance payments of the inkomstpension with a fixed contribution. In order to maintain the contribution rate at 16 percent, income indexation must be suspended in such a situation. This is done by activation of balancing.

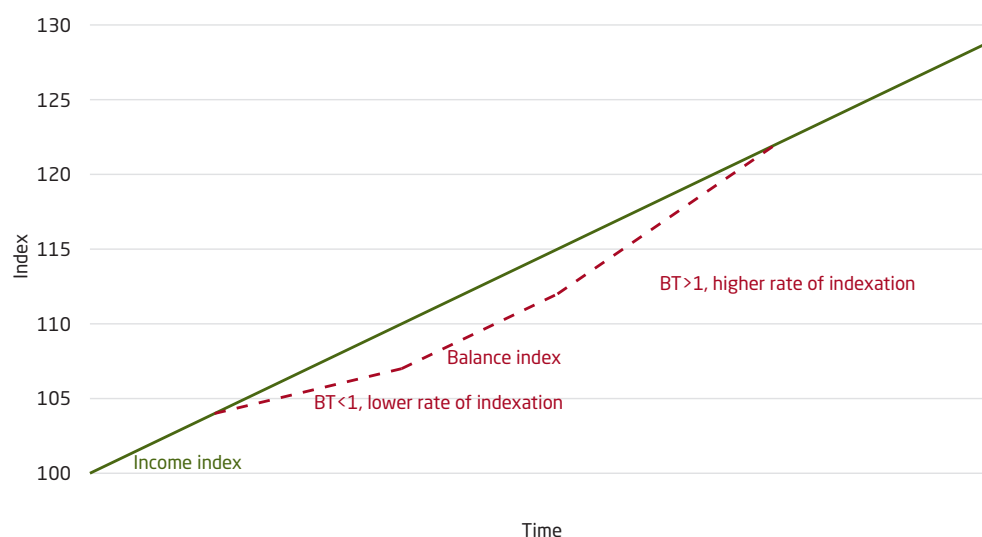
⁸Capital-weighted return. For further information, see the chapter Changes in the Value of the Pension System, section on measures of change in value in the premium pension system.

The assets of the system divided by the pension liability provides a measure of its financial position, a ratio referred to as the balance ratio (balanstal, BT). If the balance ratio is greater than the number one, assets exceed liabilities. If the balance ratio is less than one, liabilities exceed assets, and balancing is activated. When balancing is activated, pension balances and pensions are indexed by the change in a balance index instead of the change in the income index. The change in the balance index is determined by the change in the income index and the size of the balance ratio.

An example: If the balance ratio falls below 1.0000 to 0.9900 while the income index increases from 100.00 to 104.00 the damped balance ratio is first calculated according to: $\frac{0.9900-1}{3} + 1 = 0.9967$.⁹ By multiplying the income index (104.00) by the damped balance ratio (0.9967) the balance index 103.66 is obtained. The indexation of pension balances is thus 3.66 instead of 4 percent.¹⁰ Indexation of pensions is reduced to the same extent.

If the balance ratio exceeds 1.0000 during a period when balancing is activated, pension balances and pensions will be indexed at a rate higher than the increase in the income index. When the balance index reaches the income index level, balancing is turned off. Pensions then regain the value they would have had if they had been indexed using the income index alone. The system returns to indexing based solely on changes in the income index. A schematic description is given in Figure 4.1 and the actual balancing 2010–2018 is shown in Figure 4.2. The balance index reached the income index in 2018, as shown in the figure below.

Figure 4.1 Balancing – Concept description

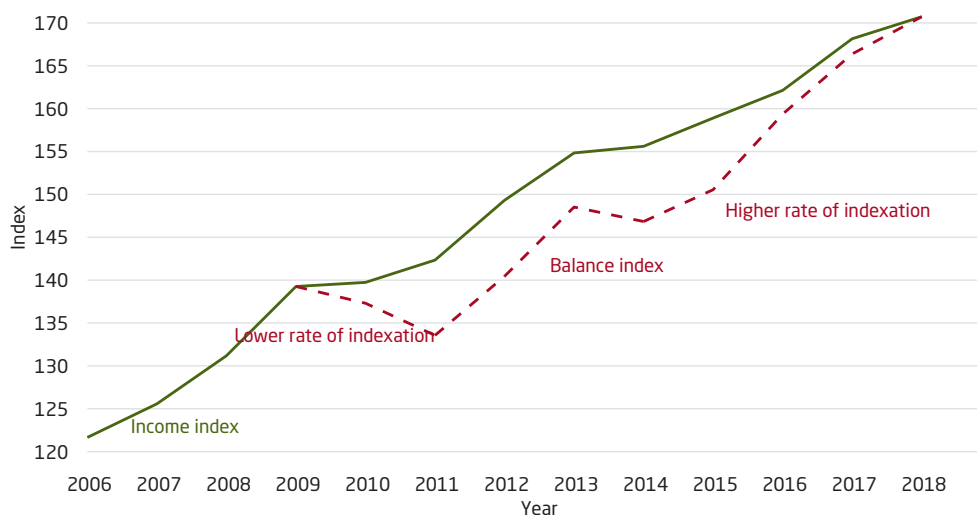


BT Balance ratio

⁹The balance index for the year 2017 and later will be calculated using the damped balance ratio (SFS:676). See also Appendix B.

¹⁰Next year's balance index is calculated by multiplying the balance index (103.66) by the change in the income index, multiplied by the damped balance ratio. See Appendix A.

Figure 4.2 Actual balancing



BT Balance ratio

Pensions Reduced by Costs of Administration

The costs of administering the inkomstpension are deducted annually from pension balances through multiplication of these balances by an administrative cost factor (see Appendix A). This deduction is made only until the insured begins to draw a pension. At current cost levels, the deduction for costs will reduce the inkomstpension by approximately 1 percent compared to what it would have been without the deduction.

Similarly, the costs of administration and fund management in the premium pension system are deducted from premium pension capital. In this case, however, the deduction continues to be made after the insured begins to draw a pension. The present cost deduction is 0.28 percent of premium pension capital per year. At this level of costs, the deduction for administrative costs will reduce the premium pension by an average of about 9 percent from what it would have been without any cost deduction. In order to reduce the costs of pension savers, capital managers associated with the premium pension system are required to grant a rebate on the ordinary expenses of the funds. The rebates to pension savers in 2017 are equivalent to a reduction in fund management fees of about 0.44 percentage points. Without the rebates, pensions would be approximately 14 percent lower.

How is the Inkomstpension Calculated?

The inkomstpension is calculated by dividing the balance of the inkomstpension account by an annuity divisor (see Appendix A) at the time of retirement. The annuity divisors are specific to each cohort and reflect partly the remaining life expectancy at the age pension is drawn and partly an advance interest of 1.6 percent. Remaining life expectancy is an average for men and women. The advance interest of 1.6 percent makes the annuity divisor lower than average life expectancy and thus initial pension is higher than it would have been without the interest.

An example: a person who retires at age 65 has a remaining life expectancy of about 20 years. The advance interest of 1.6 percent causes the annuity divisor to drop to 16.85. If the person has SEK 2.5 million in their inkomstpension account, the person receives SEK 148,368 per year (2.5 million/16.85) in inkomstpension or SEK 12,364 per month.

The inkomstpension is recalculated annually according to the change in the income index after deducting the advance interest of 1.6 percentage points credited in the annuity divisor, so-called adjustment indexation.¹¹ This means that if the income index increases by exactly 1.6 percent more than inflation, as measured by the Consumer Price Index, pensions will increase at exactly the same rate as inflation. If the income index increases by more than 1.6 percent above the inflation rate, pensions will rise in constant prices, and vice versa. When balancing is activated, the income index is replaced by the balance index when pensions are recalculated.

How Is the Premium Pension Calculated?

The premium pension can be drawn either as traditional insurance with profit annuity or fund insurance. In both forms of insurance, the value of the pension account is divided by an annuity divisor, in the same way as with the inkomstpension. But for the premium pension, unlike the inkomstpension, the annuity divisor is based on forecasts of future life expectancy. The advance rate is currently 1.65 percent in both fund insurance and traditional insurance, after a cost deduction of 0.1 percent.

Drawing premium pension in the form of traditional insurance means that the pension is calculated as a lifetime guaranteed nominal monthly amount and an additional amount varying in size from year to year. In the event of a transition to traditional insurance, the insured's fund shares are sold and the Swedish Pensions Agency assumes responsibility for the management of the assets.

Fund insurance means that the pension savings remain in the premium pension funds chosen by the insured. With fund insurance, the amount of the premium pension is recalculated once each year based on the value of fund shares in December. Each month, a sufficient number of fund shares are sold to finance payment of the calculated premium pension. If the value of the fund shares increases, fewer shares are sold; if it decreases, more shares are sold. Variations in prices of fund shares affect the value of the following year's premium pension.

The premium pension may include a survivor benefit for the period of disbursement. This means that the premium pension will be paid to either of two spouses or cohabitants as long as one of them survives. If the insured elects to include a survivor benefit, the monthly pension will be lower, as the expected pay-out duration of the premium pension will then be longer.

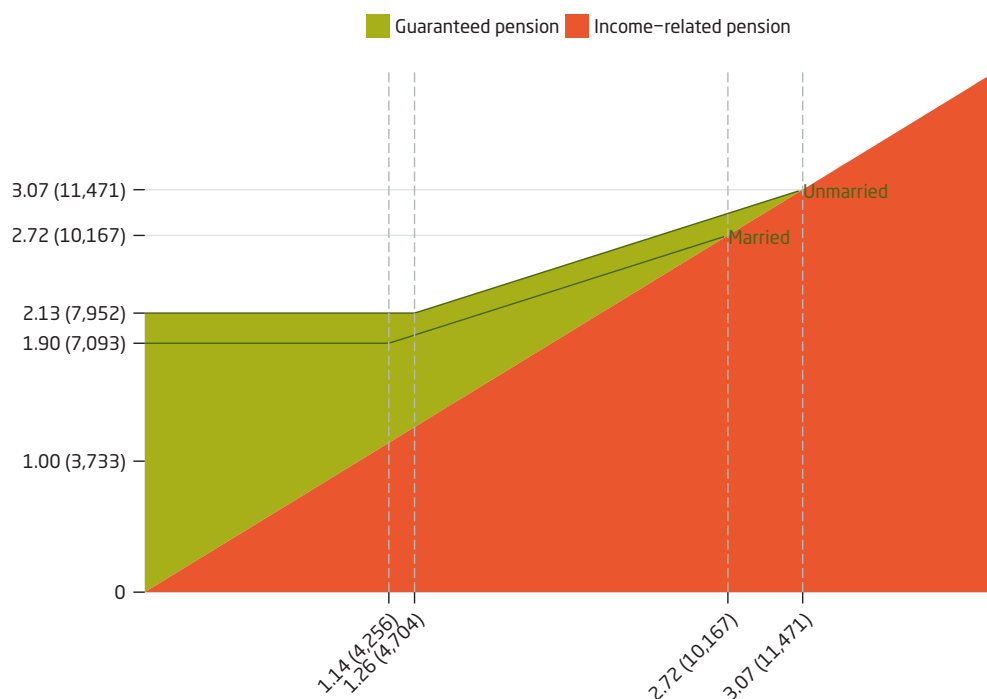
Guaranteed Pension¹²

The guaranteed pension provides basic social security for individuals with little or no income. Residents of Sweden are eligible for a guaranteed pension beginning at age 65. To receive a full guaranteed pension, an individual must in principle have resided in Sweden for 40 years after age 25. Residence in another EU/EEA country can also be credited toward a guaranteed pension.

¹¹The inkomstpension is recalculated as the ratio between the new and the old income index divided by 1.016. In years for which a balance ratio has been set, the income index is replaced by the balance index.

¹²These provisions concern the guaranteed pension for persons born in 1938 or later. For older individuals, other rules apply.

Figure 4.3 Income-related Pension and Guaranteed Pension



Annual pension in price-related base amounts (monthly pension in SEK, 2017)

In 2017 the maximum guaranteed pension for a single pensioner was SEK 7,952 per month (2.13 price-related base amounts¹³) and for a married pensioner SEK 7,093 per month (1.90 price-related base amounts). The guaranteed pension is reduced for persons with an earnings-related pension. The reduction is taken in two steps: for low incomes, the guaranteed pension is decreased by the full amount of the earnings-related pension; for higher incomes, the guaranteed pension is decreased by only 48 percent. This means that a single pensioner with a monthly earnings-related pension of SEK 11,471 or more received no guaranteed pension in 2017. For a married pensioner the corresponding income limit was SEK 10,167.

An example: A pensioner living alone has an earnings-related pension equivalent to 2.26 price-related base amounts. The guaranteed pension is first reduced by the full amount of income up to 1.26 price-related base amounts. The remainder of 0.87 price-related base amount [= 2.13 – 1.26] is reduced by 48 percent of the income above 1.26 price-related base amounts, which in this example gives a guaranteed pension of 0.39 price-related base amount [= 0.87 – 0.48 * (2.26 – 1.26)]. The total inkomstpension and guaranteed pension will then be 2.65 price-related base amounts [0.39+2.26].

When the guaranteed pension is calculated, the premium pension is disregarded. Instead, the inkomstpension is calculated as if it had been earned at 18.5 percent of the pension base, rather than 16 percent. One reason for these provisions is that they simplify administration of the guaranteed pension.

The guaranteed pension is financed by the tax revenue of the central-government budget and is therefore not included in the income statement and balance sheet of the pension system.

¹³In 2017 the price-related base amount was SEK 44,800.

ATP

Persons born before 1938 have not earned either an inkomstpension or a premium pension. Instead they receive the ATP, which is calculated by pre-existing rules. The level of the ATP pension is based on an individual's income for the 15 years of highest income, and 30 years with income are required for a full pension.

For persons born in 1938–1953, there are special transitional provisions. These individuals receive a portion of their earnings-related old-age pension as an ATP and the rest as an inkomstpension and a premium pension. The younger the individual, the smaller the proportion of ATP. Persons born in 1938 receive 80 percent of their ATP; those born in 1939 receive 75 percent of their ATP, etc. There is an additional guarantee that the pension received will not be less than the ATP earned by the individual through 1994 – the year of the decision in principle to adopt the pension reform. Those born in 1954 or later earn their entire pensions under the provisions for the inkomstpension and the premium pension.

For pension withdrawals before the year when the individual turns 65, the ATP is price-indexed. If the balancing is activated the year when the individual reaches age 65, the ATP is recalculated according to special rules. The recalculation is made in the month the person reaches the age of 65 and means that the ATP pension amount is multiplied by the ratio between the fixed balance index and the income index for the current year. From the following year, the ATP is adjustment-indexed in the same manner as the inkomstpension.

Proportion Granted a National Pension at Various Ages * percent

Birth cohort	61	62	63	64	65	66	67	68	69	70	71-	Total	Avg age
1938	3.6	2.3	2.3	2.1	77.3	4.1	3.2	0.8	0.3	0.3	0.6	97.0	64.9
1939	3.9	1.9	2.1	2.3	75.6	6.5	2.3	0.8	0.3	0.3	0.7	96.8	64.9
1940	3	2.1	2.5	3.1	75.8	5	2.6	0.8	0.4	0.5	0.6	96.5	64.9
1941	2.9	2.2	3	3.7	73.1	6.3	2.8	0.8	0.5	0.4	0.7	96.4	65.0
1942	3.4	2.9	3.4	3.9	70.8	6.2	3.4	1.2	0.5	0.4	0.7	96.6	64.9
1943	3.9	3.1	3.6	5.3	66.3	7.1	4.4	1.2	0.4	0.5	0.7	96.5	64.9
1944	4.7	3.4	4.7	5.9	63.1	7.9	4	1.1	0.5	0.5	0.7	96.5	64.8
1945	5.1	4.2	5.3	6.1	61.5	7.2	4	1.3	0.5	0.5	0.8	96.4	64.8
1946	6	4.8	5.4	6.7	59.2	6.7	4.2	1.2	0.5	0.6	0.8	96.1	64.7
1947	6.3	4.6	6	7.4	56.7	7	4.7	1.3	0.6	0.5	1.0	96.1	64.7
1948	6	4.9	6.7	7.8	54.7	7.3	5	1.5	0.5	0.6	1.1	96.1	64.7
1949	5.8	5.4	6.9	8.6	52.3	7.9	5.4	1.4	0.6	0.6	1.1	96.1	64.7
1950	5.8	5.5	7.7	9.1	50	8.6	5.4	1.6	0.6	0.6	1.1	96.1	64.7
1951	6.5	6.3	8.1	9.4	47.8	8.3							
1952	6.9	6.8	8.5	10.5	44.7								
1953	7.8	6.6	9.5	10.5									
1954	7.5	7.1	9.6										
1955	7.6	6.6											
1956	7												

* The proportions are for new retirees in relation to the potential number of retirees as of December 2017. Ages are as of December 31 of the year when the pensioner began drawing an inkomstpension/guaranteed pension.

The National Pension System in 2017 – in Illustrations and Figures

This section describes the pension system in figures. Figures 4.4–4.8, have been calculated on the basis of all 5,734,000 individual's pension accounts. Pension credit was added to pension accounts in 2017. The pension credit relates to income earned in 2016.

Incomes, Pension Credit and Pension Disbursed

In Figure 4.4 it can be seen that the average income rises until about age 45, or more correctly, up to the birth cohort that reached age 45 in 2017. For subsequent ages or birth cohorts the average income is more or less the same as for 45-year-olds until around age 60, after which it falls sharply. One reason for the drop is the increase in the proportion of persons with sickness compensation (disability pensioners) with lower average incomes. Another reason for the drop in average income is that certain individuals have reduced their work hours, or have fully retired during the year.

The importance of the ceiling on the earning of pension credit is shown in the figure – the average pension-qualifying income (pensionsgrundande inkomst, PGI) would follow the line for *incomes with no ceiling* if there had not been a ceiling.

The share of the earnings margin, 17.21 percent, used for the contribution to inkomstpension and premium pension respectively is shown in the bars of the graph.

The figure provides general information on the level of compensation for the 2,203,000 people who in December 2017 had received benefits from the national pension system. It also shows that current pensioners for the most part have had their pensions calculated according to the rules for ATP. At the same time, the importance of the guaranteed pension is also evident - especially for older age cohorts. The figure shows that inkomstpension is beginning to replace ATP pension for cohorts born in 1938 and later. The growing importance of the premium pension is not shown as clearly – but that development is also part of the picture.

The width of the bars reflects the number of people in the annual cohort, with cohort 1990 as the norm.

Figure 4.4 Average income, pension credit earned and pension disbursed

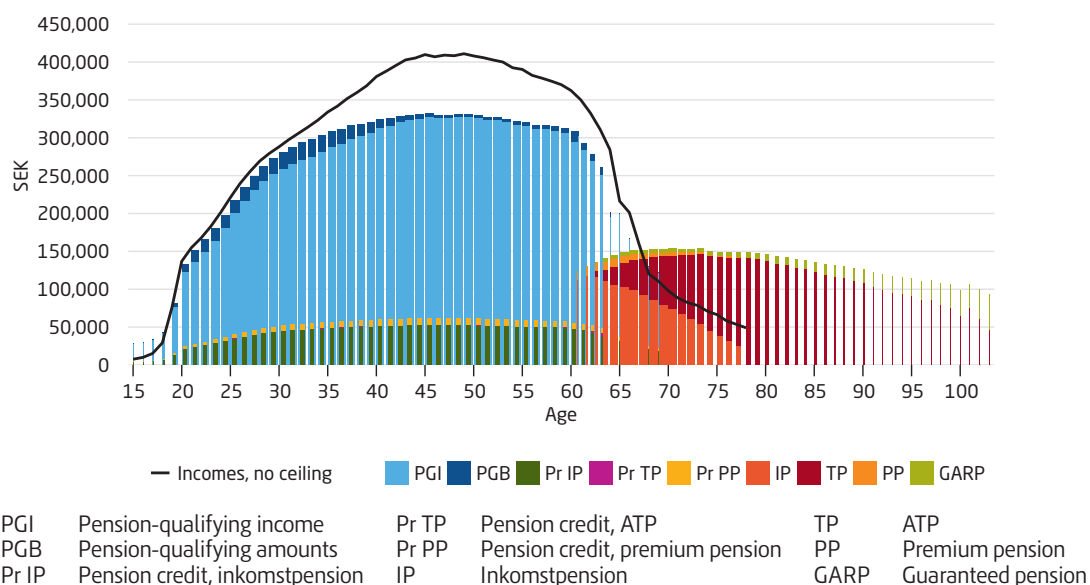


Figure 4.5 Average income, pension credit earned and pension disbursed, women

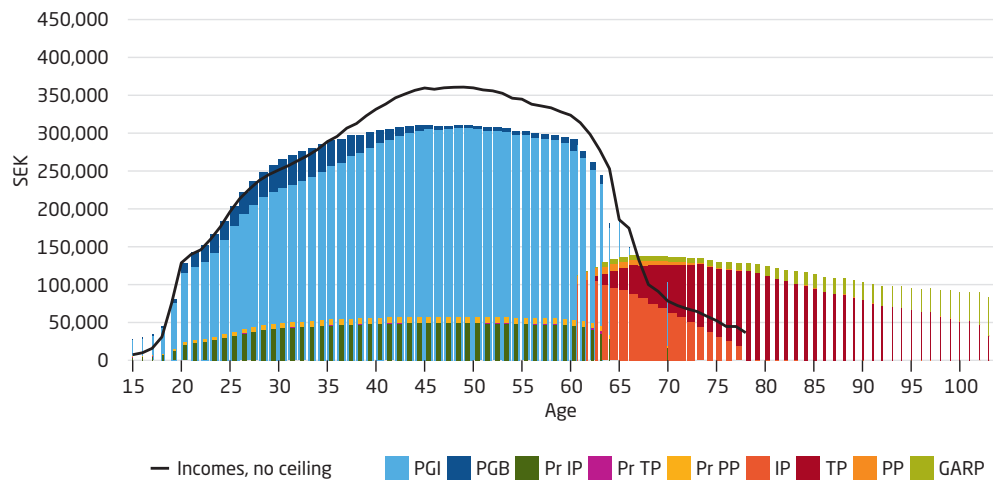
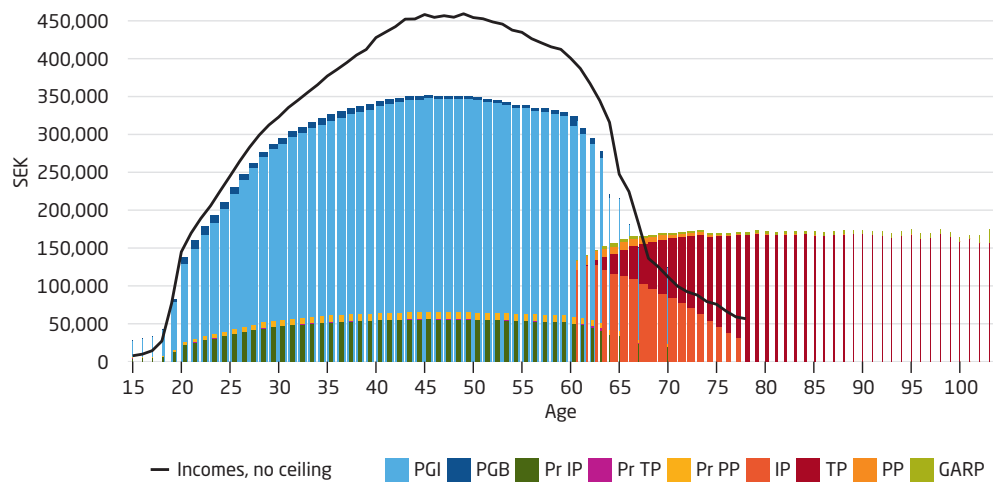


Figure 4.6 Average income, pension credit earned and pension disbursed, men

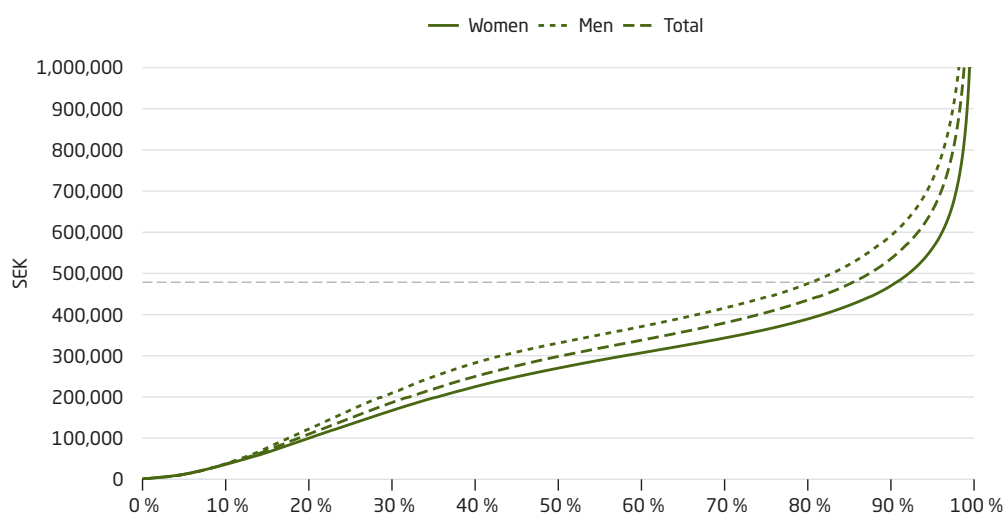


Figures 4.5 and 4.6 show that women on average have lower incomes than men. We also see that the ceiling on pension-qualifying income has a greater negative influence for men than for women, since a larger share of men's incomes are above the ceiling. That women receive more of the pension-qualifying amounts than do men is shown by the greater share of dark blue in their pension-qualifying incomes – more details about pension-qualifying amounts can be found in Figure 4.9. Moreover, women on average have lower pensions and considerably more guaranteed pension than men.

Earned Income

Figures 4.7 and 4.8 below show earned income divided between women and men. Incomes up to 8.07 income-related base amounts (SEK 478,600 for income year 2016) form the base for the national pension. The diagram below shows incomes for the income year 2016 divided up in rising order (in total 5,597,000 persons, of which 2,742,000 women and 2,855,000 men). Of these, 4,722,000 people had incomes below the contribution ceiling (2,467,000 women and 2,255,000 men).

Figure 4.7 Earned Income for Women and Men, Income Year 2016



Refers to tax-assessed earned income (wages and salaries, income from active and passive business operations, sickness cash benefits, parental allowances, sickness and activity compensation, unemployment compensation etc.). The income is before deduction of the individual pension contribution and is shown for persons with incomes above the minimum for the obligation to file a tax declaration, 42.3 percent of the price-related base amount. The horizontal line at SEK 478,600 designates the ceiling on contributions.

Roughly 600,000 men, or 21 percent of men, had an income above the ceiling on pension-qualifying income. The corresponding proportion for women was 10 percent or approximately 274,000 women. The table below shows the average tax-assessed earnings and pension-qualifying income for women and men. The table reveals that women's incomes are lower than men's – 79 percent of taxable income and 86 percent of pension-qualifying income.

Average Earned Income and Pension-Qualifying Income, Income Year 2016

SEK

	Tax-assessed earned income	Pension-qualifying income
Women	270,000	252,700
Men	340,800	294,500
Total	306,100	274,100

Pension Credit for the Inkomstpension and the Premium Pension

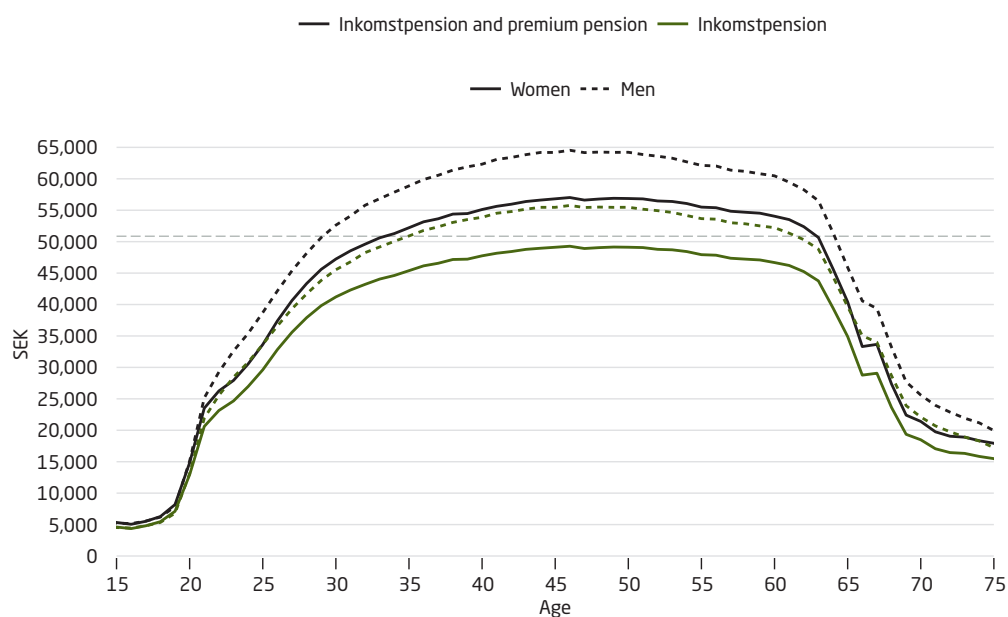
The average pension credit for inkomstpension and premium pension in 2017 amounted to 50,900 – lower for women (SEK 47,900) and higher for men (SEK 53,700). See table below.¹⁴

Average Pension Credit Earned, 2016

kronor

	Inkomstpension	Premiepension	Summa
Kvinnor	41,500	6,500	47,900
Män	46,500	7,400	53,700
Totalt	44,000	7,000	50,900

Figure 4.8 Average Pension Credit Earned, Women and Men, 2016



The horizontal line at SEK 50,900 shows the average for all individuals.

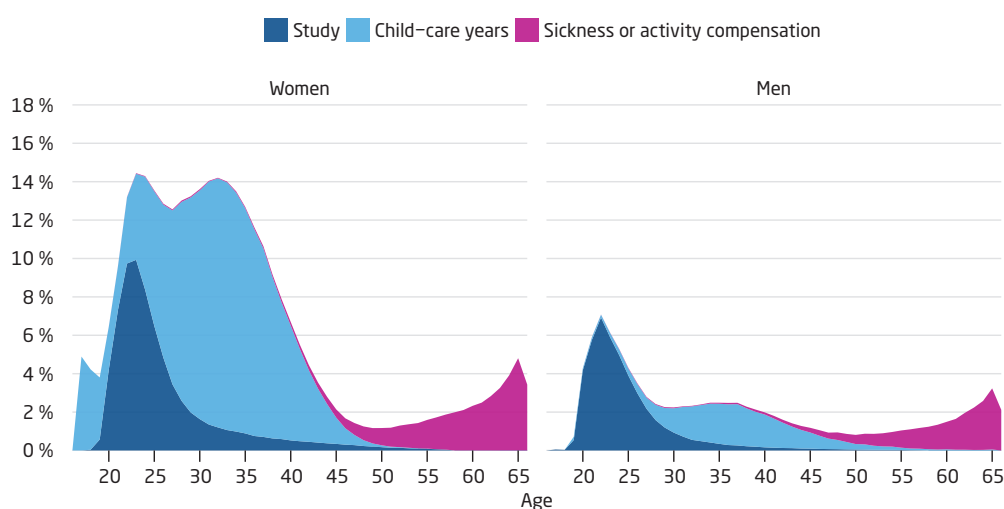
From the table and the figure above it can be seen that the average amount for women is approximately 93 percent of men's. The average earned pension credit for inkomstpension and premium pension is decreasing slightly from age 64 to 65 (age at year-end). That it doesn't decrease more is because at age 65 and later, the total income base is included in the inkomstpension and premium pension system. Before age 65, these cohorts have a certain proportion of their income-qualifying old age pension in the form of ATP pension and the remaining proportion in the form of inkomstpension and premium pension (twentieth-part phasing-in).

¹⁴The averages are calculated on the basis of those who have received pension credit. In previous years they were calculated on the basis of those who had an account balance. This means values for previous years are lower than they would have been if they had been calculated using the present definition.

Pension-Qualifying Amounts

Credit is granted for pension-qualifying amounts in particular phases of individuals' lives, such as years with small children or of studies. In 2017 pension-qualifying amounts constituted 6 percent of the allocated pension base for women and approximately 2 percent for men. The largest portion for women, 4 percent, consisted of amounts for years with small children. For men childcare years also made up the largest portion, nearly 1 percent of the total pension base. Viewed over a life cycle, pension-qualifying amounts are received by younger people for study and years with children, and later in life amounts are received for sickness compensation.

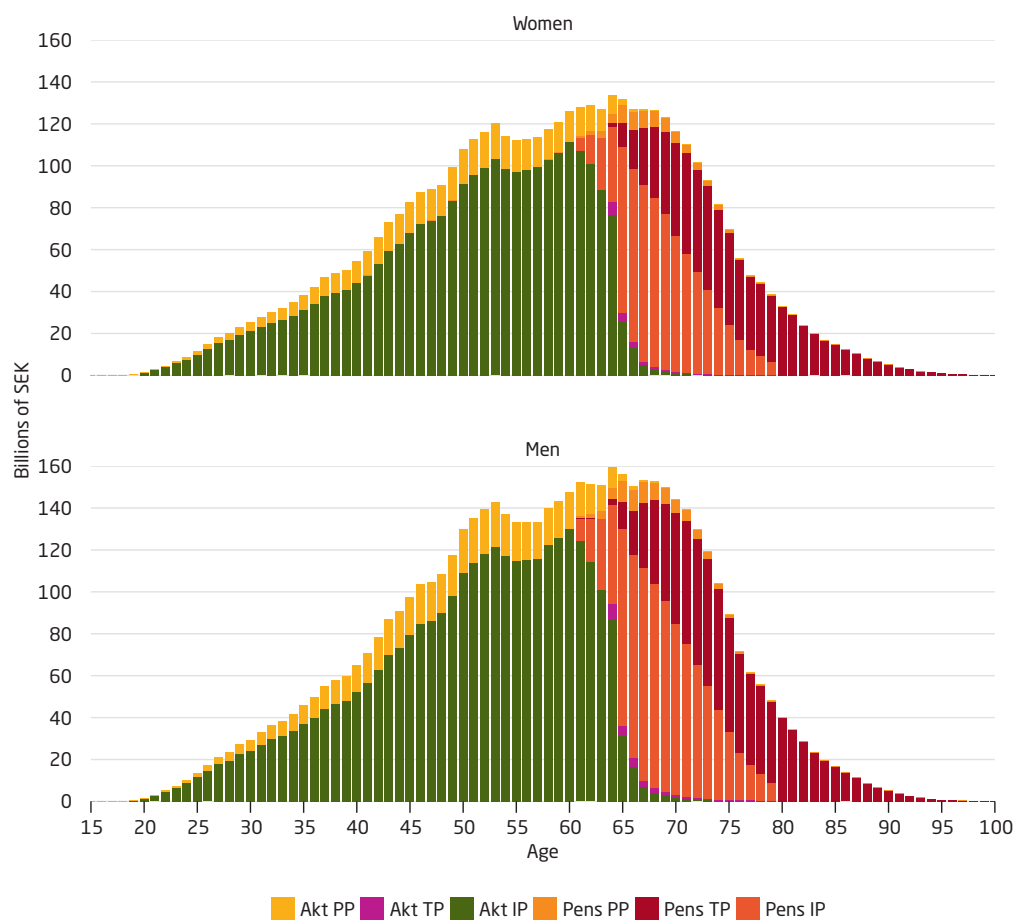
Figure 4.9 Pension-Qualifying Amounts, Income Year 2016
percent of pension base



Pension Liability

The pension liability – the pension capital of the insured – in the inkomstpension and the premium pension system was SEK 10,251 billion as of December 31, 2017. This liability, divided between women and men and for every age from 15 to 100, is shown in Figure 4.10. Women have lower earned pension capital compared with men. It is also evident that ATP pension is the principal pension asset for current pensioners, but the ATP will soon disappear completely for the economically active birth cohorts. 2017 was the last year that ATP pension could be earned - and only up to a limited amount. For the economically active, the inkomstpension will be the predominant pension, while at the same time the growing importance of the premium pension can be detected. If it is assumed that the individual's first earnings come at around age 20, all who were 42 years old or younger in 2017 have earned inkomstpension and premium pension credit for their entire economically active lives since the allocations began in 1995. Those who are older than this have instead earned more credit for their inkomstpension.

Figure 4.10 Pension liability, women and men, at year-end 2017



Akt PP	Premium pension, economically active	Pens PP	Premium pension, retirees
Akt TP	ATP, economically active	Pens TP	ATP, retirees
Akt IP	Inkomstpension, economically active	Pens IP	Inkomstpension, retirees

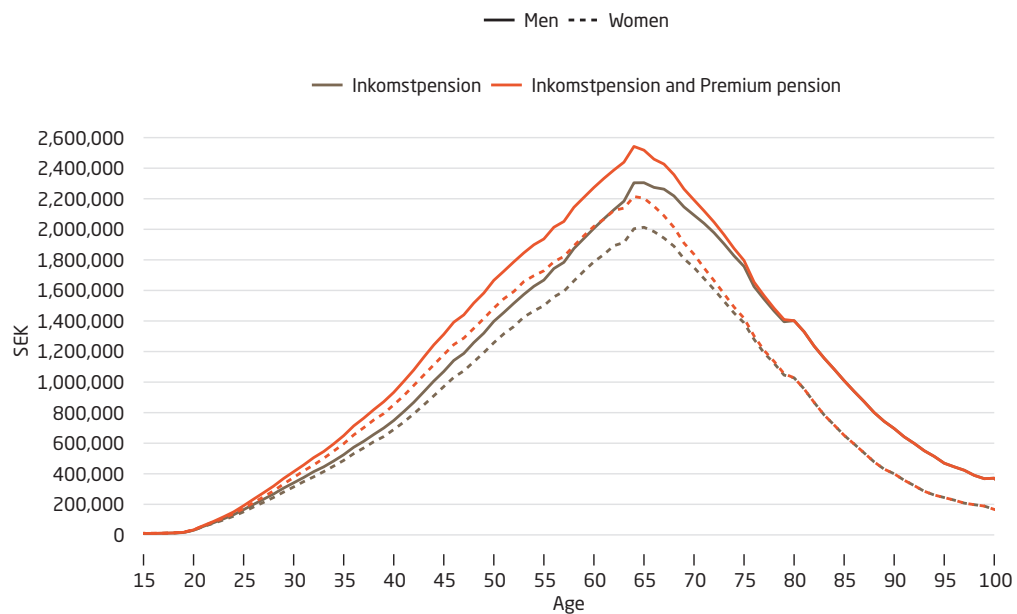
Average pension liability (the sum of all years of earned pension credit for inkomstpension and premium pension) amounted to just over SEK 1.2 million at the end of 2017. See the table below.

Average Pension Liability, 2017

SEK

	Inkomstpension	Premium pension	Total
Women	1,016,700	142,800	1,142,100
Men	1,183,100	168,800	1,333,200
Total	1,101,000	156,100	1,239,000

Figure 4.11 Average Pension Liability, 2017

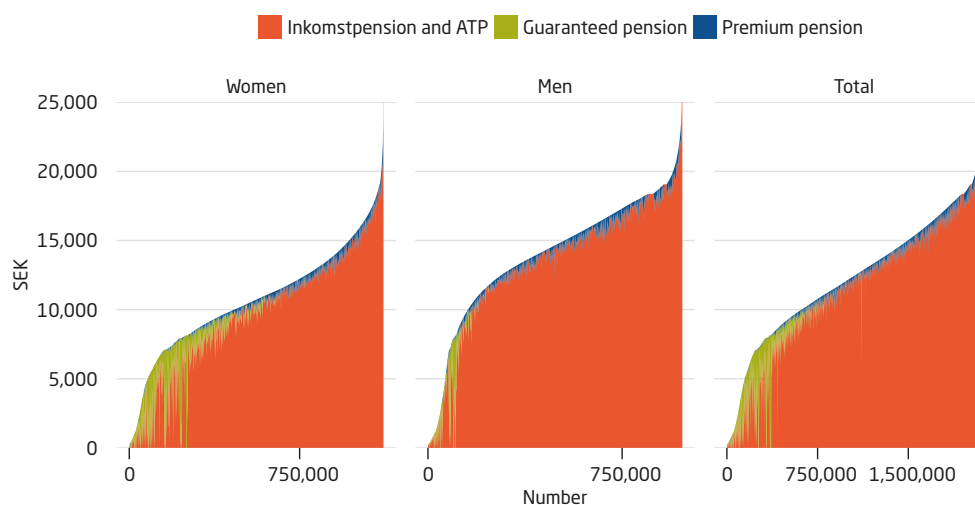


The figure above shows that average liability increases with increasing age up to and including the age of 65. After that, liability decreases, since many have entered retirement.

Pension Disbursements

In the figures below the disbursements of the national pension in December 2017 for men and women born in 1952 or earlier are shown in rising order of size (1,119,000 women and 983,000 men). For total pensions disbursed during 2017, see Note 2 in the chapter Notes and Comments.

Figure 4.12 Pension Disbursements, Women and Men, December 2017



The difference in level and composition of different parts of pensions for men and women is the most striking feature of the figure. The average pension for women – income-based pension and guaranteed pension – was SEK 10,700. The corresponding amount for men was SEK 13,900. Of women’s national pensions, 93 percent consisted of income-based pensions and 7 percent of guaranteed pensions. However, a full 47 percent of women had some portion of guaranteed pension. That the proportion with guaranteed pension increases sharply with age is not shown by the diagram. Of the national pension for men, 98 percent consisted of income-based pension and 2 percent of a guaranteed pension. A total of 14 percent of men had some proportion of guaranteed pension. Neither the widow’s pension nor the housing supplement, each of which is paid primarily to women, is included in the figure.

The pattern that emerges from the figure – with swathes of people receiving only guaranteed pension – is clearest in the case of one group, consisting mostly of women, that receives maximum guaranteed pension, that is, forty fortieths of guaranteed pension. This explains the concentration of green at the maximum guaranteed pension for “married persons” (SEK 7,093 per month in 2017) and for “unmarried persons” (SEK 7,952 per month). Those with a lower guaranteed pension, but also without any income-based pension, have fewer years of residence in Sweden. Only persons born in 1938 or later can receive premium pension – based on their own income, but only on that part earned since 1995. Thus the impact of premium pension is still so limited that it is difficult to detect in the figure. However, the importance of premium pension is growing with each new annual cohort that draws a pension. The few individuals with a national pension exceeding SEK 20,000 per month have reached that pension level in part by postponing pension withdrawal. The maximum public pension paid in 2017 was SEK 43,200 per month. It is a person born later than 1938 who has continued to work after the age of 65 and who has postponed withdrawing a pension.

5 Costs of Administration and Capital Management

The amount of costs is an important factor for future pensions. Of the factors affecting pension capital, the size of costs is the one which the responsible authorities have the greatest opportunity to influence. In the case of premium pension, however, costs also depend on the saver's own choice of fund.

This section brings together gross¹ and net reported costs² and also such transaction costs as are impossible for the National Pension Funds and the Swedish Pensions Agency to wholly quantify. The aim is to provide as complete a picture as possible of the total costs of the old-age pension system. It is important to keep in mind that net management costs and transaction costs have already had a negative affect on the performance of the funds.

Accounting for Total Costs

The total cost of insurance administration and capital management for the pension system, in addition to other charges, amounted to SEK 6.9 billion, of which SEK 2.5 billion is reported in the income statement of the pension system. The SEK 2.5 billion is the sum of insurance administration (SEK 1,531 million) and the operating expenses of the National Pension Funds (SEK 953 million). See the table Total Costs and Charges of the Old-Age Pension System.

Inkomstpension costs

For inkomstpension the costs reported in the income statement amounted in 2017 to SEK 1,819 million, of which SEK 866 million was for insurance administration and SEK 953 million was for National Pension Funds' operating expenses. In addition to the SEK 953 million in operating expenses, the National Pension Funds had fixed management fees of SEK 801 million. The sum of reported asset management costs as shown in the National Pension Funds' income statements thus amounted to SEK 1,754 million. Performance-based fees and transaction costs such as brokerage commissions are not reported as direct costs by the National Pension Funds but instead have a negative effect on returns. Performance-based fees are not an ordinary administrative cost, but a way for the National Pension Funds to share risk and reward with their external managers. In total the National Pension Funds paid SEK 442 million in performance fees and SEK 233 million in brokerage commissions and other transaction costs. When these costs and fees are included, the sum total of costs for inkomstpension is SEK 3,295 million.

Premium pension costs

In the income statement of the Swedish Pensions Agency for the premium pension system are reported administrative costs of SEK 485 million. In addition to administrative costs mortgage payments are

¹The pension system's income statements for inkomstpension and premium pension show the costs that the Swedish Pensions Agency and the National Pension Funds report as expenses in their own income statements as "gross reported costs."

²The asset management costs of the National Pension Funds and the premium pension system which are 'net reported' against revenue and net fund return are not visible in the income statement of the pension system. The concept of net reported costs refers here to such costs as those which in the National Pension Funds' income statement consist of fixed management fees and which in the premium pension income statement are used as the net for items named management fees and discounts on management fees.

made on the implementation costs of the premium pension system. In 2017 this expense amounted to SEK 181 million and is charged to premium pension savers and pensioners through the Agency's deduction for costs. The total cost of premium pension insurance administration amounted to SEK 666 million. See Total Insurance Administration in the table below.

Within the premium pension system the item Management Fees refers to both fixed and performance-based fees that the premium pension funds (including the 7th National Pension Fund) charge after rebates have been returned to premium pension savers. The gross calculated premium pension funds' management fee amounts to SEK 7,370 million. Of this gross fee it is estimated that repayment from the funds provides SEK 4,904 million in the form of rebate. The net fee can then be totaled as SEK 2,466 million³. As of January 1, 2015, a new discount model came into force limiting maximum fee charges to a percentage of the funds. For equity funds the fee is limited to maximum 0.89 percent after returned rebate, for bond funds it is limited to 0.42 percent, and for mixed and generation funds it is limited to 0.62 percent. In addition to the SEK 2,466 million in fixed management fees an estimate of premium pension funds' transaction costs is also shown. Transaction costs consist primarily of commissions paid by the funds as a part of buying/selling liquidity when the funds trade in securities and these are estimated in 2017 at SEK 519 million.

Costs and Charges of the Old-Age Pension System, 2017

millions of SEK

	Inkomstpension	Premium pension	Total
Insurance administration			
Pension administration ¹	434	417	851
Payments to other agencies	432	68	500
Amortization and interest implementation loan		181	181
Total Insurance administration	866	666	1,531
Capital management costs and charges			
Operating expenses of the National Pension Funds (reported gross)	953		953
Management fees	1,243	2,466	3,709
Fixed management fees (reported net)	801		801
Performance-based fees ²	442		442
Transaction costs ³	233	519	752
Total Capital management costs and charges	2,429	2,985	5,414
Total	3,295	3,651	6,945

1 The amount for the inkomstpension refers to actual cost, whereas the amount in Note 4 refers to the compensation paid by the National Pension Funds for costs of administration.

2 This item represents fees that the National Pension Funds pay only if a particular manager achieves a certain agreed result.

3 Transaction costs refer to brokerage and clearing fees charged on the stock and derivatives market. These charges are included directly in the transaction and have a negative effect on the return earned by the funds. Interest and foreign-currency transactions are paid for through the difference between buying and selling prices and thus cannot be reported as a separate charge. The calculation of premium pension transaction costs is now based on a selection of the funds in the system. The sample represents 70 percent of total fund assets.

³These costs are preliminary and are based on an upward adjustment of costs for the quarters 1–3. The amount does not include management fees relating to traditional insurance of SEK 10.2 million. This cost is net reported through a reduction in return on funded capital (see note 17)

Development of Costs 2013–2017

Below, cost items are shown for the past five years. Costs are reported in millions of SEK and in SEK per number of insured, that is, the number of persons with a pension account, including pensioners.

Costs of the Inkomstpension

millions of SEK

	2013	2014	2015	2016	2017
Insurance administration					
Pension administration ¹	449	463	462	455	434
Payments to other agencies	380	408	406	406	432
Total Insurance administration	829	871	868	861	866
Capital management costs and charges					
Operating expenses of the National Pension Funds (reported gross)	820	865	913	890	953
Management fees	994	1,117	1,273	1,219	1,243
Fixed management fees (reported net)	679	828	927	847	801
Performance-based fees	315	289	346	372	442
Transaction costs ²	209	256	322	289	233
Total Capital management costs and charges	2,023	2,238	2,508	2,398	2,429
Total	2,852	3,109	3,376	3,259	3,295

1 The amount for the inkomstpension refers to actual cost, whereas the amount in Note 4 refers to the compensation paid by the National Pension Funds for costs of administration.

2 See the explanation in the table Total Costs and Charges of the Old-Age Pension System

Costs of the Premium Pension

millions of SEK

	2013	2014	2015	2016	2017
Insurance administration					
Pension administration	291	323	342	379	417
Payments to other agencies	59	64	63	63	68
Amortization and interest implementation loan	138	172	181	169	181
Total Insurance administration	488	559	586	611	666
Capital management costs and charges					
Management fees (net reported)	1,646	1,868	2,029	2,033	2,466
Transaction costs	262	329	415	428	519
Total Capital management costs and charges	1,908	2,197	2,444	2,461	2,985
Total	2,396	2,756	3,030	3,072	3,651

Figure 5.1 Insurance Administration, Inkomstpension

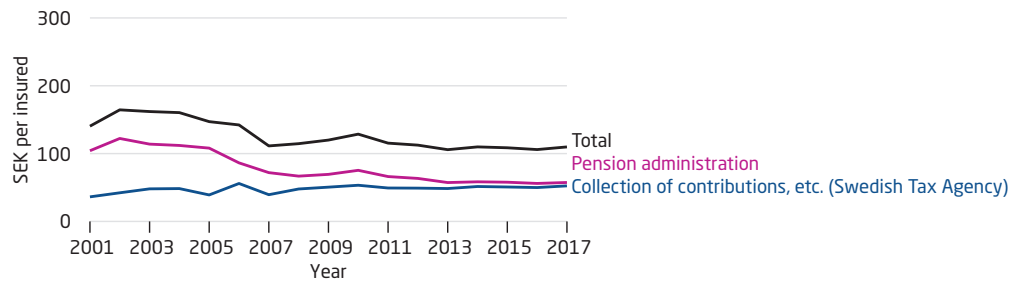


Figure 5.2 Insurance Administration, Premium Pension

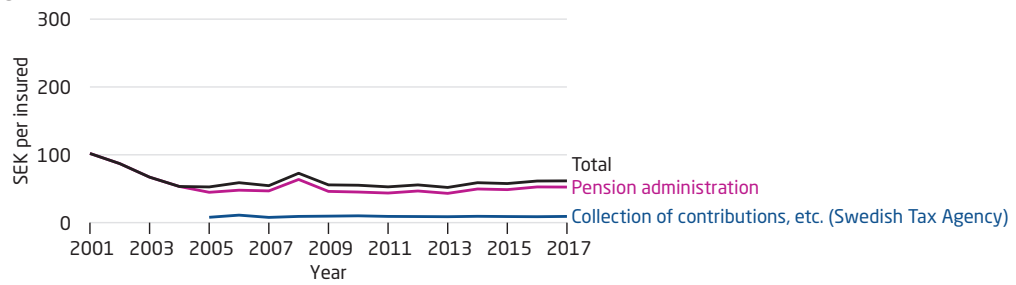


Figure 5.3 Capital management costs and charges, Inkomstpension

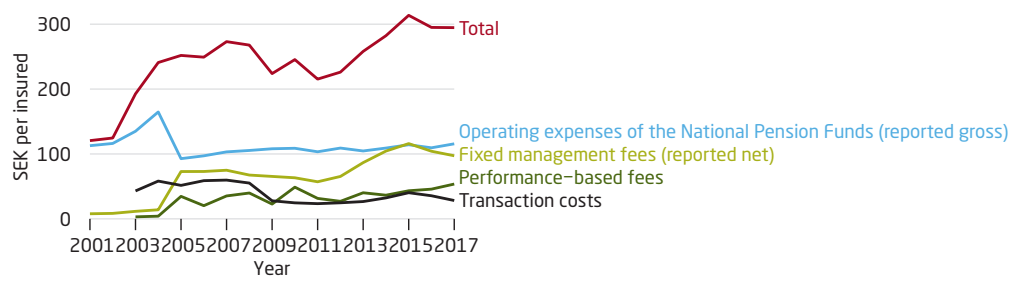
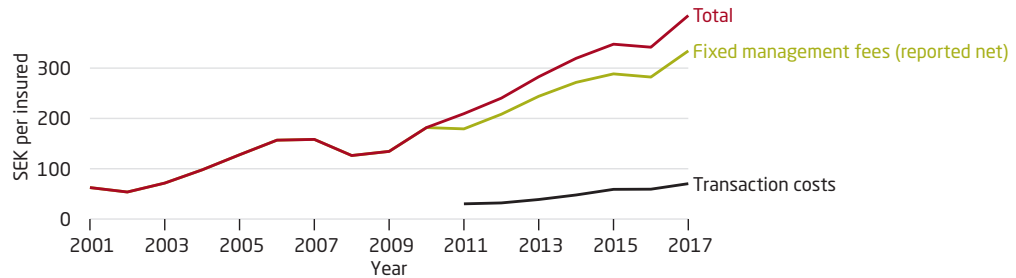


Figure 5.4 Capital management costs and charges, Premium Pension



The tables above show that costs for inkomstpension have increased over the past year. The increase in SEK is primarily due to the fact that capital management costs have increased, operating expenses have also increased but to a lesser extent. Capital management costs relate to the First – Fourth AP Funds and the Sixth AP Fund. The table on the next page, however, shows a certain reduction in the percentage of reported capital management costs.

Premium pension capital management costs and fees increased in total from 2016 to 2017, but also increased in cost per insured. The development of capital management costs and fees results from the fact that average managed capital has increased and that capital management costs are charged as a percentage of capital managed. On the other hand, as a percentage of the capital, premium pension costs have decreased over the last five years. The discount model used in the premium pension system is progressive, meaning that greater managed capital automatically gives a higher percentage discount and thus lower fees percentually. The annual cost is estimated on the basis of costs during quarters 1–3.

There are a number of cost items within insurance administration that are common to inkomstpension and premium pension. Examples are the production and distribution of the Orange Envelope, and the Swedish National Tax Board's reimbursement for tax collection, etc. Such costs are spread between the various branches of insurance in proportion to the number of insureds, volume of fees or other distribution key.

Capital Management Costs in Relation to Pension Capital Managed

In 2017 the total capital management costs for the First–Fourth National Pension Funds and for the much smaller Sixth National Pension Fund was 0.13 percent of the capital managed. The performance-based fees of the National Pension Funds were 0.03 percent, and transaction costs were 0.02 percent; thus, total capital management costs and charges amounted to 0.18 percent of the capital managed.

The capital management costs of the premium pension refer to the fees that the premium pension funds, including the Seventh National Pension Fund, have deducted after rebates, as well as the capital management costs of the premium pension system for traditional life insurance with profit annuity.

In SEK, costs are determined by each fund's percentual fee and the, by the saver, chosen distribution between the premium pension funds. The premium pension uses a discount model, obliging funds to repay retroactively a large part of the charged fees to the Swedish Pensions Agency, for redistribution to savers and pensioners. The capital management costs reported for funds within the premium pension system amounted after rebates to 0,22 percent, while the funds' transaction costs are estimated at 0.05 percent. The total of capital management costs and charges was thus 0.27 percent of the capital managed.

The percentual cost differences between the inkomstpension's funded assets and premium pension funds are explained partly by economies of scale within AP funds 1–4, partly because these funds invest approximately 35 percent of their capital in bonds or similar assets with low management costs compared to shares. In the premium pension system, approximately 10 percent of total assets are invested in holdings of this type.

Average capital managed billions of SEK

	2013	2014	2015	2016	2017
Inkomstpension	1,008	1,121	1,207	1,276	1,367
Premium pension	527	662	829	854	1,030

Capital Management Costs in Relation to Capital Managed percent

	2013	2014	2015	2016	2017
Inkomstpension					
Reported capital management costs	0.15	0.15	0.15	0.14	0.13
Operating expenses of the National Pension Funds (reported gross)	0.08	0.08	0.08	0.07	0.07
Fixed management fees (reported net)	0.07	0.07	0.08	0.07	0.06
Performance-based fees	0.03	0.03	0.03	0.03	0.03
Transaction costs	0.02	0.02	0.03	0.02	0.02
Total Inkomstpension	0.20	0.20	0.21	0.19	0.18
Premium pension					
Reported capital management costs	0.31	0.28	0.25	0.23	0.22
Fixed management fees (reported net)	0.31	0.28	0.25	0.23	0.22
Transaction costs	0.05	0.05	0.05	0.05	0.05
Total Premium pension	0.36	0.33	0.30	0.28	0.27

Insurance Administration Costs in Relation to Pension Balance/Capital

To cover the AP funds' reported expenses for inkomstpension, a cost deduction is made from the pension funds each year. For the year 2017, cost deduction for inkomstpension from pension balances was 0.03 percent. The deduction for costs is made only up to the time pension disbursement begins. Neither the fixed net reported management fees of 0.06 percent of assets managed nor the performance-based fees of 0.03 percent of assets managed nor the trading costs of 0.02 percent of assets managed are charged to pension savers through cost reductions. The net reported costs are charged to the buffer capital in the National Pension funds. The cost deducted from inkomstpension balances shall correspond to the cost declared in the inkomstpension income statement. This amount, divided by the pension liability – the insured persons' balances in their inkomstpension accounts – that has not started to be paid out ought to be the cost deduction expressed as a percentage. One reason this is not the case relates to the phasing in of the system; up to 2021 the deduction for costs increases incrementally, see note 11. Another reason is that it is budgeted expenses which are deducted from the accounts. The (small) discrepancies between costs deducted and actual costs thus seen are followed up and corrected in the next year's cost deduction.

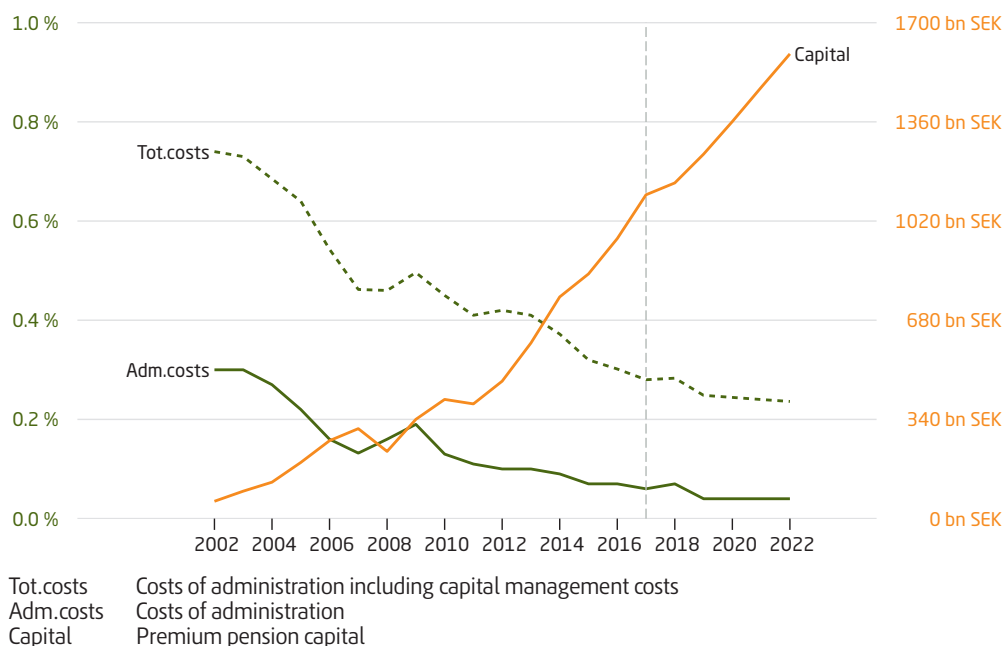
In 2017 the deduction for administrative costs for premium pension insurance was on average 0.06 percent of the premium pension capital. The maximum cost charged in 2017 was SEK 125 per account holder. The premium pension has, just like inkomstpension, small periodic discrepancies between fee charged and the actual cost. These deviations too are corrected continuously.

Insurance administration costs percent

	2013	2014	2015	2016	2017
Inkomstpension ¹	0.0307	0.0326	0.0284	0.0302	0.0305
Premium pension	0.10	0.09	0.07	0.07	0.06

1 This also includes the National Pension Funds

Figure 5.5 Premium pension costs and capital



What Difference Do Costs Make in the Size of a Pension?

Costs are an important factor in determining the size of a future pension. A seemingly low annual fee can reduce pensions considerably since it is paid over a long period. Of the factors affecting pension capital, the size of costs is the one which the responsible authorities have the greatest opportunity to influence. Also the insured are able to influence certain costs for the premium pension.

The following simplified calculation provides a fairly accurate portrayal of how a certain cost percentage affects the size of the pension disbursed. The average time for which a paid-in contribution remains in the inkomstpension system before being disbursed is roughly 21 years. If the cost of the inkomstpension is 0.03 percent, the charge for administrative costs will reduce the inkomstpension to $(1-0,0003)^{21} \approx 99$ percent of what it would have been without the charge, or by roughly 1 percent. If the costs of the premium pension is 0.3 percent, the charge for costs will reduce the premium pension appreciably to $(1-0.003)^{33} \approx 91$ percent of what it would have been without the charge, or by 9 percent. The reason why the charge for costs is deducted for 33 years is that in the premium pension system the deduction continues during the period of pension disbursement and that the expected return is somewhat higher, resulting in a longer turnover duration. A fairly normal management fee in Sweden for saving outside the national pension system is around 1 percent – not infrequently, it is even higher. If the charge for costs for the same period as in the example above is 1 percent, pension capital savings will be 72 percent of what they would have been with a fee of 0 percent; in other words, 28 percent is lost in charges for costs.

6 Changes in the Value of the Pension System

Sweden's national pension is based primarily on earnings. In each of their economically active years, gainfully employed individuals contribute a certain portion of their income toward a pension. The bulk of their contribution goes to the inkomstpension system, a lesser share to the premium pension system. Pension credit is accumulated over a long period, 40–45 years, sometimes even more. The size of future pensions will thus depend on the change in the value of contributions paid into the system. For example, someone who deposits a constant amount each year for 40 years, at an annual interest rate of 2 percent, will end up with a final balance that is 54 percent higher than that of a saver with no return.

In the inkomstpension system the change in value is normally determined by the percentage increase in the income index. This index follows the average rate of growth in the earnings of the economically active. In the premium pension system, on the other hand, the change in value is determined by the return on the funds of pension savers. For pensioners choosing traditional insurance with profit annuity, the development of value is determined by that of the assets in which the Swedish Pensions Agency has invested. The discussion below applies hereafter to the development within fund insurance. Another difference is that the change in the value of the inkomstpension is the same for everyone, whereas the return of the premium pension may vary from one individual to another, depending on the type of funds chosen.

Changes In Value During 2017

The pension balance in the inkomstpension system is normally written up in step with the income index, but during a balancing period, the balance index is used. Changes in value are only made at year-end for the income and balance indexes, unlike the premium pension system, where changes are made on a daily basis. The balancing period that began in 2010 ended in 2018 and the indexation between 2017 and 2018 was 2.6 percent (see under 2017 in the table below). It was thus by this percentage that earned inkomstpension credit of employed persons was changed at the end of the year.

For pensioners the inkomstpension and the ATP are recalculated each year by the change in the income-/balance index, reduced by 1.6 percent. The reduction is due to the fact that an advance interest rate of 1.6 percent has already been credited to the inkomstpension in the annuity divisor.¹

During a balancing period, inkomstpension is affected by developments in capital markets, as the AP funds are included in the calculation of the balance ratio. They account for just over 15 percent of reported assets, so their impact is not so extensive. The decrease in the market value of investments in the record drop of 2008 was one of the main reasons why balancing was activated in 2010. The positive return has subsequently contributed to higher indexation of inkomstpension and to the ending of balancing in 2018.

Change in value of the premium pension system is wholly determined by developments in capital markets. Both global stock markets (measured in SEK) and the Swedish stock market developed positively in 2017 as in the previous year. The change in value of premium pension funds in 2017 was 12.6 percent, which may be compared with last year's return, 10.9 percent.

¹For a more detailed description of the income index and the balance index, see chapter 4 How the National Pension System Works.

Annual Indexation of Inkomstpension Accounts and Return on Premium Pensions

percent

	2002	2003	2004	2005	2006	2007	2008	2009
Income-/balance index	5.3	3.4	2.4	2.7	3.2	4.5	6.2	-1.4
Premium pension index ¹	-31.2	17.8	8.8	30.6	12.1	5.7	-34.2	34.7
	2010	2011	2012	2013	2014	2015	2016	2017
	-2.7	5.2	5.8	-1.1	2.5	5.9	4.4	2.6
	12.2	-10.7	12.1	21.1	20.7	6.4	10.9	12.6

1 The premium pension index measures how much an amount paid into the system at a certain point in time has changed over a certain period (so-called time-weighted return). In this case the period is the same as a calendar year. The return for individual pension savers will normally have varied depending on the funds that they have chosen.

Measures of Change in Value in the Premium Pension System

The change of value in the premium pension system can be measured in several ways. The measures presented in this chapter are so-called time-weighted return and capital-weighted return. Another term for capital-weighted return is internal rate of return.

Time-weighted return is used to describe the change in value of a fund or an index. The time-weighted return shows the return on one krona deposited at the outset of the period. No consideration is given to whether deposits or withdrawals have been made during the period.

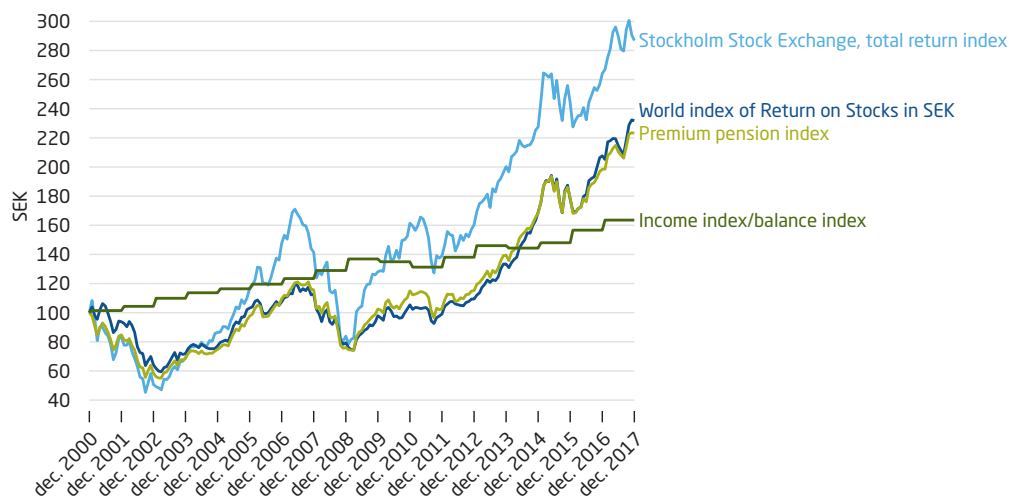
Capital-weighted return can be used for evaluating the premium pension on an overall basis, but also individual accounts. Consideration is given to the timing and amount of all deposits and withdrawals for the account, and to the balance at the end of the period. The capital-weighted return matches the average annual interest rate during the period.

In the section Income and Premium Pensions as Complementary, time-weighted return is used, whereas capital-weighted return is used in the section Change in Value of Pension Savers' Accounts. (For a more thorough description of the time- and capital-weighted return, see Appendix A.)

Income and Premium Pensions as Complementary

One reason for establishing the premium pension as complement to the inkomstpension was that variations over the years in the growth of earnings and return on capital could tend to offset each other. Development over time shows that these indexations do not necessarily follow each other (see the table above). The importance of spreading risk may increase in the future, when the premium pension funds' share of total pension capital increases.

Figure 6.1 Value of SEK 100



Value of SEK 100 paid into the inkomstpension system in december 2000 (income-/balance index) and into the premium pension system (premium pension index), and invested in an average portfolio of stocks on the Stockholm Stock Exchange and on the Global Equity Market, respectively. Return index for the Stockholm Stock Exchange and World Index of Return on Stocks according to Morgan Stanley Capital International Inc., converted into SEK.

In December, 2000, premium pension savers could begin investing their capital in the funds of the system. Before then, the capital had been under temporary management, which had invested it in an interest-bearing account with the Swedish National Debt Office (Riksgälden). The value of an amount deposited at the start in 2000 has varied substantially over the years.

The return index for the Stockholm Stock Exchange rose much more than the premium pension index in 2003–2007; it then dropped more precipitously in 2008. The recovery in 2009–2010, as well as in the years 2011–2013 and 2015, was also significantly greater on the Stockholm Stock Exchange than in the premium pension index. In 2016, the global stock market rose more than either the premium pension index or the Stockholm Stock Exchange. In 2017, it was the premium pension index that developed most strongly, marginally better than the global market and slightly better still than the Stockholm Stock Exchange.

Those who refrained from selecting funds, and thus had their moneys invested in the AP7 Såfa, the Central Government Fund Management Alternative (Statens Årskullsförvaltningsalternativ), had by December 31, 2017 obtained a return on moneys invested in December, 2000, greater by 76 percentage points than that of the average fund saver (premium pension index, which includes AP7 Såfa).

Change in Value of Pension Savers' Accounts

The time-weighted return shown above does not take into account changes in the amount of capital during the period of saving, most notably deposits, but disbursements as well. For individual savers, but also for the premium pension system as a whole, it is important to show the return as measured by the capital-weighted rate of return. One reason is that the capital in pension savers' accounts has increased considerably since the beginning because the system is being built up. At the end of 2007, there was six times as much capital in the funds as at the end of 2000. Thus, the amount on which the extremely high return was obtained in 2005 was much larger than the amount adversely affected by the equally negative return of 2002. The capital-weighted rate of return takes this difference into account

by assigning greater weight to 2005 than to 2002. In the Swedish Pensions Agency's calculations of internal rate of return, consideration is also given to other factors, such as management fees, rebates and inheritance gains.

Figure 6.2 Average Capital-Weighted Rate of Return for All Premium Pension Savers up to Different Points in Time during the Years 2000–2017



Each point on the curve shows the average annual internal rate of return (after 1995) until the time concerned.

Figure 6.2 shows the progression by year of the average annual capital-weighted rate of return for the premium pension built up at different points in time, as well as the corresponding rate of return if the premium pension had instead developed like the income/balance index. With this return, the capital-weighted rate of return through the end of 2017 would have been 3.0 percent per year. This may be compared with the actual average capital-weighted rate of return for the premium pension, 7.1 percent through 2017. The diagram shows that the corresponding calculation through 2008 was minus 0.8 percent for the premium pension system and plus 3.5 percent if the premium pension system had developed like the income/balance index. Note that the curve does not show the actual capital-weighted rate of return for inkomstpension savers, since the capital structure of the inkomstpension system is considerably different.

Figures 6.1 and 6.2 reflect two points of view for the saver, based on time-weighted and capital-weighted return as explained above. In the first diagram SEK 100 is deposited in the premium pension system in December, 2000, and it is worth about SEK 224 at the end of December, 2017. The value reached its low point of SEK 55 during 2002–2003. To take into account the deposits of premium pension savers into the system each year, and the long-term nature of pension saving, the second diagram shows the average annual capital-weighted return up until a certain point in time. The average annual capital-weighted return on moneys paid into the premium pension system was 7,1 percent in December, 2017. The annual average capital-weighted return was lowest, at over -8.5 percent, in 2001. As the premium pension system matures, the annual variation in capital-weighted return will diminish, as is clearly shown in the diagram.

Figure 6.3 shows the average capital-weighted rate of return for pension savers sorted according to their first year of contributing to the system. The difference in return decreases the longer the birth cohorts have participated and been paying into the system. Individuals who started participating in

2016 have not had their pension credit placed in funds by the end of 2017, so their capital-weighted return depends solely on interest from the temporary management.

Figure 6.3 Average Capital-Weighted Rate of Return Annually from the Saver's First Pension Qualifying Year

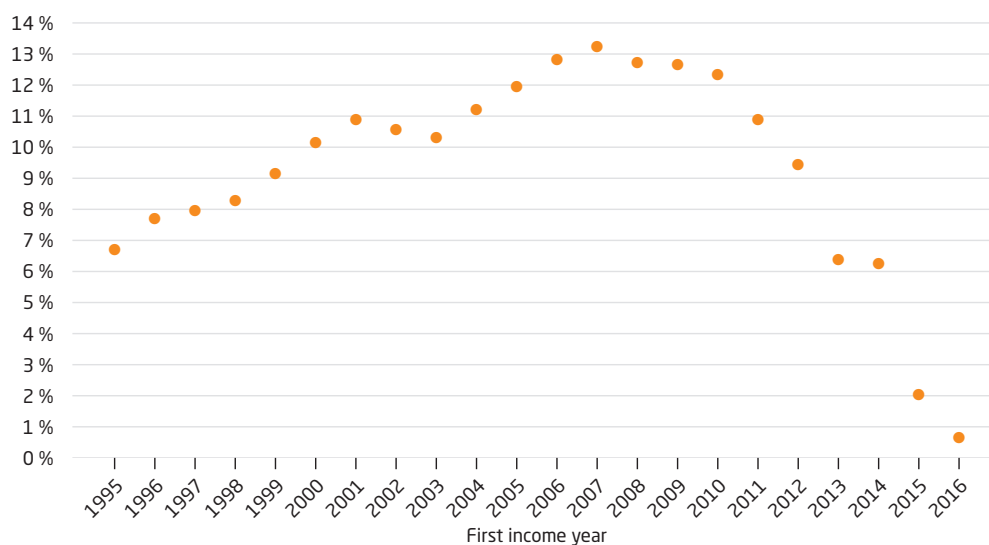
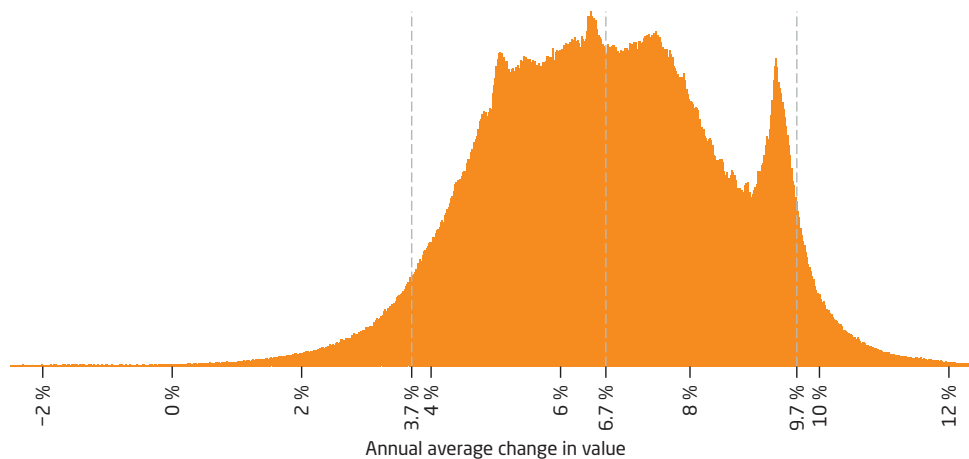


Figure 6.4 shows the distribution of the capital-weighted rate of return among pension savers who have been in the system for an equally long time. Among pension savers who began earning pension credit in 1995 and who then invested it in funds in 2000, just over 99 percent reported a positive change in value at the end of 2017. The sharp peak around 9–10 percent in the figure below mainly consists of individuals who have their capital invested in the state preselection option.

Figure 6.4 Pension Savers who Began Earning Pension Credit in the Premium Pension System 1995, Sorted According to Annual Capital-Weighted Rate of Return up to and including 2017



The dashed lines indicate the median and the percentiles for 5 and 95 percent.

Since the data refer to participants since 1995, the explanation for the spread is not that they entered the system at different times. Compare Figure 6.3, which shows the distribution by first year of credit earning. Rather, the principal reason is the choice of fund investments with differences in rate of return.

The table below summarizes the average annual change in value with the time- and capital-weighted rates of return during the existence of the premium pension system. From 1995 on, allocations were set aside for the premium pension, but not until December, 2000, were the moneys paid into funds. During the period 1995–2000 the moneys were invested in interest-bearing assets.

Nominal Average Annual Change in Value and Inflation, Respectively
percent

	1995–2017	2000–2017
Premium pension index (time-weighted)	4.8	4.8
Premium pension (capital-weighted)	7.1	7.3
Income/balance index (time-weighted)	2.8	2.9
Income/balance index (capital-weighted)	3.0	3.0
Inflation	1.1	1.3

Importance of a Long-Term View

The aspects of the pension system that relate to its change in value cannot be judged on the basis of the changes in value over only a few years. The importance of a long-term view is easily underestimated, both when stock prices are rising and when they are falling. For the 90-year period 1924–2014, the average real rate of return globally was 6.1 percent per year. However, this does not guarantee such a return in 10 or even in 20 to 30 years. For different 10-year periods since 1930, the real rate of return has varied considerably, on the Stockholm Stock Exchange, from 23 percent per year (1980–89) down to negative figures in certain other periods. There have often been major changes between adjacent 10-year averages, both on the Stockholm Stock Exchange and world-wide.

One conclusion is that “long term” is not 5–7 years, or even 10 years, as is sometimes said, but that in the matter of equity returns one should imagine a much longer period. In the context of pensions, it is reasonable for younger people to have a 30–40-year perspective. Historically, the real value development for longer periods has also been much more stable.

Only over a term of at least 35 years is the real value growth for global equities comparable in stability with Swedish real wage development over 10 years. Real wage growth is the factor above all that governs the value growth of inkomstpension. The real wage per employee increased over the period 1918–2012 by an estimated 2.1 percent per year, thus significantly slower than the annual 6.1 percent of real stock returns. The difference was most pronounced during the 1980s and 1990s.

7 Three Scenarios for the Future of the National Pension System

To show how different developments can affect the long-term financial position of the national pension system and the size of pensions, projections are presented for the evolution of the pension system over the next 75 years in.

This section is primarily based on calculations made using the Swedish Pensions Agency's pension model. The agency's typical-case model has also been used. These models may be found on the agency's website. The premium pension is not updated in the projection.

The long-term financial position of the inkomstpension system is described below in three different projections, or scenarios. These are referred to as the base, optimistic and pessimistic scenarios. The following three aspects of financial position treated are:

- Net contribution
- Fund strength
- Balance ratio

The net contribution is the difference between the system's contribution revenue and pension disbursements. For a better comparison, the net contribution is expressed in the scenarios as a percentage of total paid-in contributions; this adjusts for the volume effect of long-term economic growth. The net contribution is currently -10.7 percent.

Net Lending of the Inkomstpension System *	
billions of SEK	
	2017
Primary net lending	
Net contribution	-29
Contribution	267
Pensions	-296
Costs of administration etc., net	-2
Total Primary net lending	-30
Return	
Interest income	8
Dividends on shares	22
Total Return	30
Net lending	-0

* There may be some minor deviations from the National Accounts.

The net contribution corresponds (after deduction for costs of administration etc.) to the *primary* net lending of the system. Total net lending includes the net return of the National Pension Funds, which consists of interest income and dividends on shares.

Net lending contributes to the change in the size of the National Pension Funds. In addition, there are upward and downward fluctuations, sometimes considerable, in the market value of the securities held. In 2017, the total return generated by the buffer funds (First – Fourth and Sixth AP Funds) was SEK 121 billion.

Fund strength is the market value of National Pension Fund capital divided by pension disbursements for the year. Fund strength shows how many years of pension disbursements can be financed by the fund. For the year 2017 fund strength was 4.8 years.

The balance ratio is a measure that summarizes the financial position of the inkomstpension system. The balance ratio is the ratio between the total assets of the system and its liabilities. The assets consist of the contribution asset with the addition of the market value of the National Pension Funds. (For a more detailed discussion, see chapter 4 How the National Pension System Works and Appendix B Mathematical Description of the Balance Ratio). Calculated on the basis of assets and liabilities as of December 31, 2017, the balance ratio was 1.0347.

The future financial position of the inkomstpension system will depend on the development of several demographic and economic factors. The three scenarios studied differ in the following respects:

- Demographic development
- Change in average income
- Return on the National Pension Funds

The detailed assumptions for the scenarios are presented last in this chapter under the heading Assumptions in the Calculations for the Three Scenarios.

The number **paying contributions** is determined by the working-age population and the proportion thereof with earned income or other pension-qualifying income subject to contributions. The development of the working-age population depends primarily on net immigration and – in the longer term – the birth rate. The development of the number paying contributions is of significance for the financial position of the system. Pensions and the pension credit earned by the gainfully employed are revalued annually by the change in average income (the income index, or the balance index in years when balancing is activated). If there is an increase in the number of people with incomes who are paying contributions, the consequences will be that the net contribution, the buffer fund and the balance ratio all increase.

The change in the **average income** of the economically active is of limited importance for the net lending of the pension system, for pensions are linked to the income index, which follows average income. A change in average income results in corresponding changes in both contribution inflow and pension disbursements. In principle, therefore, a change in average income will have no effect on the relative net contribution. The value of the inkomstpension will of course be heavily influenced by the change in the income index.

The **return** on the National Pension Funds affects the size of the Funds and thus fund strength and the balance ratio as well. The negative effect of weak growth in the net contribution on fund strength and the balance ratio can be offset by a high return on fund capital. In the base scenario, the real annual return assumed is 3.25 percent; in the optimistic and pessimistic scenarios, the respective returns assumed are 5.5 percent and 1.0 percent. A factor of importance for both fund strength and the balance ratio is the difference between the return and the average income. This is due to the fact that both pension disbursements and the system's pension liability grow at the same rate as average income, whereas the market value of the National Pension Funds grows with the return and is included

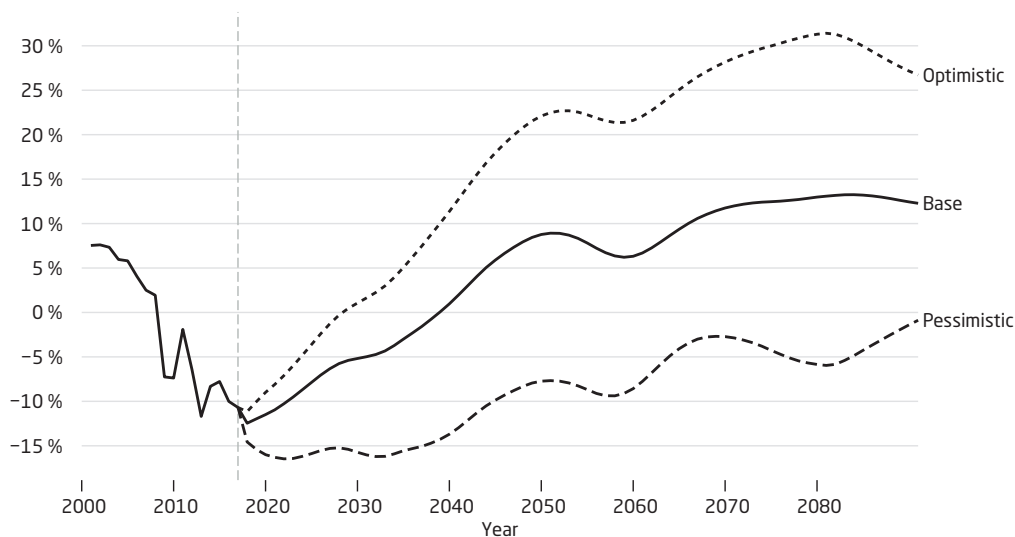
in the numerator both for the measure of fund strength and for the balance ratio. See Appendix B Mathematical Description of the Balance Ratio.

In summary, the net contribution will be negative in all three scenarios for many years to come. Pension disbursements are thus forecast to exceed contribution revenue.

Net Contribution

As previously noted, the net contribution is the difference between contribution revenue and pension disbursements in relation to contributions. Since the birth cohorts in the population differ in size and have worked to differing degrees, the contribution revenue and pension disbursements of the system will vary over time. For a better comparison of the net contribution in the three scenarios, the net contribution has been divided by the inflow of contributions in the scenario. This eliminates the volume effect of the differing growth rates on the net contribution in monetary terms.

Figure 7.1 Net Contribution



Contribution revenue less pension disbursements as a percentage of contribution revenue.

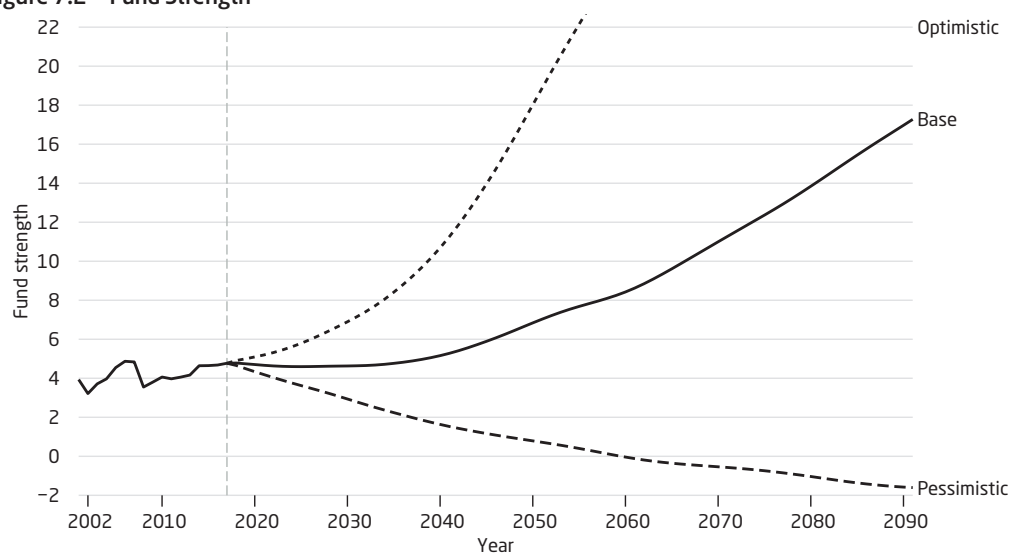
The net contribution was negative for the first time in 2009 and is expected to remain so for many years. The explanation is that to a large extent the large birth cohorts of the 1940's have left the labour force and retired. The negative balancings of 2010, 2011 and 2014 appear in the diagram as improvements in the net contribution. Around 2020 the net contribution begins to slowly improve and the contribution deficit to slowly decrease. From 2040, income is expected to be greater than expenditure in the base scenario. The principal reason is that the large birth cohorts of the 1990s and the 2010s will be of working age at the same time as the cohorts of the 1960s with pension disbursements will be decreasing; see figure 7.9 at the end of this chapter. The effect of demography is also reflected in the peaks and troughs in the figure above. The difference in timing of the peaks and troughs between the pessimistic and other scenarios is due to different assumptions of life expectancy and employment. In the pessimistic scenario, net contribution is negative throughout the whole period, but in the optimistic scenario up until and including 2028. The pessimistic scenario leads to an unfavourable dependency ratio as a result of low net immigration caused by high emigration in the period 2020-2040 (see figure 7.11).

The Buffer Fund – Fund Strength

The size of the buffer fund is expressed in terms of fund strength, that is, the fund capital at year-end divided by pension disbursements for the year. Fund strength shows how many years of pension disbursements the fund can finance without additional contributions or return in the future. The different development of the buffer fund in the three scenarios is due to differences in net contribution and in the assumed return on the fund.

Fund strength has averaged 4–5 years since 1990. At the end of 2017, it was just over 4 years and 9 months.

Figure 7.2 Fund Strength



Size of buffer fund divided by pension disbursements the same year.

In the **base scenario**, fund strength decreases slowly up until 2025 after which it begins to rise. Since the fund's return (3.25 percent) is higher than the increase in average income (1.8 percent) this leads to a steadily increasing fund after the period of negative net contribution.

In the **optimistic scenario** fund strength increases every year; the reason is that the deterioration in the net contribution is more limited than in the base scenario and that the return of the fund is high (5.5 percent) in relation to the development of average income (2.5 percent). In 2030 fund strength is equivalent to almost 7 years of pension disbursements and will continually grow further.

In the **pessimistic scenario**, fund strength gradually decreases throughout the projection period. Due to unfavourable age composition the fund is empty around 2060 and then continues to decrease.

The Balance Ratio

The financial position of the inkomstpension is expressed in terms of a ratio: the system's assets in relation to pension liabilities. See the section A Rate of Interest Other Than the Income Index – Balancing in chapter 4, How the National Pension System Works. When the ratio is less than one, liabilities exceed assets. A ratio of 2.0 means that assets are twice as great as liabilities and that the system in principle is fully funded, that is, the buffer fund, the contribution asset and the pension liability are of equal size.

In 2010 balancing was activated, and it ended in 2018. When balancing is activated, "interest" is credited to pensions and pension balances through the change in the income index and the balance

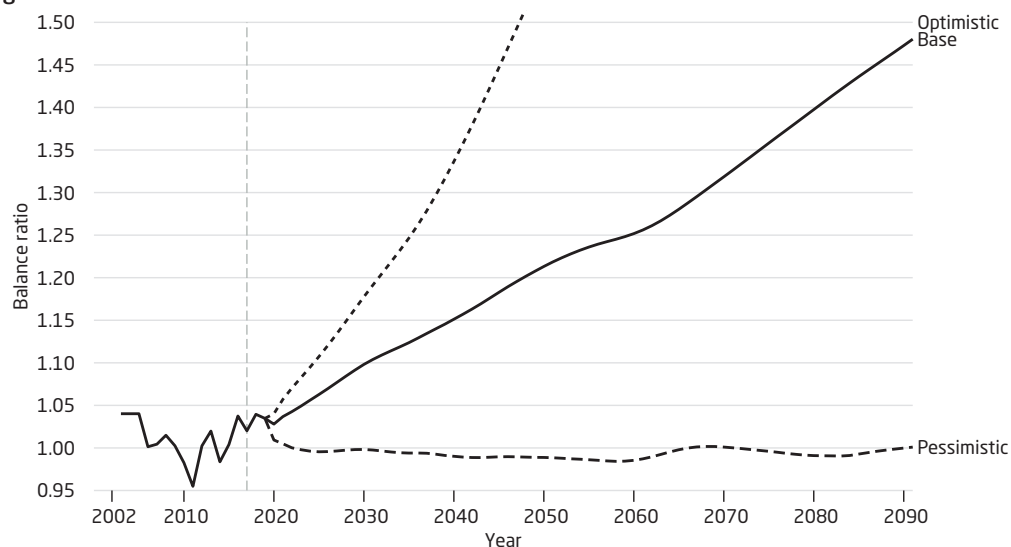
ratio. As long as balancing is activated, the cumulative indexation is less than it would have been without balancing but in the years the balance ratio is greater than 1 during a balancing period, indexing is greater than that of the income index.

Cumulative balance ratio product *

Year	Base	Optimistic	Pessimistic
2009	1.0000		
2010	0.9826		
2011	0.9383		
2012	0.9406		
2013	0.9592		
2014	0.9436		
2015	0.9474		
2016	0.9829		
2017	0.9894		
2018	1.0000		
2019	1.0000		
2020	1.0000	1.0000	1.0000
2021	1.0000	1.0000	1.0000
2022	1.0000	1.0000	1.0000
2023	1.0000	1.0000	0.9993
2024	1.0000	1.0000	0.9981
2025	1.0000	1.0000	0.9965
2026	1.0000	1.0000	0.9951

* The cumulative balance ratio product in the current period of balancing. When the product reaches 1.0000, balancing ends. Beginning with 2020 the balance ratios are based on predictions.

Figure 7.3 Balance Ratio



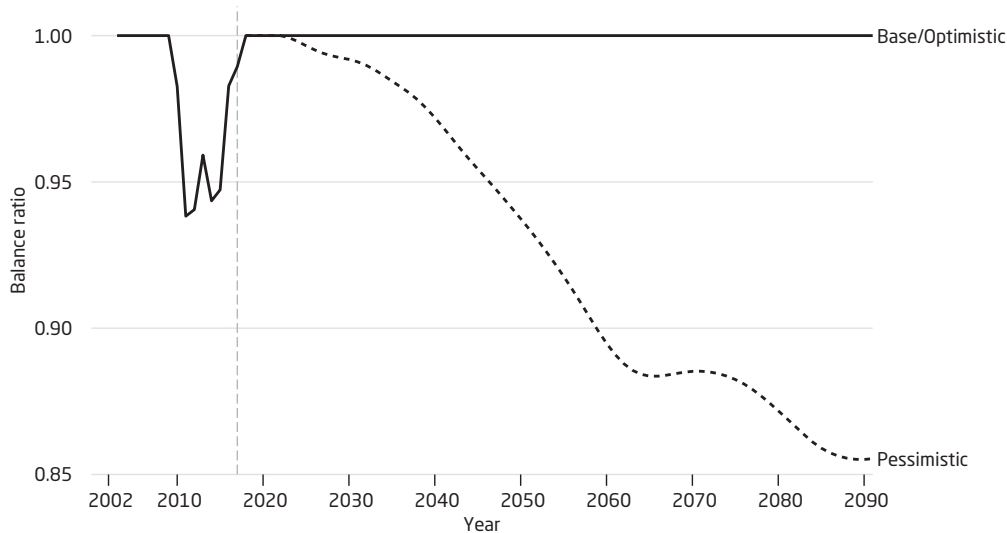
(Contribution asset + buffer fund) / pension liability

In the **base scenario** the balance ratio is greater than 1 throughout the projection period. In the base scenario the balance ratio strengthens gradually because of demographic factors and the fact that the return on the buffer fund is greater than the income index. The balance ratio reaches 1.1 around 2031, a level that according to the proposal in “Utdelning av överskott i inkomstpensionssystemet” (Distribution of Surpluses in the Inkomstpension System, (SOU 2004:105) would mean that there were distributable surpluses. However, no such proposal has been presented to the Swedish Parliament.

In the **optimistic scenario** the balance ratio is also greater than 1 throughout the projection period. As of 2025 the balance ratio exceeds 1.1.

In the **pessimistic scenario**, the balance ratio lies between 0.984 and just over 1 throughout the whole projection period. However, the cumulative effect is considerable (see Figure 7.4). The figure for the balance ratio does not show the damped balance ratio but the balance ratio as a measure of the financial position of the pension system. The damped balance ratio is that which in combination with the income index affects the upward adjustment of pensions and pension balances during balancing periods. The effects of this are shown in the table for the Cumulative balance ratio product and in Figure 7.4.

Figure 7.4 Adjusted Balance Index

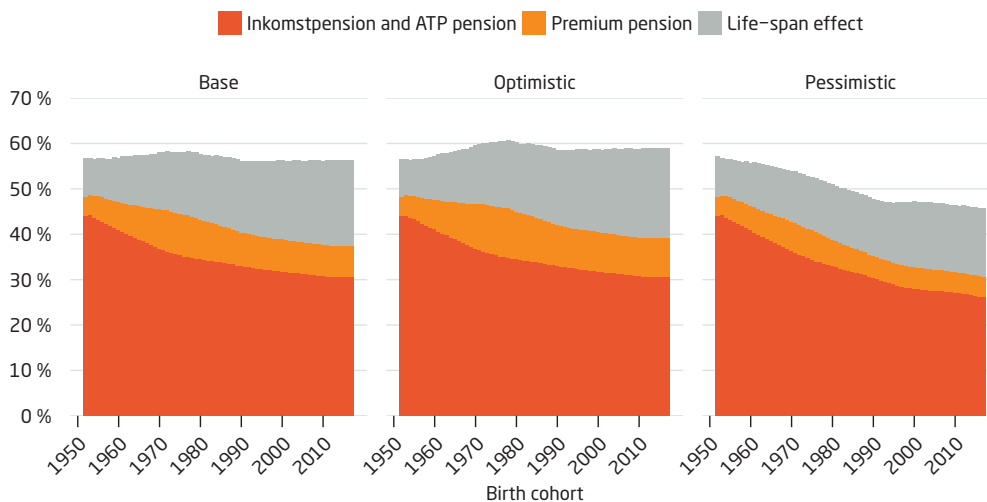


Balance Index / Income Index

Development of Pension Levels for Typical Cases

This section describes the development of the pension level at age 65 for typical cases born 1952–2017 in the three different scenarios. The effect of the scenarios on the pension level has been isolated by calculating pensions for an individual who has worked for 42 years before retiring at age 65 with an income that increases at the same rate as the general level of income. The pension level is calculated as the newly granted income-based national pension at age 65 in relation to final earnings.

Figure 7.5 Pension in Proportion to Final Earnings, Different Birth Cohorts



The pension levels in the scenarios at age 65 are described in the figures above, one for each scenario. The figures show a life-expectancy effect in the form of the total national pension received if the typical case postpones retirement to the extent required to compensate for the increase in life expectancy.

An extended working life gives a higher pension because new pension credit is earned, pension capital yields interest and a lower annuity divisor is used in the calculation of the pension. The retirement age required for the pension level not to decrease because of the increase in life expectancy is shown in the table in the next section, *Life Expectancy Effect and Alternative Retirement Age*. In the figure the pension level for the typical cases at their alternative retirement age are marked by light grey.

In the **base scenario** the pension level at age 65 decreases successively from 48 percent of final earnings for birth cohort 1952 to about 38 percent for birth cohort 2017. Those born in 1952 have an alternative retirement age of 67 years and 3 months. At that retirement age, the pension level is estimated to be 57 percent of final salary. The falling pension level is due in part to the expected increase in life expectancy. If working life is lengthened so that the effect of the increased life expectancy is neutralized, the pension level stabilizes at almost 60 percent of previous earnings from work. The higher pension level is attributable to the premium pension, which yields a yearly return above wage growth by almost 2.1 percentage points. This return over and above wage growth causes the premium pension share of the national pension to be higher than what corresponds to its contributions.

For the youngest birth cohorts, premium pension at age 65 will be about 8 percent of final earnings and inkomstpension will be just over 30 percent. For the alternative retirement age, the corresponding proportions are 11 and 46 percent respectively.

In the **optimistic and pessimistic scenarios** average growth is higher and lower, respectively, than in the base scenario. There is also a difference in the return on the premium pension.

When balancing is not activated, the inkomstpension accrues interest (is indexed) by the change in average income, and inkomstpensions are changed at the same rate as average income. In this case the relationship between the inkomstpension and final salary is not affected by the growth in real earnings, and the inkomstpension as a percentage of income remains unchanged. On the other hand, the inkomstpension will naturally be lower in monetary terms with lower growth and higher with higher growth.

The relationship between the return of the premium pension system and the increase in average income affects the relative size of the premium pension. The larger the positive discrepancy between return and wage growth, the greater the share constituted by the premium pension.

Pension level increases for typical cases if they have an occupational pension. The increase depends on the contractual area, but is about 15 percentage points at the age of 65 and about 20 percentage points at the alternative retirement age.

Life Expectancy Effect and Alternative Retirement Age

The table below shows, among other things the life expectancy for persons at age 65 for birth cohorts 1930—2020. Remaining life expectancy at the age of 65 is expected to increase from 17 years and 4 months for persons born in 1930 to 26 years for persons born in 2020, an increase of 8 years and 8 months. If those born in 2020 are to have the same pension level that they would have had if life expectancy had not increased, a portion of the increased life span after age 65 must be devoted to working longer. For the cohort born in 2020, working life must be extended to 72 years and 5 months. This measure is called the alternative retirement age. In 2017, the Swedish Pensions Agency changed its formula for the alternative retirement age¹ to simplify the calculation method and provide a better picture of the longevity effect on pensions. The change meant an increase in the alternative retirement age for the youngest cohorts by just over a year. At the same time, those born in 2020 – despite such a

¹Report from 2017: Formula for an alternative retirement age

higher retirement age – may look forward to being pensioners 1 year and 10 months longer than those born in 1930.

Alternative Retirement Ages and Time Spent Retired*

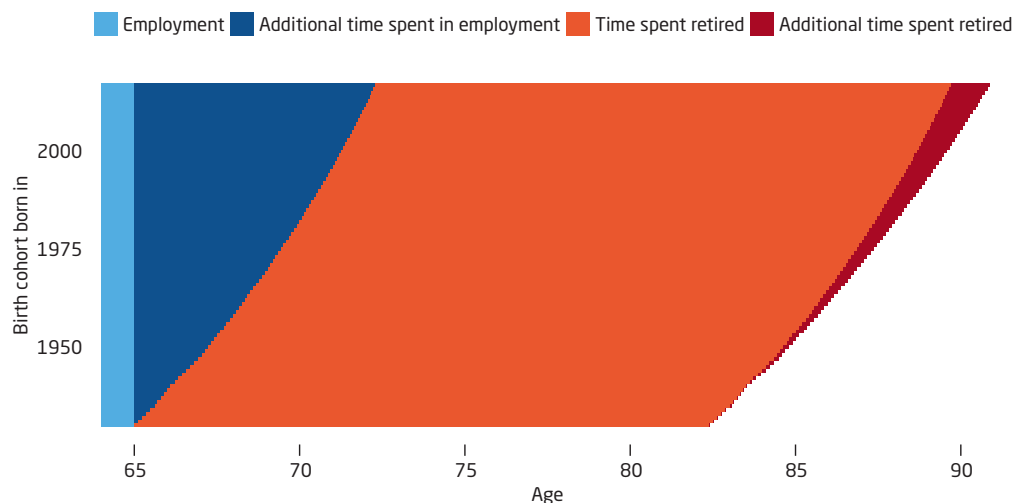
Birth cohort born in	... reaches 65 in	Life expectancy at 65	Alternative age of retirement	Time spent retired	... compared to birth cohort 1930
1930	1995	82 yr 4 mo	65 yr 0 mo	17 yr 4 mo	0 yr 0 mo
1935	2000	83 yr 0 mo	65 yr 7 mo	17 yr 7 mo	0 yr 3 mo
1940	2005	83 yr 6 mo	66 yr 1 mo	17 yr 8 mo	0 yr 4 mo
1945	2010	84 yr 2 mo	66 yr 8 mo	17 yr 11 mo	0 yr 7 mo
1950	2015	84 yr 9 mo	67 yr 2 mo	18 yr 0 mo	0 yr 8 mo
1955	2020	85 yr 4 mo	67 yr 8 mo	18 yr 1 mo	0 yr 9 mo
1960	2025	85 yr 10 mo	68 yr 1 mo	18 yr 3 mo	0 yr 11 mo
1965	2030	86 yr 4 mo	68 yr 7 mo	18 yr 4 mo	1 yr 0 mo
1970	2035	86 yr 10 mo	69 yr 0 mo	18 yr 5 mo	1 yr 1 mo
1975	2040	87 yr 4 mo	69 yr 5 mo	18 yr 6 mo	1 yr 2 mo
1980	2045	87 yr 9 mo	69 yr 10 mo	18 yr 7 mo	1 yr 3 mo
1985	2050	88 yr 3 mo	70 yr 2 mo	18 yr 9 mo	1 yr 5 mo
1990	2055	88 yr 8 mo	70 yr 6 mo	18 yr 10 mo	1 yr 6 mo
1995	2060	89 yr 1 mo	70 yr 11 mo	18 yr 10 mo	1 yr 6 mo
2000	2065	89 yr 6 mo	71 yr 3 mo	18 yr 11 mo	1 yr 7 mo
2005	2070	89 yr 11 mo	71 yr 6 mo	19 yr 1 mo	1 yr 9 mo
2010	2075	90 yr 4 mo	71 yr 10 mo	19 yr 1 mo	1 yr 9 mo
2015	2080	90 yr 8 mo	72 yr 2 mo	19 yr 1 mo	1 yr 9 mo
2020	2085	91 yr 0 mo	72 yr 5 mo	19 yr 2 mo	1 yr 10 mo

* Time spent retired refers to expected remaining life span at alternative retirement ages.

Figur 7.6 shows a graphic representation of the same trend. As shown by the dark red part of the graph, younger generations are expected to have a longer period of retirement than those born in 1930. For those born in 1954 and thereafter (that is, for individuals covered entirely by the rules of the new pension system), the alternative retirement age means that on average 2/3 of the increased life span² will be spent working, and about 1/3 on a longer period of retirement.

²2/3 of the increase in average life expectancy from the age of 23, or 85 percent of the increase in average life expectancy from the age of 65.

Figure 7.6 Alternative age of retirement



Level of National Pension in the Projection on the Swedish Pensions Agency's website 'Mina sidor'

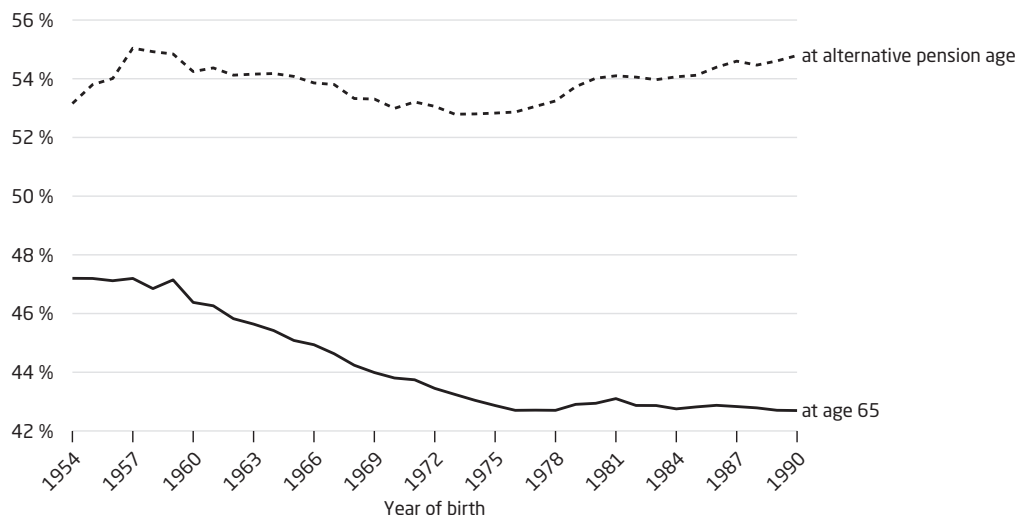
In 'Mina sidor' ('My pages') pension projections are found for each insured person based on the individual's actual earned pension credit. When the orange envelope is mailed in February/March income data are available up to and including the calendar year two years before the envelope is mailed. Thus, the envelope sent out in 2018 is based on all incomes earned by each individual through 2016. The projection on 'Mina sidor' is calculated on the basis of zero-percent growth for coming years, both in the individual's own income and in the national average income.

As a complement to the pension level for the typical case, the pension level in the projections are calculated as follows: the pension projection of each individual at age 65, excluding any guaranteed pension, divided by the pension-qualifying income of the same individual in 2016,³ This quotient is hereafter referred to as the replacement rate. It is calculated in the same manner at the alternative retirement age rate as well (see description above). However, the alternative retirement age included in the projection is an older version and the age is somewhat lower than the one reported above. An average for each annual birth cohort between birth year 1954 and 1990 has thereafter been calculated.

Both the assumptions underlying this calculation and the method applied differ from those used in the calculation of pension levels previously in the chapter under the heading Pension Levels for Typical Cases. In the figure 7.7 the comparison income is the income below the ceiling on earnings in 2016 for the respective individual, corresponding to forecast final earnings since no growth in real earnings is assumed. For young individuals, with few years of pension credit earned, this means that the replacement rate has been calculated with a virtually flat earnings profile. For persons relatively close to retirement age, the pension is calculated on the basis of many years' actual income history, which on average is reflected in a concave profile.

³For persons with no income that year, no replacement rate can be calculated, and they have been excluded from the calculation. Persons with a replacement rate greater than 150 percent have also been excluded from the calculation. The reason for doing so is that such high replacement rates generally apply to incomes so low that they are temporary.

Figure 7.7 Replacement Rates from the Swedish Pensions Agency's Website 'Mina sidor' – Average Values for Income-Based Pension at Age 65 and at Alternative Retirement Age as a Percentage of Pensionable Final Earnings



Source: 4,067,845 individual projections, 2018 . Guaranteed pension is not included.

The higher replacement rates calculated at the pension age of 65 for the oldest birth cohorts are partly explainable by the fact that their own incomes have begun to decrease. As a result, the replacement rate will be higher with the method used here. The replacement rate, calculated at the alternative pension age, increases for younger birth cohorts. The younger cohorts are expected in the forecast to have many years of earning pension credit ahead of them. This produces relatively high replacement rates. For older cohorts, new persons are added each year who have not previously earned pension credit. This lowers the replacement rate for older cohorts compared with younger ones. If immigration increases, the average replacement rate decreases, and vice versa. The replacement rate for younger cohorts is also expected to decrease in time as their salaries increase. A person's income generally tends to increase more dramatically at the beginning of working life, only to slow down later on. Compared with the previous year, the replacement rates in the chart are somewhat lower, due to the fact that the annuity divisor for premium pension has been raised as a result of lowered advance interest. This gives lower initial pension compared with earlier annuity divisors, but on the other hand the rate of development for premium pension is higher for subsequent years.

In calculations of the pension level in the national pension system, it is necessary to decide whether or not incomes above the ceiling should be included in the calculation of comparison income. In the pension levels presented in this section, consideration has not been given to incomes above the ceiling. Of all pension-qualifying incomes in Sweden, 10 percent exceed the pension-credit ceiling. If incomes above the ceiling for comparison income are added, comparison income increases by 10 percent. This lowers the average pension level by 9 percent. In addition, gross pensions are compared with gross incomes. In 2007 a tax credit for gainful employment was introduced, which means that the tax is no longer the same on pensions as on most of the incomes included in pension-qualifying income. In 2008, 2009, 2010 and 2014 reinforced tax credits on earned income were passed. Tax relief in the form of a higher basic deduction was provided in 2009 for those who had reached age 65 by the outset of

that year. In 2010, 2011, 2013, 2014 and 2016 taxes for older persons were reduced further. Of the pension-qualifying incomes below the ceiling, roughly 94 percent consist of income from work.

Assumptions in the Calculations for the Three Scenarios

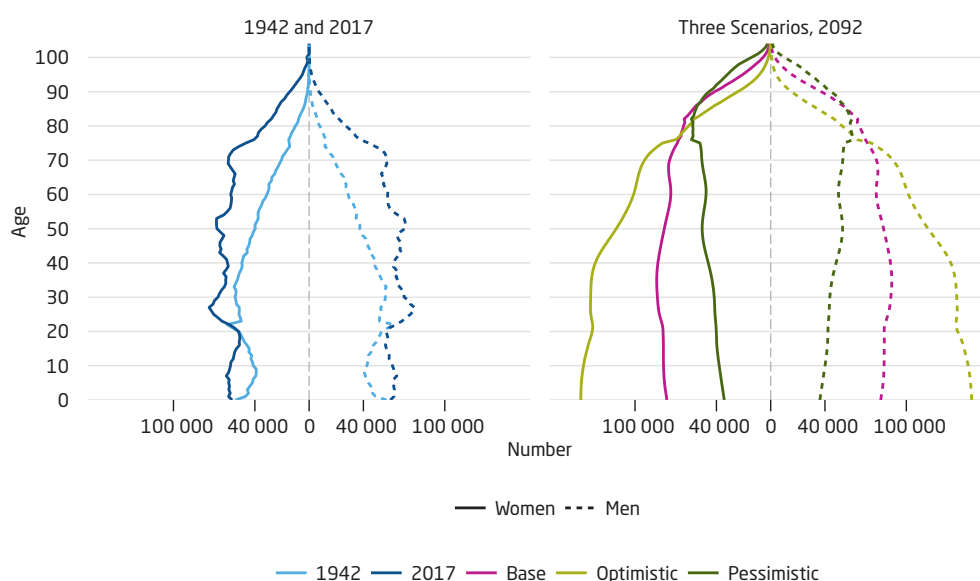
In the table and in the figure below, the various assumptions in the scenarios are summarized.

Bases for Calculation

percent

	Base	Pessimistic	Optimistic
Inflation	2.00	2.00	2.00
Change in average income	1.80	1.00	2.00
Real return, net, after fees to fund management companies			
Premium pension funds	3.90	1.00	5.50
Buffer fund	3.25	1.00	5.50
National Debt Office	2.75	1.00	3.00

Figure 7.8 Population for 1942 and 2017, Projection for 2092 in the Three Scenarios



Base Scenario

The demographic development in the base scenario follows the latest official population forecast of Statistics Sweden from 2017. In this projection the birth rate during the period is assumed to be 1.88 children per woman. The average life span for men born in 2017 is 80.8 years and is expected to increase to 85.5 years in 2050. For women the average life span is expected to increase from 84.3 to 88.1 years during the same period. For the remainder of the time until the end of the projection period in 2092, the average life span will increase by approximately 4 years for both men and women. The population forecast from 2017 has high net immigration over the next 5 years, almost 400 000 persons. After that

net migration falls by a few thousand people per year, stabilizing at about 25,000 people per year. This year's assumption for the base scenario is constant employment, that is to say, future employment is the same as today. The reason for this is that Statistics Sweden's main alternative implies future employment increases in the older section of the population. This can instead be controlled in the current pension model by increasing the retirement age. Real average income is expected to increase by 1.8 percent per year. The buffer fund's real return is assumed to 3.25 percent per year.

Optimistic Scenario

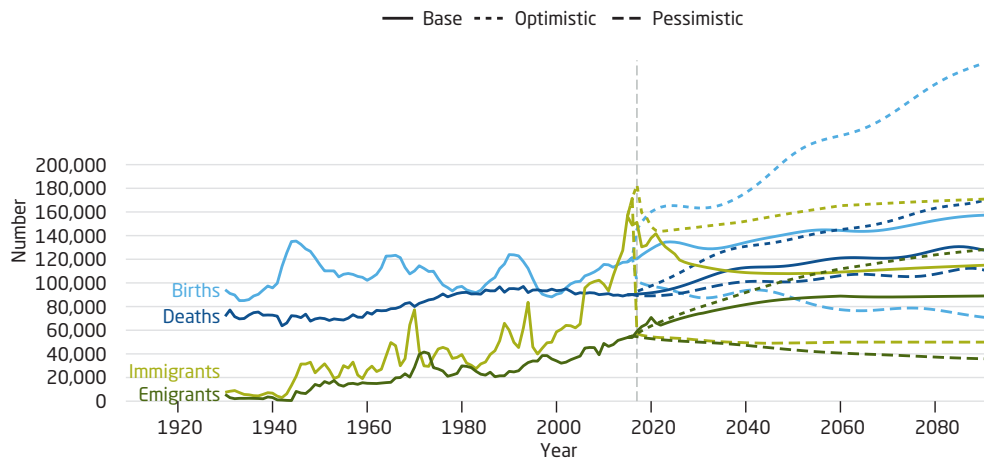
The demographic assumptions do not follow the base scenario and are based on Statistics Sweden's forecasts from 2015. Both nativity and net immigration are higher than in the base alternative. In the long run, nativity is estimated at 2.10 children per woman. Long-term immigration is assumed on average to show a surplus of some 50,000 persons per year. Mortality is assumed to be constant and to retain the same 2015 values throughout the whole of the forecast period. Employment follows the main alternative of Statistics Sweden's employment forecast from 2012 with increases in employment for older people, women and those born abroad. The real growth in average income is 2.0 percent after 2015, and the real rate of return on the buffer fund is assumed to be 5.5 percent per year in the future. The real return for the premium pension is also assumed to be 5.5 percent. The National Debt Office is assumed to fix an interest rate of 3.0 percent.

Pessimistic Scenario

The assumptions in the pessimistic scenario about birth rates and net immigration are lower than in the base alternative. Birth rate is assumed to fall to 1.45 at first and then around 2040 to rise to 1.66 child per woman. Net immigration is approximately 3,000 persons at the beginning of the forecast period, dropping to its lowest level around 2035 of about 1,500 persons a year. Subsequently it continues to rise up to the end of the forecast period, finishing at around 15,000 people per year. Remaining life expectancy increases from 84.4 years for women to 90.6 years in 2050 and 96 years in 2091. The corresponding figure for men is 81.0 to 88.3 and finally 94.6 years. The proportion employed is assumed to remain unchanged for the time ahead. The real growth in average income is assumed to be 1 percent per year. The real rate of return for the Buffer Fund, the National Debt Office and the premium pension funds is also assumed to be 1 percent per year. With a return equal to the growth in average income, the return of the buffer fund does not, in principle, contribute to the long-run financing of pensions. The buffer fund is then demographically determined and serves as a neutral repository of pension capital for the purposes of the system's financing. The assumptions in the pessimistic scenario mean that the contribution flow grows slowly in relation to the desired indexation of the average income. The pessimistic scenario describes how pensions are affected by a prolonged weak development with an unfavorable age structure.

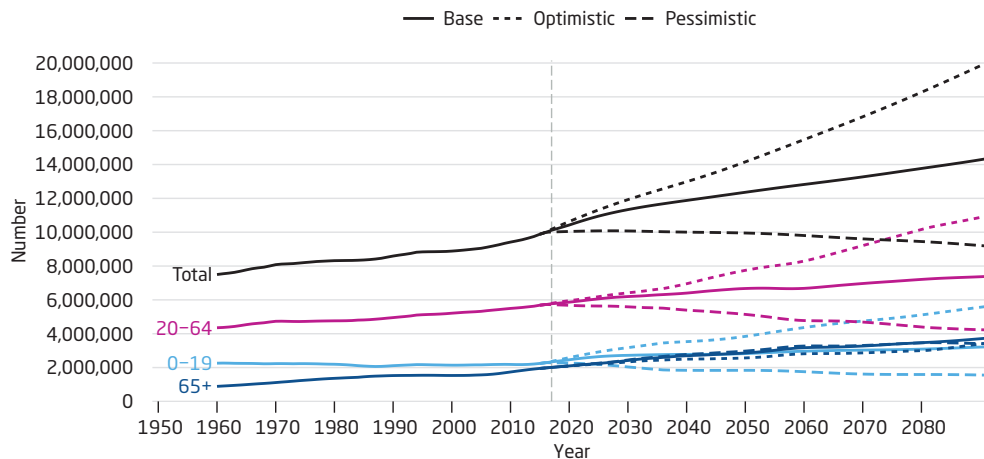
Description of the Assumptions in the Scenarios

Figure 7.9 Births, Deaths, Immigration and Emigration, 1935–2017, and Assumptions Through 2092



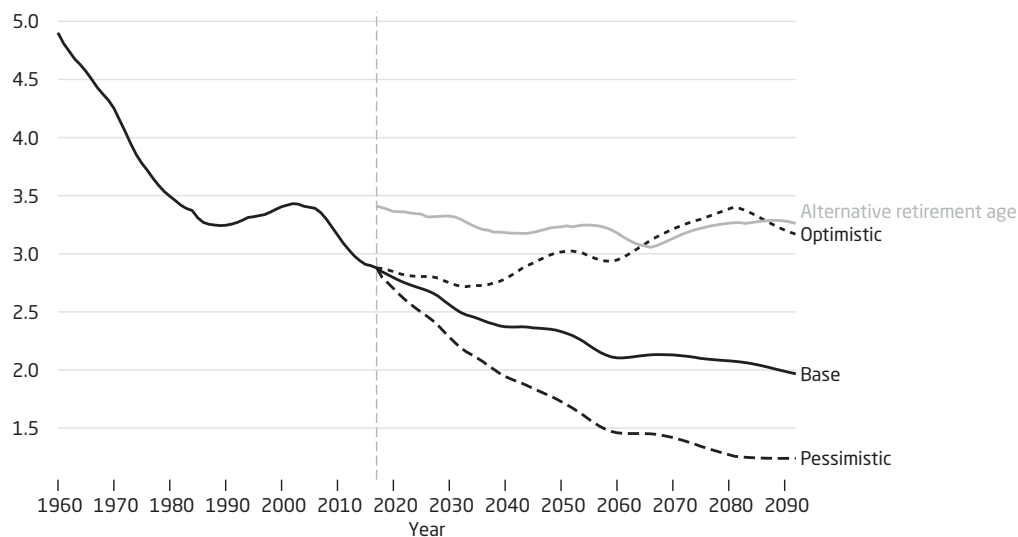
The diagram shows the development of the population since 1930 and the assumptions for 75 years into the future. The large birth cohorts of the 1940's, 1960's, 1990's and 2010's are evident. The number dying increases each year, not because of rising mortality, but because of a growing population. The peak years of immigration are the 1960's and 1970's, when there was substantial immigration of labour, particularly from Finland. There was another peak at the outset of the 1990's, when many refugees arrived, primarily from ex-Yugoslavia. The large immigrant cohorts in recent years are also reflected in the diagram.

Figure 7.10 Size of Population



The total population increases in both the positive and base scenarios, the reasons being a high birth rate and net immigration. The number of persons over 65 is more or less the same from one scenario to another. The historical data are estimates.

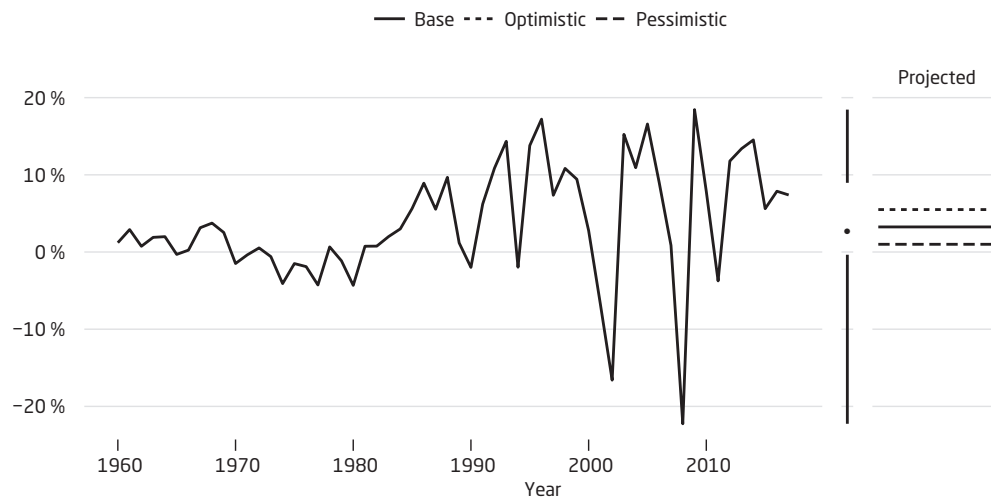
Figure 7.11 Support Ratio During 1960–2017 and Projection According to Statistics Sweden's Three Scenarios for 2018–2092



For the three scenarios the support ratio is calculated as the number of persons aged 20–64 years divided by the number aged 65 or older. The support ratio for the base scenario has also been calculated with alternative retirement ages instead of age 65 as a limit. For this curve, a smoothed mean value for the burden of support is used.

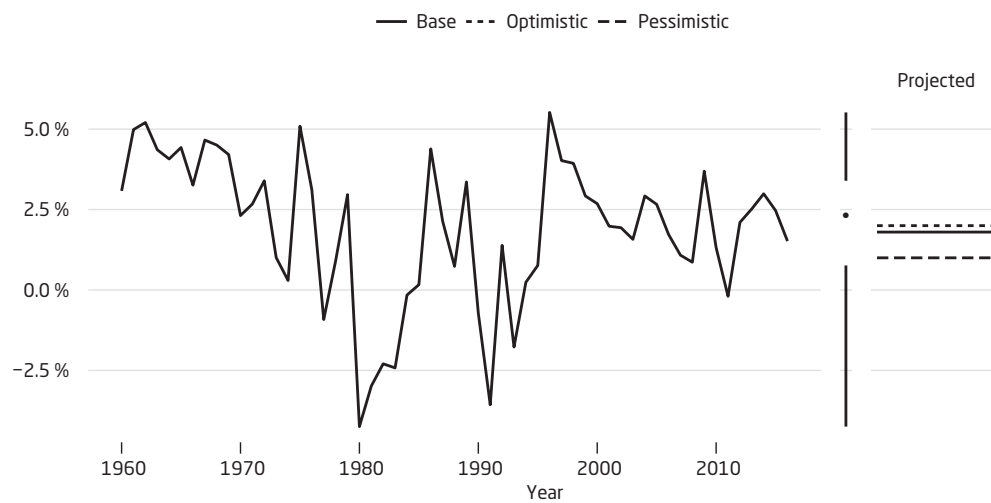
In the calculation of net contribution, fund strength and the balance ratio for the three scenarios, a constant retirement age of 65 is used over the simulation period. If the retirement age is adjusted upwards — a likely development in view of increasing life expectancy and thus falling pension levels should retirement age remain the same — it means net contribution, fund strength and balance ratio are improved. Figure 7.11 also shows the burden of support calculated with an alternative retirement age instead of 65. Initially, there will be a big jump because the alternative retirement age for 2017 is over 67 years. The support ratio is more than three people of working age per pensioner in this assumption for the projection period. This may be compared to the declining support ratios for the base and pessimistic scenario with a fixed retirement age of 65 years. This may be compared to the declining dependency ratios for the base and the pessimistic scenarios with a fixed retirement age of 65 years. The pessimistic scenario stands out with almost one gainfully employed person per pensioner. This is due to unfavourable demographics with increasing life spans, low net immigration combined with low fertility.

Figure 7.12 Real Return on the Buffer Fund, 1960–2017, and Assumptions until 2091



The historical return of the buffer fund for the last 56 years. The point between the vertical lines is the median value. The starting point for the upper vertical line is the 75th percentile; the ending point is the maximum value. The starting point for the lower vertical line is the 25th percentile; the ending point is the minimum value.

Figure 7.13 Real Growth in Earnings, 1960–2016, and Assumptions until 2091



The development of real earnings for the last 57 years. The point between the vertical lines is the median value. The starting point for the upper vertical line is the 75th percentile; the ending point is the maximum value. The starting point for the lower vertical line is the 25th percentile; the ending point is the minimum value. Source: Swedish National Mediation Office

8 Notes and Comments

Notes 2–14 relate to the inkomstpension, Notes 15–25 to the premium pension. Note 1 applies to both parts of the income-related national pension system. All amounts are shown in millions of SEK. In some tables, the sum of individual items does not tally with the sum total. This is because the individual items are rounded but the sum total is calculated on the basis of unrounded data.

Note 1 Pension Contributions

In the national pension system there are a number of different contributions, as can be seen in the table on the next page. Not all contribution revenue goes to the pension system. The part of old-age pension contribution transferred to the central government budget is that part of income above the ceiling on pension-qualifying income. Before deduction for general pension contribution this ceiling is 8.07 income-related base amounts, and after such deduction it is 7.5 income-related base amounts. Since these contributions do not correspond to any pension credit, they are in fact taxes. The old-age pension contribution is paid by employers and self-employed persons; the general pension contribution is paid by all gainfully employed persons who thus earn pension credit. In addition, national old-age pension contributions are paid from various appropriations in the central government budget for pension credit resulting from certain transfer payments such as sickness benefit and unemployment cash benefit. The central government also pays a pension contribution for so-called pension-qualifying amounts, for years with small children and for study, for example.

The table on the next page shows pension contributions received in 2017 by the Swedish Social Insurance Agency and the Swedish Pension Agency. Employer contributions or self-employment contributions are entered in the Social Insurance Agency account. The contributions for the inkomstpension system are transferred to the Swedish Pensions Agency and thereafter to the National Pension Funds. Those contributions calculated to correspond to pension credit for premium pension are forwarded to the National Debt Office. The general pension contribution and the general government old-age pension contribution are entered in the Swedish Pensions Agency account before being transferred to the National Pension Funds and the premium pension system respectively. Of the contributions registered in a particular year, a portion relate to the preceding year or, in some cases, to several years earlier. Employer contributions, for example, are registered at least one month after the corresponding salaries are paid.

The general pension contribution is transferred in its entirety to the National Pension Funds. For employer contributions and self-employment contributions, there is a preliminary allocation among the National Pension Funds, the premium pension system and the central government budget. The allocation for a year is made according to set percentages calculated by the Swedish Pensions Agency and set by the Government. It is intended that the premium pension system should receive in the course of a year contributions equivalent to premium pension credit earned during that year while the state receives contributions corresponding to taxable earnings over the so-called ceiling of 8.07 of the income-related base amount. Remaining contributions are to go to the National Pension Funds. National old-age pension contributions for a year are similarly distributed between the National Pension Funds and the premium pension system according to fixed percentages.

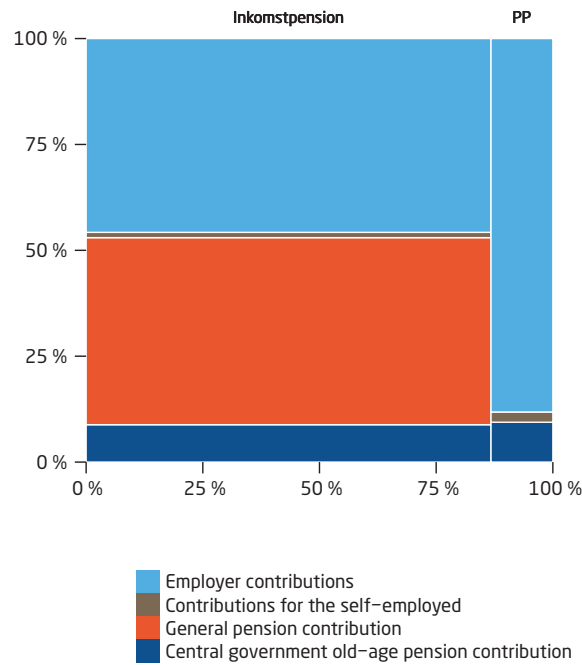
Pension Contributions by Type, 2017*
millions of SEK

	Inkomst- pension	Premium pension	Central govern- ment budget	Total 2017	Total 2016
Employer contributions	122,354	36,007	19,148	177,509	169,092
Contributions for the self-employed	3,351	987	522	4,860	4,515
General pension contribution	118,111	0	0	118,111	112,164
Central government old-age pension contribution	23,602	3,842	0	27,445	28,543
Final settlements etc.	-11	45	-279	-245	493
Final settlements in 2017 for 2015	340	-61	-279	0	0
Collection loss, settlement	-209	0	0	-209	-66
Adjustment to accounting of National Pension Funds and premium pension system	-142	106	0	-36	559
Total	267,407	40,881	19,392	327,680	314,807

* Contributions received by the Swedish Social Insurance Agency/the Swedish Pensions Agency in 2017 and transferred to the National Pension Funds, the premium pension system and the central government budget, respectively.

To ensure that the premium pension system has received contributions corresponding to the pension credit earned for a particular year and that the central government budget has received contributions for the part of incomes above the contribution ceiling, any discrepancies are reconciled two years later. Settlements are then made between the central government budget, the premium pension system and the National Pension Funds. The settlements mean that contribution revenue is redistributed between the premium pension system, the central government budget and the National Pension Funds, ensuring that the first two receive the correct amount for a year's contributions while the National Pension Funds receive the remainder. Settlements are also made between the national pension system and the various appropriations in the government budget charged with national old-age pension contributions. This is to ensure that the various appropriations pay the correct amount for national old-age pension contributions. These settlements are made three years after the year they apply to.

Figure 8.1 Pension Contributions



Contribution revenue increased between 2016 and 2017. The reason is that total earnings increased between these years. The contribution revenue of the inkomstpension system increased by 4.2 percent, whereas total earnings rose by roughly 4.7 according to the National Institute of Economic Research.

The difference between the National Pension Funds' reporting of contribution revenue and that of the Swedish Social Insurance Agency/the Swedish Pensions Agency (SEK -142 million) can be explained largely by periodization differences. The difference between reported contribution revenue in the premium pension system and that reported by the Swedish Social Insurance Agency/the Swedish Pensions Agency (SEK 106 million) is partly due to certain adjustment amounts being included in the amount for the premium pension system (see Note 18).

Table A Pension Contributions, Excluding Settlements etc. Allocated by Type of Contribution Base, 2017*
millions of SEK

	Employer, self-employed, and centr. govt. pension contribution	General pension contribution	Total
Earned income ¹	182,369	111,052	293,421
Transfer payments, see Table B	10,342	7,059	17,400
Pension-qualifying amounts, see Table C	17,103	0	17,103
Total	209,814	118,111	327,925

* The allocation of the general pension contribution between the two types of contribution base is estimated and is not shown in the accounting systems.

¹ Including sick pay and self-employment income, excluding transfer payments.

The general pension contribution is 7 percent of the sum of earned income and pension-qualifying transfer payments such as sickness cash benefits, but excluding sickness and activity compensation (disability pension). General pension contribution is only levied on incomes up to the ceiling of 8.07 of the income-related base amount.

The pension contribution paid by employers and self-employed on earned income, and by the central government on the above-mentioned transfer payments, is 10.21 percent. The central-government pension contribution on sickness and activity compensation and on so-called pension-qualifying amounts, which are not subject to the general pension contribution, is 18.5 percent.

The allocation in Table A refers to the contributions received by the Swedish Social Insurance Agency or the Swedish Pensions Agency in 2017.

Table B Pension Contributions for Transfer Payments, 2017*
millions of SEK

	Cent. govt. pension contrib.	General pension contrib.	Total
Sickness cash benefit	3,665	2,502	6,167
Rehabilitation cash benefit	150	102	252
Allowance for care of close relatives	19	13	32
Work injury compensation, etc.	227	155	382
Parental insurance	3,621	2,471	6,092
Care allowance	363	248	611
Unemployment cash benefit etc.	2,293	1,565	3,858
Educational allowance	0	0	0
Artists' Board	4	3	7
Allowance to disease carriers	0	0	0
Total	10,342	7,059	17,401

* The allocation of the general pension contribution among the different types of transfer payments is estimated and is not shown in the accounting systems.

Table C Pension Contributions Paid for Sickness/Activity Compensation and Pension-Qualifying Amounts, 2017
millions of SEK

Sickness and activity compensation ¹	6 876
Amounts credited for years with small children	7 468
Amounts credited for study ²	2 759
Total	17 103

1 Amount refers to contributions for disbursements of both pension-qualifying benefits and pension-qualifying amounts. In both cases the contribution is 18.5 percent.

2 A minor portion of amounts credited for study consists of pension-qualifying income.

Notes and Comments Regarding the Inkomstpension

Note 2 Pension Disbursements etc.

ATP and Inkomstpension Disbursements and Amounts Transferred to the European Community
millions of SEK

	2016	2017
Pension disbursements	282,379	295,994
ATP disbursements	175,971	174,032
Inkomstpension disbursements	106,408	121,962
Transfers to European Communities	5	7
Total	282,384	296,001

In 2017 a total of SEK 295,994 million in pensions was disbursed from the National Pension Funds, thereby reducing the pension liability to retirees.

According to the Act (2002:125) on Transfer of Pension Credit to and from the European Communities (EC), the value of pension credit for EC officials can be transferred from the National Pension Funds and the premium pension system to the service pension system of the EC. In 2017, over SEK 7 million was thus transferred from the National Pension Funds, reducing the pension liability to the economically active. In total, the National Pension Funds were charged with SEK 296,001 million as a result of pension disbursements or transfer of pension credit.

Note 3 Return on Funded Capital

Return on Funded Capital of the First–Fourth and Sixth National Pension Funds, 2017 *

millions of SEK

	First	Second	Third	Fourth	Sixth	*	Total 2017	Total 2016
Stocks and shares	28,986	33,148	32,314	33,676	3,581	0	131,705	83,290
Dividends received	4,897	5,898	5,017	5,736	105	0	21,653	24,817
Gain/-loss, listed and unlisted stocks and shares, net	24,089	27,250	27,297	27,940	3,476	0	110,052	58,473
Bonds and other interest-bearing securities	2,219	4,431	2,371	1,663	-12	0	10,672	18,500
Net interest	1,941	3,182	1,546	1,783	-12	0	8,440	9,328
Gain/-loss, interest bearing assets, net	278	1,249	825	-120	0	0	2,232	9,172
Other investments	-1,411	-8,296	-6,099	-4,929	18	0	-20,717	17,690
Gain/-loss, derivatives, net	1,075	-1,825	-1,694	-185	0	0	-2,629	-6,873
Net foreign-exchange gain/-loss	-2,486	-6,471	-4,405	-4,744	18	0	-18,088	24,563
Costs of commissions	-236	-281	-152	-132	0	0	-801	-847
Total	29,558	29,002	28,434	30,278	3,587	0	120,859	118,633

* The adjustments column is included to adjust for different rounding off effects. Source: Annual reports of the First, Second, Third, Fourth, and Sixth National Pension Funds, 2016 and 2017.

The item of Gain/-loss, derivatives, net includes all derivatives; there has therefore been an adjustment of net interest under Bonds and other interest-bearing securities.

The item Commission Expenses comprises fees which are not result-based. Result-based charges, brokerage fees and other expenses have reduced the return (see chapter 5 Costs of Administration and Capital Management).

Note 4 Costs of Administration

Costs of Administration

millions of SEK

	2016	2017
Costs of Insurance administration	863	906
Swedish Pensions Agency	457	473
Tax administration and other agencies ¹	406	432
Costs of fund administration	890	953
First National Pension Fund	187	209
Second National Pension Fund	217	218
Third National Pension Fund	186	195
Fourth National Pension Fund	195	214
Sixth National Pension Fund	105	117
Total	1,753	1,859

¹ Includes Enforcement Authority.

For the First–Fourth National Pension Funds, only internal administrative costs are reported. External costs of administration and custodial fees are referred to as costs of commissions and are reported as negative revenue (see Note 3). The costs of administration for the Sixth National Pension Fund also include certain external costs of administration. For all funds, result-based charges, transaction costs etc. have reduced the return shown in Note 3 (see chapter 5 Costs of Administration and Capital Management).

Owing to phase-in provisions applicable until 2020, only a portion of administrative costs (92 percent in 2017, see Note 11) is charged to the pension balances of the insured. Each fund finances its costs of administration by drawing on its own fund.

Note 5 Value of Change in Contribution Revenue

Contribution Revenue *

millions of SEK

	2016	2017
Change in contribution revenue	11,197	10,707
Contribution revenue 2017		267,407
Contribution revenue 2016	256,700	-256,700
Contribution revenue 2015	-245,503	
(Turnover duration 2017 + Turnover duration 2016)/2		x 29.99787
(Turnover duration 2016 + Turnover duration 2015)/2	x 30.25690	
Value of change in contribution revenue	338,787	321,187

* Duration in years.

Note 6 Value of Change in Turnover Duration

Turnover Duration *

millions of SEK

	2016	2017
Change in turnover duration	-0.23680	-0.28126
Turnover duration 2017		29.85724
Turnover duration 2016	30.13850	-30.13850
Turnover duration 2015	-30.37530	
(Contribution revenue 2017 + contribution revenue 2016)/2		x 262,054
(Contribution revenue 2016 + contribution revenue 2015)/2	x 251,102	
Value of change in turnover duration	-59,461	-73,705

* Duration in years.

Basis for Calculating Turnover Duration

	2013	2014	2015	2016	2017
Turnover duration	31.40097	30.37530	30.13850	29.85724	
Pay-in duration	20.40760				
Pay-out duration	10.99337				
Income age		45.21646	45.45309	45.66774	
Payment age		75.59176	75.59159	75.52498	
Turnover duration for contribution asset calculation	31.47808	31.44136	30.37530	30.13850	29.85724

As of the financial year 2015 the calculation of turnover duration has changed. Turnover duration is now calculated directly as the difference between the expected payment age and income age. Previously the corresponding calculation was made in a round-about way via expected pay-in and pay-out time. Since income age cannot be calculated until all pension credit have been determined, the latest year for which turnover duration can be calculated is the year before the accounting year.

Prior to the accounting year 2015, the median of the previous three years' turnover durations, called smoothed turnover duration, was used. Since then the most current turnover duration is used (see "Turnover duration" for 2016 and "Turnover duration for contribution asset calculation" for 2017). The bottom line of the table "Turnover duration for contribution asset calculation" shows which turnover duration has been used for each financial year. Note, however, that the calculated balance ratio refers to the reporting year + 2 years, namely the turnover duration 29.85724 for the year 2017 is used for the calculation of the balance ratio for the year 2019.

How turnover duration is calculated is described in Appendix B Mathematical Description of the Balance Ratio, Turnover Duration.

Note 7 New Pension Credit and ATP Points

The items of New Pension Credit and ATP points have been adjusted with other amounts that have affected the size of the pension liability. These adjustment amounts are explained in the tables below.

Value of New Pension Credit *
millions of SEK

	2016	2017
Estimated inkomstpension credit earned	253,403	267,211
Non-adjusted Estimated Pension Credit for Inkomstpension	256,098	267,211
Adjustment Amount for Estimated Pension Credit for Inkomstpension	-2,695	0
Estimated value of ATP points earned	272	73
Adjustment amount, new pension credit	9,748	8,019
Confirmed inkomstpension credit earned in <i>t-1</i> ¹	240,153	252,540
Estimated inkomstpension credit earned in <i>t-1</i>	-240,092	-253,403
Adjustments affecting pension balances, etc.	-3,585	-3,386
Change in amounts disbursed	13,272	12,268
Adjustment amount, new ATP points	3,418	2,516
Effect of difference between assumed value for year <i>t</i> and estimate for <i>t-1</i> etc.	639	1,529
Value of other paid-in pension contributions for ATP ²	260	86
Change in amounts disbursed	2,519	901
Total ³	266,840	277,819

* The table is reported after the income year

1 Pension credit earned in 2015 has been adjusted downward by SEK 4,175 million to SEK 240,153 million. Pension credit earned in 2016 has been adjusted downward by SEK 2,690 million to SEK 252,540 million.

2 Excluding value of ATP points.

3 Summates to SEK 266,841 million but is adjusted to SEK 266,840 million due to rounding effects.

Since the tax assessment for the year of the financial statements had not been completed when the statements were prepared, the value of pension credit earned during this year can only be estimated. The adjustments affecting the size of pension balances also represent tax-assessment changes etc.; see Note 14, Table A. The change in disbursed amounts refers to changes in the pension liability to retirees as a consequence of other changes in disbursements than those due to indexation; see Note 14, Table C.

Of the ATP points earned during a single year, only a minor portion will have any impact on future pensions. The portion estimated to contribute to higher pensions has been reported in Note 14, Table B, as the estimated value of ATP points earned. However, all pension contributions relating to ATP contribute to an increase in the estimated pension liability. The last year for which ATP points may be earned is 2017. This means that pension contributions, except for administratively caused discrepancies, will not be equal in amount to the pension credit earned until 2018.¹

¹Paid-in contributions for ATP exceed the value of ATP pension points earned. The explanation for this difference is that in the ATP system, pension credit is often earned relatively early in working life. Individuals aged 55 who are already past their 15 best pay-in years (and who have worked for at least 30 years) cannot increase their ATP pension at all, even if they keep working and paying contributions until age 65. This situation illustrates one of the disincentives in the ATP system for older members of the work force to contribute to the labour supply.

Note 8 Indexation

Indexation, 2017

millions of SEK

	Active	Retired	Total
Indexation of Pension Balance and Pensions ¹	141,203	137,954	279,157
Change in Indexation regarding Pension Liability ²	106,991	13,964	120,955
Total	248,194	151,918	400,112

1 see Table A

2 see Table B

Indexation, 2016

millions of SEK

	Active	Retired	Total
Indexation of Pension Balance and Pensions ¹	228,788	173,505	402,293
Change in Indexation regarding Pension Liability ²	-88,242	-94,611	-182,853
Total	140,546	78,894	219,440

1 see Table A

2 see Table B

Table A Indexation of Pension Balance and Pensions, 2017

millions of SEK

	Active	Retired	Total
Inkomstpension, indexation	139,191	67,086	206,277
Effect of income index	81,676	56,510	138,186
Effect of balance ratio	57,515	10,576	68,091
ATP, indexation	2,012	70,868	72,880
Effect of income index	1,181	59,619	60,800
Effect of balance ratio	831	11,158	11,989
Effect of price index		92	92
Total	141,203	137,954	279,157

Indexation of Pension Balance and Pensions, 2016

millions of SEK

	Active	Retired	Total
Inkomstpension, indexation	223,664	77,409	301,073
Effect of income index	188,403	26,855	215,258
Effect of balance ratio	35,261	50,554	85,815
ATP, indexation	5,124	96,096	101,220
Effect of income index	4,316	33,306	37,622
Effect of balance ratio	808	62,696	63,504
Effect of price index		94	94
Total	228,788	173,505	402,293

The pension liability changes by the change in the income index unless balancing is activated in the system. When balancing is activated, the pension liability changes instead by the balance index (except for the ATP liability for individuals under age 65). The change in the balance index consists of the change in the income index multiplied by the current damped balance ratio. For the balance index 2016 and earlier the balance ratio was used. The value of indexation refers to the indexation that has affected the pension liability as of December 31, 2017. For those who have drawn ATP before age 65, the pension liability is indexed by the change in the price-related base amount until they reach age 65.

Table B Change in Indexation regarding Pension Liability, 2017

millions of SEK

	Active	Retired	Total
Last year's liability adjustment	188,538	-22,008	166,530
This year's liability adjustment	-81,548	35,973	-45,575
Total	106,991	13,965	120,955

Change in Indexation regarding Pension Liability, 2016

millions of SEK

	Active	Retired	Total
Last year's liability adjustment	100,296	-116,619	-16,323
This year's liability adjustment	-188,538	22,008	-166,530
Total	-88,242	-94,611	-182,853

Note 9 Value of the Change in Life Expectancy

Value of the Change in Life Expectancy, 2017

millions of SEK

	Active	Retired	Total
Inkomstpension		-5,108	-5,108
ATP	-136	-10,992	-11,128
Total	-136	-16,100	-16,236

Value of the Change in Life Expectancy, 2016

millions of SEK

	Active	Retired	Total
Inkomstpension		-1,857	-1,857
ATP	-81	-5,386	-5,467
Total	-81	-7,243	-7,324

As used here, the term “life expectancy” refers to the assumed length of time for which an average pension amount is disbursed, so-called economic life expectancy, which is expressed in terms of an economic annuity divisor. In the calculation of these divisors, consideration is given to the advance rate of 1.6 percent. The method of calculating economic annuity divisors is shown in formula B.7.5 in Appendix B. The selection of data used in calculating the economic annuity divisors was changed in connection with last year’s income statement. This means that only death is now used as the basis for the expected pension payment period. Previously the calculation was also affected by pension deferral. Another difference is that the risk period has been changed to a full year, after having been approximately 11 months. An average of the preceding three years’ economic annuity divisors is used in the calculation, leaving the previous year’s values unchanged. Thus its impact is gradual. For more details, see the report “VER 2016-390 *Payment Age and Economic Annuity Divisors*”.

A higher economic life expectancy will increase the ATP liability, both to the economically active and to retirees. For the inkomstpension system, only the pension liability to retirees increases if life expectancy goes up.

The value of the change in life expectancy is the difference between the pension liability calculated with the economic annuity divisors used in the year of the financial statements, and the pension liability calculated with the economic annuity divisors used in the previous year.

Note 10 Inheritance Gains Arising, Inheritance Gains Distributed

Inheritance Gains, Arising and Distributed

millions of SEK

	2016	2017
Inheritance gains arising	12,452	12,721
60 years or older	5,685	5,921
Younger than 60 years ¹	6,767	6,800
Inheritance gains distributed	14,875	15,155
60 years or older	7,994	8,386
Younger than 60 years	6,881	6,769

1 Died last year, distributed current year.

The pension balances of deceased persons (inheritance gains arising) are distributed to the survivors of the same age. The distribution is made as a percentage increase in pension balances according to an inheritance gain factor. Until the year when a birth cohort reaches age 60, the inheritance gains distributed are those actually arising. Because of the taxation procedure, allocation lags by one year. The inheritance gain factor is thus determined by the total pension balances of decedent persons of the same age. The inheritance gains from persons dying before their 60th year in 2016 (born in 1957 or later) were distributed to the respective birth cohorts in 2017. The difference between inheritance gains arising and inheritance gains distributed is explainable in part by the annual adjustment of pension balances for changes in tax assessments.

Beginning with the year when a birth cohort reaches age 60, the inheritance gains distributed are not those actually arising, but those expected to arise. Inheritance gain factors are estimated on the basis of the mortality observed by Statistics Sweden for an earlier period. Partly because this mortality will not be exactly the same as actual mortality in the year concerned, there is a discrepancy between inheritance gains arising and inheritance gains distributed. For those dying in their 60th year or at a higher age in 2017 (born in 1957 or earlier), the inheritance gains are distributed in the same year.

Note 11 Deduction for Costs of Administration

Deduction for Costs of Administration

millions of SEK

	2016	2017
Deduction for Costs of Administration	1,591	1,653

Costs of administration are financed by a percentage deduction from the pension balances of the insured. In order to avoid charging a disproportionately high cost to younger birth cohorts during the period when the ATP is being phased out, this administrative cost deduction is being introduced in steps. In 2017, 92 percent of administrative costs were financed by a deduction from pension balances. This deduction will increase by 2 percentage points each year and thus will not cover 100 percent of administrative costs until 2021.

The calculation of the administrative cost factor is based on budgeted costs of administration, costs of the National Pension Funds for the current year and the pension balances for the preceding year (see Appendix A). The difference between the monetary amount of the deduction made and the cost confirmed is considered in the calculation of the administrative cost factor for the following year.

The deduction for administrative costs is made by multiplying pension balances by the administrative cost factor. The deduction in 2017 was 0.0305 percent and totalled SEK 1,653 million. In 2016 the deduction was 0.0302 percent.

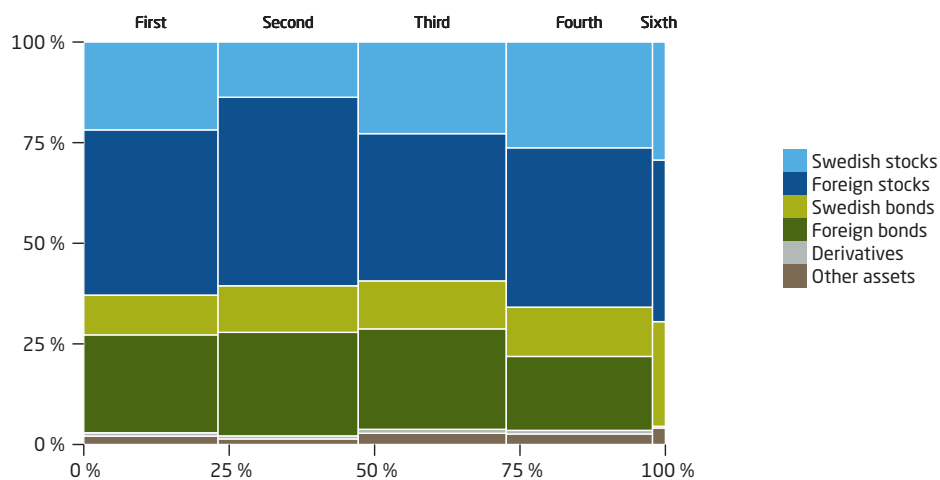
Note 12 Fund Assets

Assets and Liabilities of the Buffer Fund, 2017

millions of SEK

	First	Second	Third	Fourth	Sixth	Total 2017	Total 2016
Assets							
Stocks and shares	209,896	211,068	218,356	239,506	22,208	901,034	849,144
Swedish	72,868	47,818	83,747	95,547	9,371	309,351	282,500
Foreign	137,028	163,250	134,609	143,959	12,837	591,683	566,644
Bonds and other interest-bearing securities, net	114,226	129,978	135,721	111,321	8,311	499,557	463,818
Swedish bonds	33,021	40,330	43,889	44,532	8,311	170,083	165,294
Foreign bonds	81,205	89,648	91,832	66,789	0	329,474	298,524
Derivatives	2,753	2,647	3,636	3,254	136	12,426	13,061
Other assets	6,986	4,840	10,257	9,528	1,310	32,921	33,228
Total Assets	333,861	348,533	367,970	363,609	31,965	1,445,938	1,359,251
Liabilities							
Derivatives	-645	-1,490	-5,228	-2,265	-216	-9,844	-12,935
Others	-707	-1,112	-17,503	-4,735	-141	-24,198	-24,826
Total Liabilities	-1,352	-2,602	-22,731	-7,000	-357	-34,042	-37,761
Total	332,509	345,931	345,239	356,609	31,608	1,411,896	1,321,490

Figure 8.2 Fund Assets



Other assets include cash and bank balances, prepaid expenses and accrued revenue etc. Liabilities, aside from derivative instruments, include other liabilities, prepaid revenue and accrued expenses.

Note 13 Contribution Asset

Contribution Asset*

millions of SEK

	2016	2017
Contribution revenue	256,700	267,407
Turnover duration	x 30.13850	x 29.85724
Contribution Asset	7,736,553	7,984,035

* Duration in years.

See Notes 5–6 and Appendix B for the values and formulas used in calculating contribution revenue and turnover duration.

Note 14 Pension Liability

Pension Liability, 2017

millions of SEK

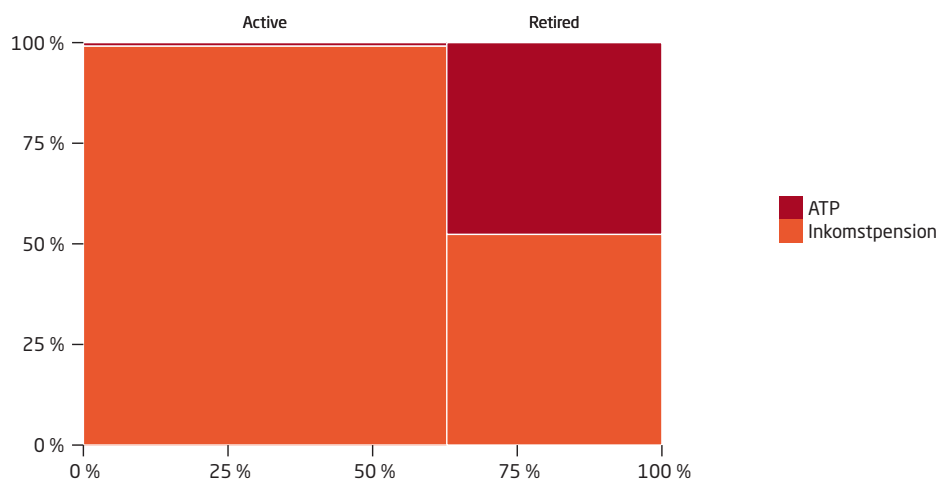
	Active	Retired	Total
Inkomstpension	5,684,576	1,776,974	7,461,550
ATP	47,816	1,616,663	1,664,479
Total	5,732,392	3,393,637	9,126,029

Pension Liability, 2016

millions of SEK

	Active	Retired	Total
Inkomstpension	5,519,951	1,586,381	7,106,332
ATP	75,726	1,698,444	1,774,170
Total	5,595,677	3,284,825	8,880,502

Figure 8.3 Pension Liability, 2017



The above table is shown to facilitate comparisons with previous years but is not used since financial year of 2015 because of new calculation rules (SFS 2015:676 and 2015:795).

The pension liability to retirees for the ATP and the inkomstpension is calculated in the same manner for both. The liability of a cohort is calculated as the product of the cohort's pension disbursements in the month of December multiplied by the factor 12 and the average economic lifetime of the cohort. The total liability to retirees is the sum of the cohorts' pension liabilities. Average economic lifetime is expressed in the form of economic annuity divisors. The inkomstpension liability to the economically active consists of the total pension balances of all insured persons in this category as of December 31, 2017, with the addition of the estimated pension credit earned in 2017. The method of calculating the pension liability to the economically active and to retirees, as well as the economic annuity divisors, is shown in Appendix B, formula B.7.1–B.7.5.

The ATP liability to the economically active cannot be calculated directly from the data in the records of pension credit earned. In order to determine the ATP liability, an estimate is made of the ATP of every individual (born between 1938 and 1953) in the year when they reach 65. The estimated annual amount is multiplied by the economic annuity divisor for 65-year-olds in the year of the accounts. Persons older than 65 who have not yet begun to draw their entire pension at the time of calculation are assumed to do so in the following year. To obtain the present value of the estimated pension liability, the liability is reduced by the individual's expected future contributions and discounted by an assumed future increase in the income index. In the calculation it is assumed that the average income will increase by 2 percent

annually. The ATP liability to the economically active will gradually diminish with the phase-out and will in principle be gone entirely by 2018.

Table A Analysis of the Change in Inkomstpension Liability to the Economically Active *
millions of SEK

	2016	2017
Inkomstpension liability to the economically active, December 31, <i>t-1</i>	5,274,769	5,519,951
Of which adjusted estimated pension credit for inkomstpension earned in year <i>t-1</i>	-240,092	-253,403
Pension balances as of December 31, <i>t-1</i>	5,034,677	5,266,548
Inheritance gains arising from persons dying before age 60 ¹	-6,767	-6,800
Adjustments affecting pension balances ²	-422	-346
Opening pension balance in year <i>t</i>	5,027,488	5,259,402
Inheritance gains arising, persons dying at or after age 60	-5,685	-5,921
Changes in tax assessments etc. affecting pension balances	-3,163	-3,040
Adjusted confirmed inkomstpension credit earned in year <i>t-1</i> ³	240,153	252,540
Distributed inheritance gains from persons dying at or after age 60	7,994	8,386
Distributed inheritance gains from persons dying before age 60	6,881	6,769
Indexation	223,664	139,191
Deduction for administrative costs	-1,591	-1,653
Pensions drawn	-232,163	-242,320
Pensions revoked	2,970	4,011
Pension balances as of December 31, <i>t</i>	5,266,548	5,417,365
Estimated inkomstpension credit earned in year <i>t</i>	253,403	267,211
Non-adjusted Estimated Pension Credit for Inkomstpension	256,098	267,211
Adjustment Amount for Estimated Pension Credit for Inkomstpension	-2,695	0
Inkomstpension liability to the economically active	5,519,951	5,684,576

* The figures for 2016 are shown only for comparison.

1 Distributed in year *t-1*.

2 Transfers to the European Communities (see Note 2), adjustments for deceased persons, sealed cases, etc.

3 See Note 7.

Table B Analysis of the Change in ATP Liability to the Economically Active*
millions of SEK

	2016	2017
ATP liability to the economically active, December 31, <i>t-1</i>	115,620	75,726
Effect of difference between assumption for year <i>t</i> and estimate in <i>t-1</i> etc.	639	1,529
Opening ATP liability, year <i>t</i>	116,259	77,255
Indexation	5,124	2,012
Estimated value of paid-in contributions for the ATP, <i>t</i>	272	73
Pensions drawn	-46,108	-31,474
Value of other paid-in pension contributions for the ATP	260	86
Value of change in life expectancy	-81	-136
ATP liability to the economically active	75,726	47,816

* The figures for 2016 are shown only for comparison.

Table C Analysis of the Change in Pension Liability to Retirees, ATP and Inkomstpension, 2017
millions of SEK

	Inkomstpen- sion	ATP	Total
Pension liability to retirees, December 31 <i>t-1</i>	1,586,381	1,698,444	3,284,825
Additional liability to the economically active ¹	238,309	31,474	269,783
Change in amounts disbursed	12,268	901	13,169
Pensions disbursed ²	-121,962	-174,032	-295,994
Indexation	67,086	70,868	137,954
Value of change in life expectancy	-5,108	-10,992	-16,100
Total	1,776,974	1,616,663	3,393,637

1 Inkomstpension: Net of Pensions drawn and Pensions revoked, see Table A. ATP: See Table B.

2 See Note 2.

The liability to retirees is changed by indexation, increased by higher life expectancy and decreased by disbursements made during the year. Pension amounts can change for reasons such as new pension credit earned, changes in marital status (applies to the ATP), changes in taxation etc. Such changes in liability are reported as changes in disbursements (changes in amounts). The liability to retirees also increases with the approval of new pensions. This increase in the pension liability is accompanied by a corresponding reduction in the pension liability to the economically active.

Table D Explanation of Change in Pension Liability prior to Calculation of Damped Balance Ratio, 2017
millions of SEK

		Indexation	Balancing	Total
Pension balance	5,417,365	-81,548		5,335,817
Liability to pensioners	3,393,637		35,973	3,429,610
Adjusted estimate of pension credit for inkomstpension earned in 2017	267,211			267,211
Pension liability ATP pension gainfully employed	47,816			47,816
Total				9,080,454

The liability for gainfully employed persons' inkomstpension is calculated as the sum of all pension balances on December 31 2017 divided by the ratio between the income index of 2018 and that of 2017. During balancing periods the liability for pensioners is adjusted by the damped balance ratio for year $t + 1^2$.

²For this year's report the balancing effect was used in indexation between 2017 and 2018, amounting to 1.0106 (income index for 2017 divided by the balance index for 2017). For more details see VER 2018-99. This was because the balancing period ended in 2018.

Notes and Comments Relating to the Premium Pension

Note 15 Pension Disbursements

Pension Disbursements Premium Pension		
millions of SEK		
	2016	2017
Pension disbursements	6 962	8 585
Fund insurance	6112	7570
Traditional insurance	850	1015
Transfers to European Communities	1	2
Total	6 963	8 587

At the time of retirement, a pension saver has the option of retaining her/his accumulated balance in fund insurance; the amount of the pension will then depend on the rate of return of the funds chosen by the saver. The other option is to switch to traditional insurance with profit annuity, either on retirement or later. With traditional insurance with profit annuity, the pension is disbursed as a nominal guaranteed monthly amount. If the management of the traditional insurance with profit annuity capital achieves a return higher than the guaranteed rate, pension savers will receive a rebate in the form of a monthly supplement, which may vary from year to year. In 2017, SEK 495 million was disbursed in supplementary amounts, as shown in Note 23. In 2016 the supplementary amount was SEK 635 million.

According to the Act (2002:125) on Transfer of Pension Credit to and from the European Communities (EC), the value of pension credit for EC officials can be transferred from the National Pension Funds and the premium pension system to the service pension system of the EC. In 2017 the sum of SEK 2 million was transferred from the premium pension.

Note 16 Return on Funded Capital

Return on Funded Capital, 2017

millions of SEK

	Fund Insurance	Traditional insurance	Total 2017	Total 2016
Return				
Stocks and shares	121,577	1,279	122,856	87,851
Direct return	30	30	60	71
Realized and unrealized capital gains	121,547	1,248	122,795	87,781
Bonds and other interest-bearing securities	132	370	502	1,724
Direct return (net interest)	-12	-4	-16	682
Realized and unrealized capital gains	144	375	519	1,041
Net foreign-exchange gain/-loss	-1,767	0	-1,767	2,585
Total Return	119,942	1,649	121,591	92,160
Allocated Management Fees	4,133	16	4,149	4,242
Change, Traditional insurance		3,079	3,079	2,556
Total	124,075	4,744	128,819	98,958

The return earned includes realized and unrealized foreign-exchange gains and losses after deduction of fund management costs and distributed rebates of fund management fees.

The pension liability was changed by the return on the premium pension funds, which totals SEK 121,591 (92,160) million.

Note 17 Costs of Administration

Costs of Administration

millions of SEK

	2016	2017
Operating expenses	430	470
Financial items, net	-18	-2
Total	412	468

The item of Financial items, net, refers primarily to borrowing expenses, gain/-loss on trade inventories and interest revenue (net). Costs of fund management are paid directly from insurance assets and are not included in the premium pension system's operating expenses. Total costs of administration in 2017 were SEK 468 million, of which SEK 10 million refers to change in traditional insurance with profit annuity. The corresponding amount for costs of administration in 2016 was SEK 412 million, of which SEK 9 million refer to traditional insurance with profit annuity. A presentation of the respective gross and net reported costs is provided in the chapter Costs of Administration and Capital Management.

Note 18 New Pension Credit

New Pension Credit

millions of SEK

	2016	2017
Preliminary contribution revenue, including interest on the premium pension earned in 2015/2016	39,104	40,436
Adjustment amount, confirmed pension credit	726	439
Confirmed pension credit, including interest, for the premium pension earned in 2015/16 and 2016/17	37,979	39,543
Preliminary contribution for the premium pension earned in 2015/16 and 2016/17	-37,253	-39,104
Change in pension credit	25	6
Total	39,855	40,881

In the operations of the premium pension system, the equivalent of contribution revenue is new pension credit including interest for the period during which the contribution moneys are managed before being invested in the funds chosen by the insured. During the year, changes in pension credit have come from previous income years. The sum of new pension credit for premium pension in 2017 was SEK 40,881 million, in 2016 SEK 39,855 million.

Note 19 Inheritance Gains Arising and Distributed

Inheritance Gains, Arising and Distributed

millions of SEK

	2016	2017
Inheritance gains arising	2,346	2,561
Inheritance gains distributed	2,346	2,561

Inheritance gains arising and distributed are analogous to decedents' capital. Inheritance gains are distributed once a year; in addition, a minor portion is distributed during the course of the year in connection with changeovers from fund insurance to traditional insurance with profit annuity. In 2017 inheritance gains distributed were SEK 2,561 million; this amount was determined by the sum of the capital released by deaths in calendar year 2016. The corresponding amount distributed in 2016 was SEK 2,346 million. This item includes reductions in premium pension credit when premium pensions are transferred between spouses.

Note 20 Deduction for Costs of Administration

Costs of Administration

millions of SEK

	2016	2017
Deduction for costs of administration	542	602

The amount of SEK 602 (542) million is for the fees deducted by the Swedish Pensions Agency to finance the costs of administration for the premium pension system in 2017 (2016). The average fee for 2017 (2016) was equivalent to 0.06 (0.07) percent of pension savers' account balances with a ceiling of SEK 125 (120). During the build-up phase and until 2018, the premium pension system will be financed by a combination of fees deducted, interest-bearing overdrafts for working capital needs and borrowing within authorized limits from the National Debt Office. The amount of the fee deducted is based on the cost level forecast for 2017.

Note 21 Insurance Assets

Insurance Assets, 2017

millions of SEK

	Fund insurance	Traditional insurance	Temporary management	Total 2017	Total 2016
Stocks and shares	1,050,278	11,732		1,062,010	915,119
Bonds and other interest-bearing securities	59,723	18,948	37,478	116,149	106,436
Trade in progress and inheritance gains arising	3,509	65		3,574	2,811
Total	1,113,510	30,745	37,478	1,181,733	1,024,366

In 2017, insurance assets in fund insurance amounted to SEK 1,113,510 million, of which SEK 3,509 million was attributable to current trading and mortality capital.

Temporary management of preliminary contributions refers to income year 2017. As of December 31, 2017, there were 5,881,940 premium pension savers, all of them in fund insurance, and 1,533,791 pensioners, of whom 1,231,476 were in fund insurance and 302,315 in traditional insurance with profit annuity.

Note 22 Other Assets

Other Assets

millions of SEK

	2016	2017
The Swedish Pensions Agency's administrative inventory of fund shares (trading inventory)	64	287
Other assets	5,550	5,263
Total	5,614	5,550

The Swedish Pensions Agency's administrative inventory of fund shares facilitates trade in fund shares by reducing the number of trading transactions with fund managers.

Other assets consist of cash and bank balances, fund trading in progress, other receivables and accrued interest revenue.

Note 23 Change in Owner Equity

Change in Owner Equity, 2017

millions of SEK

	Fund insurance	Traditional insurance	Total 2017	Total 2016
Opening owner equity:				
Consolidation fund	-399	8,921	8,522	6,471
Rebate paid from consolidation fund		-495	-495	-635
Net income for the period	134	3,079	3,213	2,686
Total owner equity	-265	11,505	11,240	8,522

The Swedish Pensions Agency reports a negative owner equity overall for fund insurance operations. The solvency rules of the Insurance Business Act do not apply to the Swedish Pensions Agency, but the deficit is financed by credit at the National Debt Office. It is expected that a balance between assets and liabilities will be reached by 2018. Traditional insurance with profit annuity reports a positive result that will be added to the consolidation fund as owner equity. The amounts in the consolidation fund are distributed to pensioners as refunds in connection with pension disbursements.

Note 24 Pension Liability

Pension Liability

millions of SEK

	2016	2017
Fund insurance	962,304	1,113,511
Traditional insurance	17,126	19,272
Liabilities in regard to preliminary contributions	36,034	37,683
Total	1,015,464	1,170,466

The pension liability is a liability to pension savers and to pensioners. Pension liability in fund insurance is linked primarily to fund shares and is affected by the development of the market value of the funds chosen. Fund holdings are valued at the price quoted on the closing day of the accounts and correspond to the value of insurance assets in Note 21.

Pension liability in traditional insurance with profit annuity is calculated for each insurance as the capital value of remaining guaranteed disbursements. The value is calculated on assumptions about future return, life expectancy and operating expenses. The value of the asset is shown in Note 21.

Information on how the economic annuity divisors for fund insurance and traditional insurance with profit annuity are calculated is found in Appendix A Calculation Factors.

Liabilities in regard to preliminary contributions correspond to the assets invested under temporary management; the value of these assets can be found in Note 21.

Table A Pension Liability, 2017
millions of SEK

	Fund insurance	Traditional insurance	Liabilities in regard to preliminary contributions
Premium pension capital, December 31, 2017	1,113,511	19,272	37,682
Pension liability, December 31, 2016	962,304	17,127	36,054
Change in value	119,942	1,649	
Confirmed premium pension credit earned in 2016	39,213	330	-39,543
Preliminary contributions, premium pension, earned in 2017			40,436
Management fees allocated, etc.	4,133	16	
Inheritance gains arising	2,367	195	
Settlement, preliminary contributions, previous years			60
Change in pension credit for the premium pension		0	
Decrease in liability because of pensions drawn in 2017	-7,570	-1,015	
Switch to Traditional insurance from fund insurance	-4,252	4,252	
Inheritance gains distributed ¹	-2,367	-195	
Deduction for costs of administration	-602		
Change in pension liability		-3,079	675
Other	343	-8	
Adjustment affecting premium pension capital			
Total	1,113,511	19,272	37,682

1 Inheritance gains, capital released in 2016, to be allocated in 2017.

The pension liability is changed by new pension credit earned, preliminary contributions, changes in the extent of pension withdrawal, changes in pension credit due to changes in taxation, changes in value of assets, costs of administration, pension disbursements and estimates of future mortality for the insured.

Note 25 Other Liabilities

Other Liabilities

millions of SEK

	2016	2017
Other liabilities	5,990	5,574
Share of consolidated Swedish Pensions Agency assets, liabilities and result, net	4	5
Total	5,994	5,579

Other liabilities consist chiefly of fund trading in progress, borrowings from the National Debt Office, accrued management fees and accrued interest fees.

The accounting for the premium pension's share of the Swedish Pensions Agency's assets, liabilities and results has been simplified so that a net amount is reported. It is included so that the balance sheet will balance.

Appendix A Calculation Factors

The Social Insurance Code 58 Ch. 10 § (SFB) (2010:110) requires that the income index be calculated for each year. By Government decision, the Swedish Pensions Agency is to calculate and prepare proposals for an income index, which the Government then confirms. In addition, the Agency is required by the Regulations for the Earnings Related Old Age Pension (1998:1340) to calculate and confirm factors for inheritance gains, administrative costs and annuity divisors.

According to 64 Ch. 3 § SFB, premium pension operations are to be conducted according to sound insurance principles. These principles, as interpreted by the Swedish Pensions Agency, govern the calculation of the bonus rate, inheritance gains and annuity divisors for the premium pension. Further, the Swedish Pensions Agency is to calculate the fee that will finance premium pension operations.

Income Index

The change in the income index shows the development of the average income. Here, income refers to pension-qualifying income without limitation by the ceiling, but after deduction of the individual pension contribution.

$$I_t = I_{t-1} \cdot \frac{u_{t-1}}{u_{t-2}} \quad (\text{A.1.1})$$

$$u_t = \frac{Y_t}{N_t} \quad (\text{A.1.2})$$

t	calendar year
I_t	income index year t
u_t	average pension-qualifying income in year t . The denominator uses the same income data previously used to calculate the income index for the previous year and is therefore an estimate
Y_t	total pension-qualifying income without limitation by the ceiling, person aged 16–64 in year t , after deduction of the individual pension contribution
N_t	number of persons aged 16–64 with pension-qualifying income in year t

As of 2017, the income index is calculated according to new rules (SFS 2015: 676). The income index for year t will measure the change in average income between the years $t - 2$ and $t - 1$. Pension qualifying income is first known after taxation, that is, in December of the year following the income year. This means the income of the two most recent years is based on estimates. The income data used in the denominator is the same income data used for previous years. For 2018, the income index was calculated in a special way $I_t = I_{t-2} \cdot u_{t-1}/u_{t-3}$. Income index for year t is thus corrected by the outcome for the year $t - 3$. In the denominator for this calculation year, the outcome of average pension-qualifying income is used.

Balance Index

When balancing is activated, the balance index is used instead of the income index.

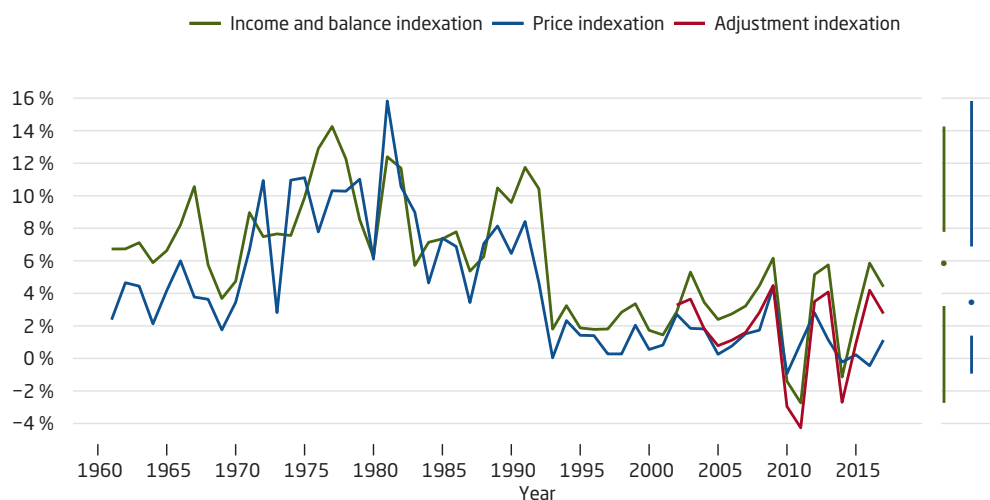
$$B_t = I_t \cdot BT_t^* \quad (\text{A.2.1})$$

$$B_{t+1} = B_t \cdot \left(\frac{I_{t+1}}{I_t} \right) \cdot BT_{t+1}^* = I_{t+1} \cdot BT_t^* \cdot BT_{t+1}^* \quad (\text{A.2.2})$$

B_t balance index year t
 I_t income index year t
 BT_t^* damped balance ratio year t^1

At the turn of the year $(t - 1) \rightarrow t$, indexation takes place via multiplication of pensions by the ratio between the balance index for year t and the income index for year $t - 1$ divided by 1.016, and of pension balances by the ratio between the balance index for year t and the income index for year $t - 1$. At the end of year t , there is analogous indexation of the ratio between the balance index for year $t + 1$ and the balance index for year t . Indexation by the balance index ceases when the balance index reaches the level of the income index.

Figure A.1 Indexation



The point between the vertical lines is the median value. The starting point for the upper vertical line is the 75th percentile; the ending point is the maximum value. The starting point for the lower vertical line is the 25th percentile; the ending point is the minimum value.

Rate of return

In the premium pension system the amount to pay out is recalculated each year based on the value of the premium pension account. For those with fund insurance the yield from the account will depend on the fund returns, while for those with traditional insurance with profit annuity the value of the account will depend on the rate of return. The guaranteed amount in traditional insurance with profit annuity is only recalculated when more money comes in. The rate of return does not affect the amount

¹For balance index 2016 and earlier the balance ratio was used (SFS:676).

of the life-insurance provisions since the pension liability is calculated on the basis of expected future payments of guaranteed amounts.

Figure A.2 Rate of Rebate and Guarantee



The point between the vertical lines is the median value. The starting point for the upper vertical line is the 75th percentile; the ending point is the maximum value. The starting point for the lower vertical line is the 25th percentile; the ending point is the minimum value.

Inheritance Gain Factors for the Inkomstpension

The pension balances of deceased persons are credited to the survivors in the same age group in the form of inheritance gains. For the economically active, this is done through multiplying the pension balances of the survivors by an annually calculated inheritance gain factor for the inkomstpension.

$$AF_{i,t} = \begin{cases} 1 + \frac{\sum_{j=2}^{17} PBd_{j-1,t-1}}{\sum_{j=2}^{17} PB_{j-1,t-1}}, & i = 2, 3, \dots, 17 \\ 1 + \frac{PBd_{i-1,t-1}}{PB_{i-1,t-1}}, & i = 18, 19, \dots, 60 \\ \frac{L_{i-1,t} + L_{i,t}}{L_{i,t} + L_{i+1,t}}, & i = 60, 61, \dots \end{cases} \quad (\text{A.4.1})$$

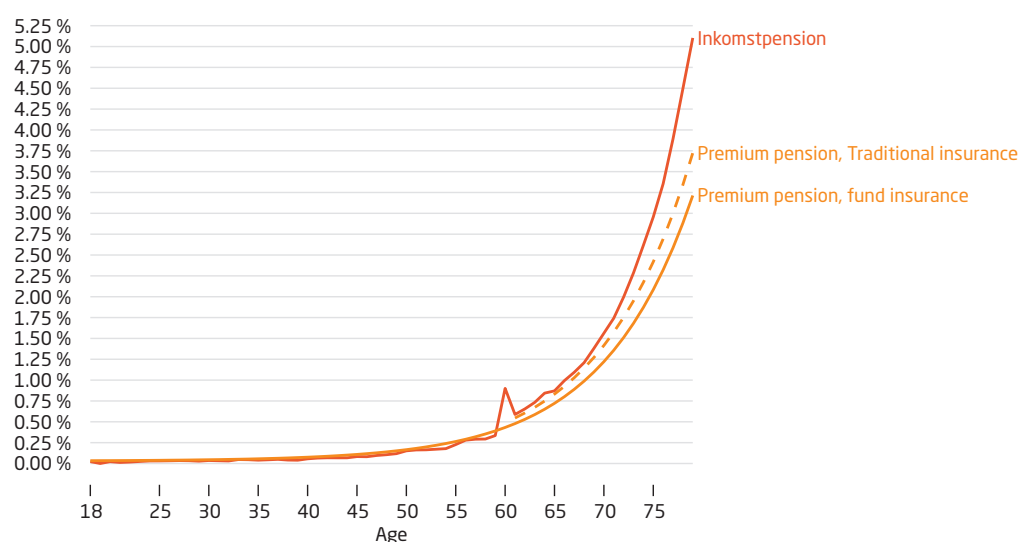
- i age at end of year t
- $AF_{i,t}$ inheritance gain factor, year t for age group i
- $PBd_{i,t}$ pension balances of persons dying in year t in age group i
- $PB_{i,t}$ total pension balances of survivors in year t in age group i
- $L_{i,t}$ number of survivors in year t in age group i out of 100,000 born, according to the life span data of Statistics Sweden for the five-year period immediately preceding the year when the insured reaches age 60 for $i = 60-64$ and age 64 for $i = 65$ or older.

For persons 60 years of age or less, the inheritance gain factor is calculated as the sum of the pension balances of the deceased divided by the sum of the pension balances for the survivors in the same age group. For the group aged 2–17 years, a common inheritance gain factor is calculated. As there is some

delay in information on persons dying during the year, the distribution of inheritance gains to persons aged 60 or less is made with a time lag of one year. For older persons, inheritance gain factors are calculated on the basis of the life-expectancy statistics from Statistics Sweden.

Inheritance gains arising after retirement are implicitly taken into account in the annuity divisor, through redistribution from individuals who die earlier to those who live longer. For the purpose of distributing inheritance gains by the same principle for both the economically active and retirees in the same birth cohort, the method of allocation is changed from age 60 on. The change of method is made in the year when the individual turns 60 in order to avoid delay in the allocation of inheritance gains for the year prior to retirement for persons who begin drawing their pensions at age 61. In the year when an insured turns 60, he or she is credited with double inheritance gains because of the two different procedures.

Figure A.3 Inheritance Gains



The inheritance gain factor for the inkomstpension for 60-year-olds is shown in the diagram as the two inheritance gain factors multiplied by each other. In the actual distribution of inheritance gains, however, the two different inheritance gains factors are applied to different bases.

The impact of inheritance gains on the pension liability is limited, for the pension balances of deceased persons are redistributed to the survivors. There is, however, an effect on the inkomstpension liability to the economically active because of the difference between inheritance gains arising and inheritance gains distributed; this effect is shown in Note 10. For the group dying before their 60th year, the difference is explained by tax assessment changes between the time when inheritance gain factors are calculated and the time when the gains are distributed, and by late information on persons dying. For the group dying in their 60th year or thereafter, the reasons are differences between estimated and actual mortality, and possible variations in mortality depending on the insured's level of income, i.e. the effect due to the shorter average life spans, for each gender, of persons with low incomes compared to persons with high incomes.

Inheritance Gain Factors for the Premium Pension

In the premium pension system, inheritance gains are calculated as a percentage of the premium pension capital of the survivors. The percentage corresponds to the one-year risk of death, i.e. the probability

of dying within one year. Inheritance gains are distributed once a year for both the economically active and retirees. As with the inkomstpension, future expected inheritance gains are included in the annuity divisor. If the insured elects a survivor benefit, the inheritance gain will be much smaller, as it is then based on the probability that the longer-surviving party, whether the primary insured or the co-insured, will die within one year of the first party.

The risk of death in year t is calculated by Makeham's formula (see Annuity Divisors for the premium pension). The values of a , b and c in the formula are determined by the relationship between the capital of pension savers dying in year $t - 1$ and the capital of the surviving pension savers in the same year, calculated for each age group. The pension capital used to determine the inheritance gain in year t corresponds to the average balance of the premium pension account as of the last day of every month of year $t - 1$. The amounts of the inheritance gains are adjusted by a factor (close to 1) that will equalize with the greatest possible accuracy the total amount distributed in year t and the capital of pension savers dying in year $t - 1$.

The inheritance gains for the premium pension fund insurance do not affect the pension liability over time, as death capital is offset by inheritance gains distributed.

Values in determination of inheritance gain for 2016, distributed during 2017

	a	b	c	factor
Fund insurance	0.00030	0.0000059	0.1081	0.9830
Traditional insurance	0.00010	0.0000075	0.1067	1.0062

Administrative Cost Factor, Inkomstpension

The costs of administering the inkomstpension system reduce the pension balances of the economically active. The deduction from pension balances is recalculated annually through multiplication of pension balances by an administrative-cost factor.

$$FF_t = 1 - \left(\frac{B_t \cdot A_t + J_{t-1}}{PB_{t-1}} \right) \quad (\text{A.6.1})$$

FF_t	administrative cost factor, year t
B_t	budgeted costs of administration, year t
A_t	proportion charged to pension balances, year t
J_t	adjustment amount, equals the difference between the amount that would have been deducted from pension balances in year t , based on actual cost in year t and the adjustment amount in year $t - 1$, as well as the actual deduction taken from pension balances in year t .
PB_t	total pension balances, year t

The administrative-cost factor is calculated on the basis of a certain proportion, A , of budgeted costs for year t . Until the year 2021, the proportion charged to pension balances will be less than 100 percent (see Note 11). Moreover, there is an adjustment for the administrative costs of year $t - 1$. The adjustment amount is equal to the difference between the amount that would have been deducted from pension balances, based on actual cost and the adjustment amount for the previous year, and the actual deduction made from pension balances in the same year.

The administrative-cost factor affects the inkomstpension liability to the economically active via the deduction from pension balances (see Note 14, Table A). The difference between total costs of administration (see Note 4) and the deduction from pension balances puts a strain on the balance ratio.

Charge for Costs of Administration, Premium Pension

In the premium pension a charge is deducted from pension savers' premium pension accounts once a year. The charge is to cover the total operating costs of the premium pension, including interest and other financial expenses.

Administrative costs affect the capital of the premium pension system and at the same time, through the deduction from pension balances, they affect the premium pension liability by the same amount (see Notes 17 and 20) for fund insurance. For traditional insurance with profit annuity, life-insurance provisions are affected by assumptions of future expected operating costs.

Annuity Divisors for the Inkomstpension

The annuity divisors for the inkomstpension are used for recalculation of pension balances as annual disbursements and are a measure of life expectancy at retirement, with consideration given to the interest of 1.6 percent (advance interest) credited to pensions in advance.

$$D_i = \frac{1}{12L_i} \sum_{k=i}^r \sum_{X=0}^{11} \left(L_k + (L_{k+1} - L_k) \frac{X}{12} \right) (1.016)^{-(k-i)} (1.016)^{\frac{-X}{12}}, \quad i = 61, 62, \dots, r \quad (\text{A.8.1})$$

- D_i annuity divisor for age group i
 $k - i$ number of years of retirement ($k = i, i + 1, i + 2$, etc.)
 X number of months (0,1,...,11)
 L_i number of survivors in age group i per 100,000 born, according to the life span statistics of Statistics Sweden. These statistics are for the five-year period immediately preceding the year when the insured reached age 60 in the case of pension withdrawal before age 65, and age 64 in the case of withdrawal thereafter.

For persons who have begun drawing their old-age pensions before age 65, the amount disbursed is recalculated, because of the recalculated annuity divisors, at the outset of the year when the individual turns 65. The reason for the recalculation is the change in the underlying statistical data for the latest life expectancy statistics available in the individual's 65th year. With the continuing increase in life expectancy, the recalculated annuity divisors have so far been higher than before, resulting in reduction of future monthly pensions. The consequent marginal decrease in the inkomstpension liability to retirees is a component of the Change in Amounts Disbursed in Note 14, Table C.

After age 65, there is no further recalculation of annuity divisors. The increase in the pension liability of the system resulting from the fixed annuity divisors puts strain on the balance ratio when life expectancy is increasing.

Drawing an old-age pension involves a transfer of pension liability from the economically active to retirees. The actual recalculation of pension balances as annual disbursements results in a marginal change in the pension liability. The change arises because of the difference between annuity divisors and what we refer to as "economic annuity divisors" in this report. For a description of economic annuity divisors, see Appendix B Mathematical Description of the Balance Ratio, Pension Liability. The economic annuity divisors are used to calculate the pension liability to retirees.

Annuity divisors are determined for each age with no upper age limit.

Confirmed Annuity Divisors for the Inkomstpension *

	61	62	63	64	65	66	67	68	69	70
1938	17.87	17.29	16.71	16.13	15.56	14.99	14.42	13.84	13.27	12.71
1939	17.94	17.36	16.78	16.19	15.62	15.04	14.47	13.89	13.32	12.76
1940	18.02	17.44	16.86	16.27	15.69	15.11	14.54	13.96	13.39	12.82
1941	18.14	17.56	16.98	16.39	15.81	15.23	14.65	14.08	13.50	12.94
1942	18.23	17.65	17.06	16.48	15.89	15.31	14.74	14.16	13.59	13.02
1943	18.33	17.75	17.16	16.58	15.99	15.41	14.84	14.26	13.68	13.11
1944	18.44	17.86	17.28	16.70	16.11	15.54	14.96	14.38	13.80	13.23
1945	18.55	17.96	17.38	16.80	16.22	15.64	15.07	14.48	13.91	13.33
1946	18.64	18.05	17.47	16.89	16.31	15.73	15.16	14.57	13.99	13.41
1947	18.73	18.15	17.56	16.98	16.40	15.83	15.24	14.66	14.07	13.49
1948	18.83	18.24	17.66	17.07	16.49	15.91	15.33	14.74	14.16	13.58
1949	18.89	18.31	17.72	17.13	16.55	15.97	15.38	14.79	14.21	13.63
1950	18.98	18.39	17.80	17.21	16.63	16.05	15.46	14.87	14.28	13.70
1951	19.06	18.48	17.89	17.30	16.71	16.13	15.54	14.95	14.37	13.78
1952	19.14	18.55	17.96	17.37	16.78	16.20	15.61	15.02	14.43	13.85
1953	19.20	18.62	18.03	17.44	16.85	16.26	15.68	15.09	14.50	13.91

* Annuity divisors are confirmed each year up to age 80, but the table shows only the divisors up to age 70.

Annuity Divisors for the Premium Pension

To calculate the annual premium pension, the value of the premium pension account is divided by an annuity divisor for the premium pension. Unlike the inkomstpension, the annuity divisor for the premium pension is based on forecasts of life expectancy.

$$D_x = \int_0^{\infty} e^{-\delta t} \frac{l(x+t)}{l(x)} dt \quad (\text{A.9.1})$$

$$\delta = \ln(1+r) - \epsilon \quad (\text{A.9.2})$$

$$l(x) = e^{-\int_0^x (1-s)\mu(t)dt} \quad (\text{A.9.3})$$

$$\mu(x) = \begin{cases} a + be^{cx} & \text{for } x \leq 100 \\ \mu(100) + (x - 100) \cdot 0.01 & \text{for } x > 100 \end{cases} \quad (\text{A.9.4})$$

D_x	annuity divisors
x	exact age at time of calculation
r	interest rate
ϵ	interest intensity of operating costs
s	mortality charge

The annuity divisors are calculated in continuous time and according to exact age at retirement, but in principle they are consistent with the formula for the annuity divisor for the inkomstpension.² The survival function, $l(x)$, can be considered equivalent to the number L used in the calculation of the inkomstpension. The mortality function, $\mu(x)$, is the so-called Makeham's formula used for calculating

²The formula applies in cases where one life is insured, i.e. where there is no survivor coverage.

the risk of death within one year. The values of a, b and c correspond to Statistics Sweden's forecast of remaining life expectancy in the years 2015–2110 for individuals born in 1938, 1945 or 1955.

So-called cohort mortality is used, which means that the year cohort 1938 is used for individuals born in the 1930s or earlier, year cohort 1945 is used for individuals born in the 1940s, and year cohort 1955 is used for individuals born in the 1950s or later. For $x > 100$ $\mu(x)$ merges with a straight line with a slope of 0.01. During 2016, a charge s was imposed on mortality intensity following an analysis of how premium pension mortality differed from that found in Statistics Sweden.

Current Values for Disbursement Amounts in Fund Insurance and Traditional Insurance

Cohort	a	b	c	s
1930s	0.00005	0.00000198	0.1239	0.1
1940s	0.00460	0.00000053	0.1373	0.1
1950s	0.00470	0.00000019	0.1476	0.1

When calculating the guaranteed amount in traditional insurance with profit annuity, the Statistics Sweden alternative with low mortality is used, reduced by a further 10 percent. In calculating the amount of pension paid out, Statistics Sweden's main alternative for mortality is used, with the above-mentioned reduction of 10 percent.

When calculating the pension amount, interest rate assumptions are called advance interest. Interest intensity δ is based on the interest rate 1.75 percent for both fund and traditional insurance, which corresponds to $\delta = 0.016349$. The interest rate used in calculating the guaranteed amount in traditional insurance with profit annuity is 0.0 percent.

In the valuation of life insurance provisions, from 2013-12-31 to 2017-04-30, a discount curve based on swap interpolation with a 35-point risk deduction was used, together with a concluding part converging towards a given forward rate of 4.2 percent. When the new Act governing the Swedish Pensions Agency's premium pension activities came into force, the discount rate was also changed to count as an average of the interest rate curve for government bonds and housing bonds. To this interest rate curve no assumption of convergence towards a predetermined forward rate was added.

For traditional insurance with profit annuity, the pension liability is the same as (FTA) insurance technical provisions. It is calculated by multiplying every guaranteed amount by an annuity divisor. The annuity divisor is calculated in the same manner as the determination of pension amounts but using different assumptions. See the formulas above. In the calculation of FTA, however, separate mortality assumptions are used for women and men as well as the above-mentioned interest curve. The FTA increase if a lower mortality rate or interest rate is assumed. For premium pension in the form fund insurance, the pension liability is equal by definition to the value of all the assets, which in turn equals the aggregate value of all fund shares. For fund insurance, therefore, a change in annuity divisors has no effect on the pension liability.

Annuity divisors are determined for each age, without an upper age limit. For an annual amount, they are calculated using an interest rate of 1.75 percent for both fund and traditional insurance.

Annuity Divisors for Annual Amount, Fund and Traditional Insurance

	61	62	63	64	65	66	67	68	69	70
Without survivor benefit	20.91	20.37	19.82	19.26	18.69	18.12	17.54	16.29	15.71	15.13
With survivor benefit										
Co-insured 55	26.30	26.12	25.95	25.80	25.65	25.51	25.38	25.17	25.06	24.97
Co-insured 60	24.69	24.44	24.19	23.96	23.75	23.55	23.36	23.04	22.89	22.75
Co-insured 65	23.39	23.05	22.72	22.40	22.10	21.81	21.53	21.06	20.83	20.63
Co-insured 70	22.31	21.88	21.45	21.04	20.63	20.23	19.84	19.12	18.79	18.47

Annuity Divisors for Guaranteed Annual Amount (Traditional insurance)

	61	62	63	64	65	66	67	68	69	70
Without survivor benefit	27.64	26.82	25.99	25.17	24.34	23.51	22.69	20.25	19.46	18.68
With survivor benefit										
Co-insured 55	36.66	36.34	36.04	35.76	35.50	35.26	35.03	34.53	34.36	34.20
Co-insured 60	33.86	33.42	33.02	32.63	32.27	31.94	31.63	30.95	30.72	30.51
Co-insured 65	31.69	31.12	30.58	30.07	29.58	29.13	28.70	27.73	27.41	27.11
Co-insured 70	29.80	29.10	28.42	27.75	27.11	26.48	25.88	24.41	23.92	23.45

Change in Value, Premium Pension

In chapter 6 Changes in Value of the Pension System, two different measures are used for calculating the change in value in the premium pension system. These measures are time-weighted return and capital-weighted return. They are briefly described below.

Capital-Weighted Rate of Return

The capital-weighted rate of return takes into consideration the capital flow of the account by weighing together the return and the capital in the account during the corresponding period. This means that during periods when the sum under capital management has been large, the return is given greater weight in the calculation than the return during periods when there has been little capital managed. The cash flows chiefly included in the calculations consist of paid-in pension credit and pension disbursements. The interest on the preliminary pension credit, the return on the funds in the portfolio, the administration fee to the Swedish Pensions Agency, the management fee to fund companies, the bonus on the management fee and inheritance gains are not included in the cash flows, but affect the return directly.

When the capital-weighted return is calculated, the so-called internal rate of return is sought. This rate is a discount rate at which the present value of all cash flows, including the value of the closing balance but with the opposite sign, will equal zero.

The capital-weighted return (also referred to as the Internal Rate of Return, or IRR) is calculated by solving the equation

$$\sum_{t=0}^T \frac{C_t}{(1+r)^{\frac{t}{365}}} = 0 \quad (\text{A.10.1})$$

r internal rate of return during the period, expressed as an annual rate

t	number of days since the starting point
T	closing point
C_t	transaction (cash flow) at time t
C_T	final value, that is, the value of the account as of the day when the valuation is made

The equation requires that the final value be negative so that a value of SEK X results in a transaction of SEK $-X$. C_T is thus always ≤ 0 .

To calculate the internal rate of return, it is therefore necessary to know the closing value of the portfolio (market value), all cash flows to and from the portfolio, and the time when these cash flows take place. The internal rate of return can be said to yield the “interest rate on bank accounts” which, given the deposits and withdrawals, have resulted in the current closing value.

The formula above for the internal rate of return is the one normally used in financial matters.

It can also be expressed in the following way, which is consistent with how interest is actually credited to bank accounts:

$$\sum_{t=0}^{T-1} C_t \cdot (1+r)^{\frac{T-t}{365}} = C_T \quad (\text{A.10.2})$$

Interest is earned on each deposit C_t from the time of deposit t until the closing date T .

C_T is greater than or equal to zero, and is the balance at the time of calculation.

Time-Weighted Rate of Return

With the time-weighted return, adjustment is made for the effects of capital inflows and outflows, that is, to prevent new pension credit recorded or pensions paid from affecting the calculated rate of return. The time-weighted return thus measures the return for a certain deposited amount for a certain period of time. If time-weighted, the return is measured for a period, the returns for the partial periods are weighed together with equal weights. A partial period consists of the time between two cash flows. The equation below describes the time-weighted return.

$$R_t = \left(\prod_{t=0}^T \frac{MV_{t+1}}{MV_t + C_t} \right) - 1 \quad (\text{A.10.3})$$

R_t	return during the period
t	number of days since the starting point
T	closing point
MV_t	market value at time t
C_t	transaction (cash flow) at time t

The time-weighted return can be used to obtain accurate comparisons of the return between funds, where fund managers cannot set aside more capital under favourable return conditions or vice versa. The measure can also be used for comparisons with relevant market indices or with the return achieved by other managers. In the premium pension system, the pension saver cannot freely determine the in- or outflow of capital for the premium pension account. On the other hand, the saver decides whether and when the moneys invested are to be transferred to another fund. The fund companies have no influence over the flow of capital in the fund.

Measures of the development of value for the system

How well are the funds doing?

- Time Weighted Return (Premium Pension Index)

How well are the pension savers doing?

- Capital-Weighted Return
-

Measures of the development of value for fund savers

How well are *my* funds doing?

- Time Weighted Return per Fund
- Time-Weighted Return for the Fund Portfolio

How well is *my* account/*my* pension doing?

- Capital-Weighted Return
-

Appendix B Mathematical Description of the Balance Ratio

Excerpt from Regulation (2002:780) on the Calculation of the Balance Ratio¹

In accordance with Ch. 58 § 14 of the Social Insurance Code (SFB, 2010:110), a balance ratio is to be calculated annually². The regulations (2002:780) require the Swedish Pensions Agency to prepare a calculation of the balance ratio, to be confirmed subsequently by the Government. The balance ratio is calculated as follows:

Balance Ratio, BT

$$BT_t = \frac{AT_{t-2} + BF_{t-2}}{S_{t-2}} \quad (\text{B.1.1})$$

$$AT_t = A_t \cdot OT_{t-1} \quad (\text{B.1.2})$$

t	calendar year if the variable refers to flows, end of calendar year if the variable refers to stocks
AT_t	contribution asset year t
BF_t	buffer fund, the aggregate market value of the assets of the First–Fourth and Sixth National Pension Funds in year t . By market value is meant the value which according to Ch. 6 § 3 of the National Pension Funds Act (2000:192) and Ch. 4 § 2 Sixth National Pension Fund Act (2000:193), is to be shown in the annual reports of these funds.
S_t	pension liability, year t
A_t	contribution revenue of the pay-as-you-go system, year t
OT_t	turnover duration, year t

Damped Balance Ratio, BT^*

The damped balance ratio for a year is equal to 1 plus one-third of the difference between the balance ratio fixed for that year and the number 1. The damped balance ratio is rounded to four decimal places.

$$BT^* = \frac{BT - 1}{3} + 1 \quad (\text{B.2.1})$$

¹Some editing has been done to simplify the presentation.

²New rules came into force on January 1, 2016. The changes affected liability and asset estimates, and the new regulations in Chapter 58 of the Social Insurance Code (2010:110) were applied for the first time in the calculation of the balance ratio and damped balance ratio of 2017. For more details on the changeover, see the Orange Report 2015.

Turnover Duration, OT

$$OT_t = U\dot{A}_t - I\dot{A}_t \quad (\text{B.3.1})$$

Income Age, $I\dot{A}$

$$I\dot{A}_t = \frac{\sum_{i=16}^{R_{intj,t}} \overline{PR}_{i,t} \cdot L_{i,t} \cdot (i + 0.5)}{\sum_{i=16}^{R_{intj,t}} \overline{PR}_{i,t} \cdot L_{i,t}} \quad (\text{B.4.1})$$

$$\overline{PR}_{i,t} = \frac{\frac{PR_{i,t}}{N_{i,t}} + \frac{PR_{i+1,t}}{N_{i+1,t}}}{2}, \quad i = 16, 17, \dots, R_{intj,t} - 1 \quad (\text{B.4.2})$$

$$\overline{PR}_{R_{intj,t}} = \frac{PR_{R_{intj,t}}}{N_{R_{intj,t}}} \quad (\text{B.4.3})$$

$$L_{i,t} = L_{i-1,t} \cdot h_{i,t}, \quad i = 17, 18, \dots, R_{intj,t} \text{ where } L_{16,t} = 1 \quad (\text{B.4.4})$$

$$h_{i,t} = \frac{N_{i,t}}{N_{i-1,t-1}}, \quad i = 17, 18, \dots, R_{intj,t} \quad (\text{B.4.5})$$

- i age at year-end
 $R_{intj,t}$ the highest age group to have earned pension credit for year t
 $PR_{i,t}$ the sum of 16 percent of pension qualifying-income calculated according to Ch. 59 of the Social Insurance Code and 16 percent of the pension-qualifying amounts calculated according to Ch. 60 of said code, income year t , age group i
 $N_{i,t}$ number of individuals in age group i who at any time through income year t have been credited with pension-qualifying income or pension-qualifying amounts and have not been registered as deceased
 $L_{i,t}$ proportion of persons in age group i year t
 $h_{i,t}$ change in proportion of persons in age group i year t

The proportion of pension liability relating to pensioners R_i^*

The proportion of pension liability relating to pensioners R_i^* indicates how large a share of pension liability in age group i concerns pensioners and is included in the calculation of the payment age $U\dot{A}$

$$R_i^* = \frac{SP_{i,t}}{SP_{i,t} + PB_{i,t}^*} \quad (\text{B.5.1})$$

$SP_{i,t}$ pension liability in year t for age group i concerning pensioners in the distribution system in respect to pensions paid

$PB_{i,t}^*$ the sum of pension balances without regard to change in the income index between year t and $t + 1$

Payment Age, $U\dot{A}$

$$U\dot{A}_t = \frac{\sum_{i=61}^{R_{utb,t}} 1.016^{-(i-61+0.5)} \cdot L_{i,t}^* \cdot (i + 0.5) \cdot R_i^*}{\sum_{i=61}^{R_{utb,t}} 1.016^{-(i-61+0.5)} \cdot L_{i,t}^* \cdot R_i^*} \quad (\text{B.6.1})$$

$$L_{i,t}^* = L_{i-1,t}^* \cdot he_{i,t} \quad \text{där } L_{60,t}^* = 1 \quad (\text{B.6.2})$$

$$he_{i,t} = \frac{U_{i,t}}{U_{i,t} + Ud_{i,t} + 2 \cdot Ud_{i,t}^*}, \quad i = 61, 62, \dots, R_{utb,t} \quad (\text{B.6.3})$$

$R_{utb,t}$ oldest age group receiving a pension, year t

$L_{i,t}^*$ proportion of remaining disbursements to age group i year t

R_i^* the proportion of pension liability in age group i concerning pensioners

$he_{i,t}$ change in pension disbursements due to deaths, year t , age group i

$U_{i,t}$ total pension disbursements in December of year t to age group i

$Ud_{i,t}$ total of last monthly pension disbursements to persons in age group i who received pensions in December of year $t - 1$, but not in December of year t ³

$Ud_{i,t}^*$ total of last monthly pension disbursements to persons in age group i who were granted pensions in year t but did not receive a pension payment in December of year t ⁴

³As of 2016, only payments terminated due to death are included. In previous years payments terminated as a result of pension deferral were also included. The risk period has been changed to cover an entire year. Previously the only payments included were those made to individuals who had received at least one payment in year t (in practice, to be included in the variable, previous payments in December of year $t - 1$ and January of year t was required).

⁴As of 2016, only payments terminated due to death are included. In previous years payments terminated as a result of pension deferral were also included.

Pension Liability, S

$$S_t = SA_t + SP_t \quad (\text{B.7.1})$$

$$SA_t = PB_t^* + IPR_t + TP_t \quad (\text{B.7.2})$$

$$PB_t^* = \frac{PB_t}{I_{t+1}} \cdot I_t \quad (\text{B.7.3})$$

$$SP_t = BT_{t+1}^* \cdot \sum_{i=61}^{R_{utb,t}} U_{i,t} \cdot 12 \cdot \left(\frac{De_{i,t} + De_{i,t-1} + De_{i,t-2}}{3} \right) \quad (\text{B.7.4})$$

$$De_{i,t} = \frac{\sum_{j=i}^{R_{utb,t}} \frac{1}{2} \cdot (L_{j,t}^* + L_{j+1,t}^*) \cdot 1.016^{i-j-1}}{L_{i,t}^*}, \quad i = 61, 62, \dots, R_{utb,t} \text{ where } L_{R_{utb,t}+1}^* = 0 \quad (\text{B.7.5})$$

- SA_t pension liability in year t in regard to pension commitment for which disbursement has not commenced (pension liability to the economically active)
- SP_t pension liability in year t in regard to pensions being disbursed to retired persons in the pay-as-you-go system
- PB_t^* the sum of pension balances without regard to change in the income index between year t and $t + 1$
- IPR_t estimated value of pension credit earned in year t for inkomstpension according to Chapter 61 §§ 5-10 of the Swedish Social Insurance Code, calculated according to Chapter 62 § 5, second paragraph of same code
- TP_t estimated value of ATP, year t for persons who have not begun to draw this pension
- PB_t the sum of pension balances for year t according to Chapter 62 §§ 2, 5 and 7 of the Swedish Social Insurance Code
- I_t income index for year t according to Chapter 58 § 11 of the Swedish Social Insurance Code
- BT_t^* damped balance ratio, calculated according to Chapter 58 § 20a of the Swedish Social Insurance Code, when the balance index has been fixed for the same year⁵
- $De_{i,t}$ economic annuity divisor for age group i year t

⁵For this year's report the balancing effect in the indexation between 2017 and 2018 was used, amounting to 1.0106 (income index for 2017 divided by the balance index for 2017). For more details see VER 2018-99. This was because the balancing period ended in 2018.

Appendix C List of Terms

actuarial provisions (försäkringstekniska avsättningar)
provisions set aside to guarantee the commitment of the insurer in traditional insurance.

adjustment indexation* (följsamhetsindexering)
annual recalculation of inkomstpension and ATP pension based on the change in the income index. The change in the index is reduced by the interest of 1.6 percent credited in the annuity divisor. Note that there is no adjustment index, only adjustment indexation. If the income index for year t is designated by I_t the adjustment indexation is calculated as follows:

$$\text{Adjustment indexation (at the turn of the year } (t - 1) \rightarrow t) = \frac{I_t/I_{t-1}}{1.016}$$

During a balancing period, the income index is replaced by balance index.

administrative costs* (administrationsavgift)
fee to cover costs of administration and operations, (see Appendix A).

annuity divisor* (delningstal)
a number used to calculate pension amounts in premium-based pension insurance. The annuity divisor reflects remaining life expectancy at retirement, taking into account the imputed interest credited to the pension (see Appendix A). Economic annuity divisors are used for calculating the pension liability (see Appendix B).

ATP (tilläggs pension)
part of the national public pension calculated according to the ATP system. Supplementary pension refers to the former ATP plus folkpension and is paid to all persons born before 1938. Persons born between 1938 and 1953 receive a certain number of twentieths of their income-related pension as ATP and the remaining number of twentieths as inkomstpension and premium pension. The respective number of twentieths depends on the year of birth. The ATP system was a defined-benefit pension system. The ATP portion of the ATP plus folkpension is equal to 60 percent of the average pension points for the 15 years with the most pension points; the folkpension portion is equal to 96 percent of one price-related base amount for single pensioners and 78.5 percent for married pensioners. To receive a full pension, an individual must have at least 30 years of pension-qualifying income.

balance index* (balansindex)
replaces the income index during a balancing period. When balancing is activated, pension balances and pensions are indexed by the change in a balance index instead of the income index.

balance ratio (balanstal)
a number that expresses the relationship between assets and pension liability in the inkomstpension and ATP pension system (see Appendix B).

*For amounts and values, see Statistik och publikationer at www.pensionsmyndigheten.se.

balancing	(balansering)
a method for restoring financial balance in the inkomstpension and ATP pension systems of the national pension. Balancing is activated if the balance ratio drops below 1.0000, that is, if the pension liability exceeds the assets of the system, and ends when the balance index reaches the same level as the income index.	
buffer fund	(buffertfond)
absorbs interperiod discrepancies between pension contributions and pension expenditure in a pay-as-you-go system. The primary purpose of the buffer fund is to stabilize pension disbursements and/or pension contributions in relation to economic and demographic variations. The buffer fund of the national public pension system consists of five different funds: the First-Fourth and Sixth National Pension Funds.	
capital-weighted return	(kapitalviktad avkastning)
another term for the capital-weighted return is internal rate of return. In the premium pension system, the measure is used in evaluating individual accounts, but also for the system as a whole. Consideration is given to the point in time and amount of all paid-in pension credit and pensions disbursed as well as pension account balances at the end of the period. The capital-weighted return corresponds to the average annual return during the period and may be compared, for example, with the interest on a bank account. The Pensions Agency's calculation of the capital-weighted return for the premium pension includes in the return not only the change in value of the funds concerned, but also inheritance gains, bonuses and management fees. For more detailed information, see Appendix A.	
ceiling on contributions*	(avgiftstak)
the highest income on which the national pension contribution and the central-government pension contribution can be based, equivalent to 8.07 income base amounts.	
ceiling on pension-qualifying income*	(intjänandetak)
the highest income, after deduction of the individual pension contribution, for which pension credit is earned. It corresponds to 7.5 income base amounts.	
central government old-age pension contribution	(statlig ålderspensionsavgift)
a pension contribution paid by the central government. The contribution is 10.21 percent of pension-qualifying social-insurance benefits, except for sickness and activity compensation (disability pension). For sickness and activity compensation and so-called pension qualifying amounts, the contribution is 18.5 percent.	
compounding	(förräntning)
in this report, synonymous with indexation.	
contribution asset	(avgiftstillgång)
the value of the flow of contributions to the inkomstpension. Calculated by multiplying the contribution revenue by turnover duration.	
contribution base	(avgiftsunderlag)
the incomes and amounts on which a pension contribution is to be paid. Consists primarily of earnings, but also of social insurance benefits, such as sickness cash benefits and unemployment cash benefits, as well as pension-qualifying amounts.	

*For amounts and values, see Statistik och publikationer at www.pensionsmyndigheten.se.

contribution revenue	(avgiftsinkomst)
the total pension contributions paid to the pay-as-you-go system in one year.	
damped balance ratio	(dämpat balanstal)
the damped balance ratio for a year is equal to 1 plus one-third of the difference between the balance ratio fixed for that year and the number 1. The damped balance ratio is rounded to four decimal places.	
defined-benefit pension system	(förmånsbestämt pensionssystem)
a pension system where pensions are set in advance to a fixed amount or a certain percentage of, for example, final salary or average earnings during a specified number of years. In a defined-benefit pension system the financial risk - due to variations over time in return on the system's assets and in mortality rates - is borne by the insurer. In a public pension system, the insurer is the taxpayers, which means that contributions/taxes to the system may vary.	
defined-contribution pension system	(avgiftsbestämt pensionssystem)
a pension system in which pension credit in monetary terms accrues by the same amount as the pension contribution paid by or for the individual. In a defined-contribution pension system, the insured bears the financial risk deriving from the variability over time in the mortality rate and in the rate of return on the assets of the system. This means that the value of the pension is not guaranteed but may vary.	
fund	(fond)
a legal entity operated by a fund management company. The fund management company invests in securities in which investors in turn can buy shares.	
fund asset	(fondtillgång)
the value of the assets at the end of the confirmation year.	
fund insurance	(fondförsäkring)
pension insurance where capital is invested in funds that may be selected via an insurance company. Through their choice of funds, the insured decide how to invest their saving and bear the risk associated with the development of their pension balances.	
fund strength	(fondstyrka)
the monetary amount of the buffer fund at the end of a given year divided by the pension disbursements for the same year. It is a measure of the size of the buffer fund in relation to the flow of pension payments.	
funded system	(fonderat system)
a pension system in which contributions or premiums paid in are placed in funds and saved separately for each individual or for a collective. The premium pension system is an example of a funded system.	
guarantee rule/guaranteed supplement	(garantiregel/garantitillägg)
an amount by which ATP pension is raised for those born 1938-1953 to ensure they will not receive lower pensions than what they earned up to and including 1994.	
guaranteed pension	(garantipension)
portion of the national public pension paid to those with little or no inkomstpension and/or ATP pension.	

income age	(intjänandeålder)
indicates the average expected capital-weighted age for earned pension credit.	
income index*	(inkomstindex)
the change in the income index shows the development of the average income each year. The measure of income used here is pension-qualifying income, without limitation by the ceiling, but after deduction of the individual pension contribution, (see Appendix A).	
income-based old-age pension	(inkomstgrundad ålderspension)
the inkomstpension and ATP plus the premium pension.	
income base amount*	(inkomstbasbelopp)
base amount which is recalculated each year according to the change in the income index. The income base amount is used primarily to calculate the ceilings on contributions and pension-qualifying income.	
indexation*	(indexering)
recalculation of pension balances by the change in the income index, or balance index, and the recalculation of pensions by adjustment indexation.	
individual pension contribution	(allmän pensionsavgift)
pension contribution paid by each person individually via income tax. It corresponds to 7 percent of income up to the ceiling for contributions.	
inheritance gain*	(arvsvinst)
pension balances or insurance capital of deceased insured persons credited to other similar insurances. In the national public pension, this refers to inkomstpension assets and premium pension capital inherited by the surviving insured (see Appendix A).	
inkomstpension	(inkomstpension)
the portion of the national public pension where the contribution, 16 percent of the pension base, is paid to a pay-as-you-go system.	
internal rate of return	(internränta)
see capital-weighted return.	
National Pension Funds	(AP-fonderna)
legally and administratively, the buffer fund of Sweden's pay-as-you-go pension system consists of five different funds: the First, Second, Third, Fourth and Sixth National Pension 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 viewed in some respects as a single fund.	
national public pension	(allmän pension)
pension provided for by law. The national public pension is governed by the Social Insurance Code and consists primarily of the inkomstpension, the ATP pension, the premium pension and the guaranteed pension.	

*For amounts and values, see Statistik och publikationer at www.pensionsmyndigheten.se.

- old-age pension contribution (ålderspensionsavgift)
paid by employers as an employer contribution and by self-employed persons as an individual pension contribution. The contribution rate for the old-age pension is 10.21 percent. It is paid on the individual's entire income, but the contribution levied on the portion of income above the ceiling is not credited to the pension system, but to the central government.
- pay-as-you-go pension systems (fördelningssystem)
pension system in which pension contributions or premiums paid in during a given year are used to finance disbursements the same year. In a PAYG system with a buffer fund, any surpluses are used to finance deficits in other years.
- payment age (utbetalningsålder)
indicates the average capital-weighted age for pension payments.
- pension balance (pensionsbehållning)
the value of earned pension credit within the national public pension at any given time. The pension balance for inkomstpension, after deduction of administration costs, is the sum of pension credit each year, adjusted to reflect inheritance gains distributed and recalculated by changes in the income index or the balance index.
- pension base (pensionsunderlag)
the total of an individual's pension-qualifying income and pension-qualifying amounts, but no higher than 7.5 income base amounts per year.
- pension contribution (pensionsavgift)
contribution to the national public pension. See individual pension contribution, old-age pension contribution and central-government old-age pension contribution.
- pension credit (pensionsrätt)
amount set aside each year for inkomstpension and premium pension. An individual's pension credit is 18.5 percent of her/his total pension base and equal to her/his total contribution to the pension system. Individuals born in 1954 or thereafter are credited with 16 percent of their pension base for the inkomstpension and with 2.5 percent of their pension base for the premium pension.
- pension level (pensionsnivå)
in this report, the average pension in relation to the average pension-qualifying income for persons aged 16–64.
- pension liability (pensionsskuld)
in this report, the financial commitment of the pension system at the end of each year. For the inkomstpension, the pension liability to the economically active is calculated as the sum of the pension balances of all individuals. The pension liability to retirees is calculated by multiplying the annual pension amount of each birth cohort by the economic annuity divisor for that cohort. Through 2017 the pension liability will also be calculated for the ATP credit earned by the economically active. With fund insurance, the pension liability for the premium pension is calculated as the total value of all fund shares; with traditional insurance, the pension liability is calculated as each guaranteed amount multiplied by an annuity divisor.
- pension points (pensionspoäng)
points in the national public pension for persons born 1938-1953 which are calculated annually on the basis of pension-qualifying income and are used to calculate ATP pension. Pension points

are calculated as follows:

$$\text{Pension points} = \frac{\text{PGI} - \text{HPBB}}{\text{HPBB}}$$

PGI pension-qualifying income
HPBB the higher price-related base amount

pension-qualifying amounts (pensionsgrundande belopp)
basis for pension credit in the national public pension for a fictive income for: years with small children, studies, national service, sickness or activity compensation.

pension-qualifying income (pensionsgrundande inkomst)
income used as a basis for calculating pension credit in the national public pension. In principle, pension-qualifying income consists of annual income (earnings, sickness cash benefits, parental cash benefits, unemployment cash benefits, etc.) reduced by the individual pension contribution. Beginning in 2003, annual income must exceed 42.3 percent of one price-related base amount to qualify for pension credit.

premium pension (premiepension)
part of the national public pension in which the contribution, consisting of 2.5 percent of the pension base, is invested in funds.

price-related base amount* (prisbasbelopp)
an amount used in the national pension system for purposes including calculation of the guaranteed pension. The price-related base amount is recalculated each year according to the change in the Consumer Price Index (for June). In addition there is a higher price-related base amount, which is used to calculate pension points and also follows changes in the Consumer Price Index.

return (avkastning)
income that results from an investment. For shares of stock, the return may consist of a dividend and the change in the market price. In this report, the concept refers to the direct return plus the change in value of the buffer fund and the premium-pension funds.

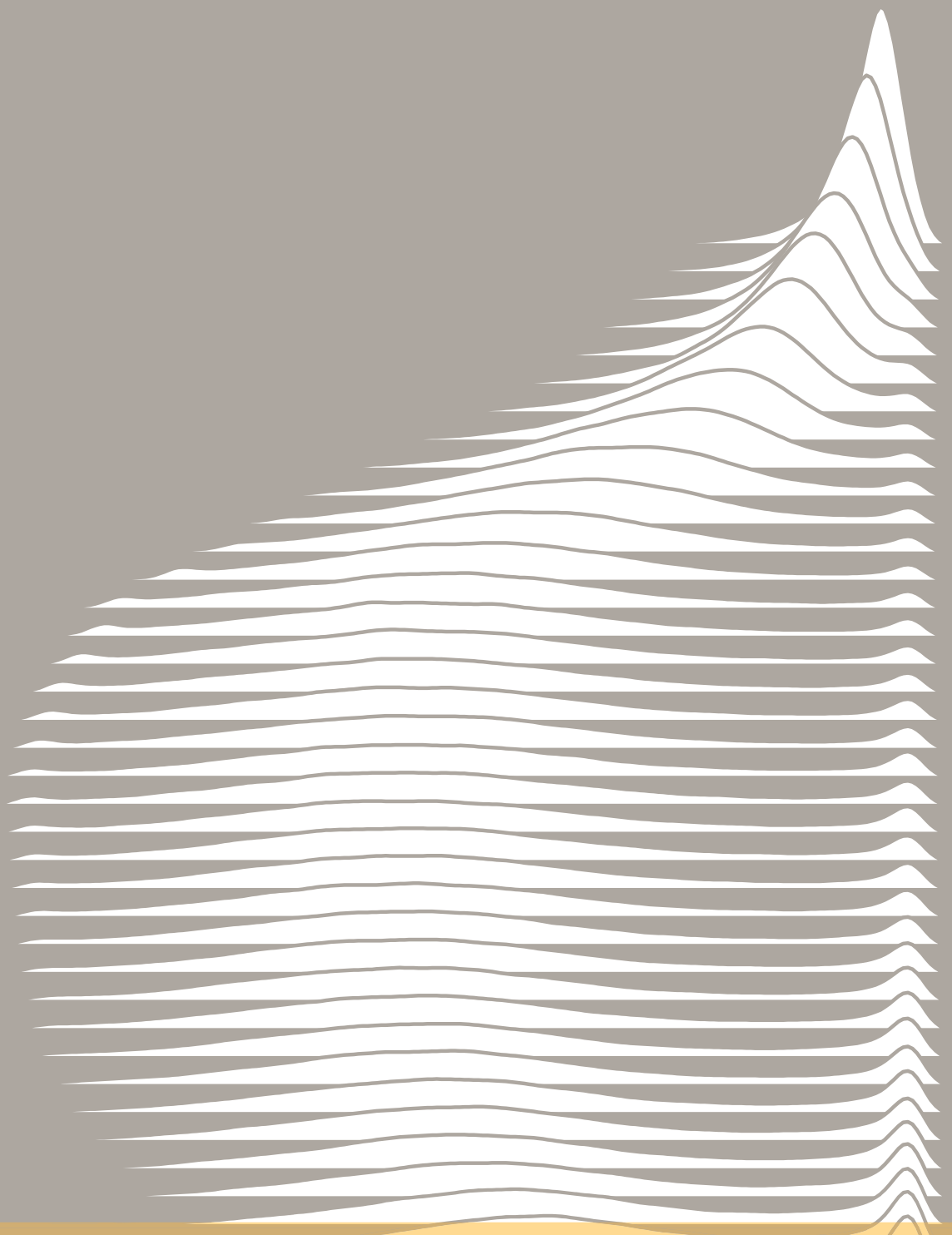
time-weighted return (tidsviktad avkastning)
the time-weighted return is used to describe the change in value of a fund or index. The measure shows the return on a deposit made at the outset of the period, without consideration of whether additional deposits or withdrawals have been made during the period. For more detailed information, see Appendix A.

traditional insurance (traditionell försäkring)
pension insurance where the insurance company decides how the insurance capital is to be invested and provides some form of guaranteed payments together with the chance to receive a share of any surplus.

turnover duration (omsättningstid)
reflects the expected time from the earning of pension credits to their payment in the form of inkomstpension. The turnover duration is calculated as the difference between payment age and income age. The turnover duration is used to value the flow of contributions. It is determined by the

*For amounts and values, see Statistik och publikationer at www.pensionsmyndigheten.se.

rules for earning pensions and pension payments and by the earned income and mortality patterns of each age group.



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