

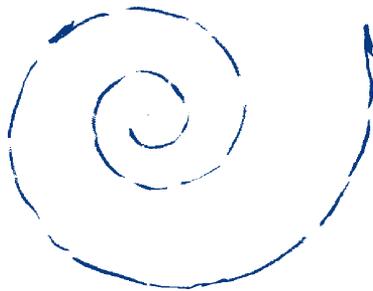
Social Insurance in Sweden 2001



Welfare for the Elderly

Social Insurance in Sweden 2001

**Social Insurance
in Sweden
2001**



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The *Social Insurance Book 2001* is the latest in the series of periodic publications from the National Social Insurance Board aimed at providing an overall review and discussion of important and topical issues relating to social insurance.

The theme of this third volume is *Welfare for the Elderly*.

Now that the pension issue has been resolved, eldercare is the area of public spending where demographic trends are most likely to cause serious financing difficulties some twenty years from now. Saving in one or more "eldercare fund" might be a way of spreading the burden of costs between different generations of the working population, thus reducing the risk of having to introduce heavy tax increases as a last resort to maintain eldercare at a respectable level. It might also be hoped that a positive yield on fund investment would lead to lower taxation and keep proposed insurance charges down to a minimum.

A special savings scheme to finance future eldercare would inevitably cost money. One or two per cent of GDP might suffice to achieve an effective spreading of costs, though with wide variations for different assumptions of growth in expenditure and yield from funds. It is scarcely likely that an equivalent amount could be raised using a voluntary eldercare insurance scheme. A compulsory social insurance scheme also offers other important advantages.

However, if a fund for demographic equalization is to be linked to the issue of eldercare, we have to act quickly. Today, the generation of the forties is still at work, but the time for their retirement is approaching. For a further 10–20 years, the ratio of very old people to the rest of the population will be significantly lower than later on. It is thus now that the conditions exist for consciously planning a fairer distribution of costs between the generations.

To "lock away" money today for tomorrow's eldercare may seem to be an unnecessary infringement of the free – and at any given moment of time, wise – right of disposal of resources. However, it is not certain that such savings in public finances will be available at all unless a broad consensus can be reached on a good cause to save for. If people can be convinced of the wisdom of creating a buffer today for the old of tomorrow, we will have achieved two aims. The public finances savings goal becomes both more realistic and easier to understand. People will have greater trust in society's ability to provide many more old people in the future with the care necessary to ensure a dignified old age.

Many members of staff at the National Social Insurance Board have contributed to the Social Insurance Book.

Britt-Marie Anderson acted as editor. Each section has its own main author. Hans Olsson and Birgitta Jonasson were responsible for *Welfare for the Elderly* and Lena Ericson was responsible for *Social Insurance in Figures*.

Among all those who provided valuable comments on the original draft, I would especially like to mention Agneta Kruse, Inger Marklund, Edward Palmer and Ole Settergren. Special thanks are also due to Kristina Malm who was responsible for the top copy and diagrams.

Stockholm, November 2001

*Anna Hedborg
Director-general*

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Eldercare insurance? – some conclusions

Like many other countries, Sweden is facing a national economic supply problem due to demographic developments. In less than ten years from now, the large generation of those born in the 1940s will begin their transition from gainful employment to retirement. As they continue to grow older, these people will become consumers of care services on an ever greater scale. It is a well-known fact that the final year of life, regardless of the age at which it occurs, can be extremely care-intensive. Moreover, many forms of care themselves promote longevity, while others are by their nature preventive, postponing until later the need for further care. A lively debate has lately arisen concerning our ability to finance the future cost of eldercare. Here we discuss the possibility of saving today so as to spread the costs of eldercare more fairly among different generations. We also discuss whether the present system, which puts the responsibility for financing eldercare on the municipalities, is the best way to ensure a fair deal for those requiring care in old age. An eldercare insurance scheme might also prove to be a solution for the municipalities. When the national supplementary pension scheme (ATP) was first introduced, contributions were collected earlier than was actually justified by expenditure on pensions at the time. This resulted in the National Pension Fund (AP), which now acts as a buffer between the generations that will enable us to cope with the demographic pressure on pensions. Should we take a similar approach to the cost of eldercare? In other words, should society put aside funds now in order to help finance the expected rise in eldercare costs after 2020?

There is very little we can do to influence demographic trends in Sweden during the next few decades. Those entering the workforce after 2015 will be the small birth cohorts of the 1990s and onwards. The number of persons of working age is beginning to decline.

Meanwhile, people are expected to live longer by several years on average, leading to a successive aging of the population in Sweden. Today, there are just over 8 persons older than 80 for every 100 persons aged 20–64.



In 2030, the equivalent ratio will be almost 15 to 100, according to the main alternative in the most recent population forecast from the National Statistics Office of Sweden (SCB) – almost twice the proportion. During the early 2010s, on the other hand, it is possible that the population aged over 80 will decline, both in relation to the size of the working population and in absolute numbers. There is thus still time to prepare the national economy for the strain that eldercare expenditure will eventually exert on it. Knowing from experience how long it takes for any new system to gain political and juridical acceptance, it is high time we gave the matter serious thought.

In the Swedish model, both pensions and nursing-and-care services are organized primarily as redistribution (“pay-as-you-go”) systems, that is to say, payments by the working population in the form of taxes and contributions are not invested in funds but are used to finance current pensions for retired people, health and medical care for all citizens and public welfare programmes. Society’s commitment to care of the elderly is important for the welfare of the individuals themselves and of their relatives. As the ratio of old people to the working population increases, the society’s commitments become considerable. It is also important that individuals in their fifties as well as their relatives are informed today of the extent to which society will provide for these needs in ten or twenty years’ time. This can have a decisive effect on how such individuals

view the need to save personally for their own future eldercare. Up to now, the Swedish model has guaranteed a relatively high minimum standard of living for old people. If this is to continue, perhaps it is important for people to start saving together towards a collective “insurance” to help finance tomorrow’s eldercare. Unless we act now, an intolerably heavy burden is likely to fall on the younger members of the working population who will ultimately have to foot the bill for both pensions and care.

For more than 10 years now, the form and financing of the national pension scheme has been the subject of heated debate and extensive reform. Now that the new pension scheme is in place, there is a certain time logic in putting eldercare next in line for discussion. The Social Insurance Book 2001 is devoted to this theme. The following section deals with aging from a medical perspective. Medical experts warn us



that the population will continue to age and life expectancy will continue to grow. This may also spell increased costs for eldercare. However, extrapolating the future cost of eldercare for different age groups solely on the basis of present-day trends is likely to result in an overestimation, since we should also take into account the likelihood of our becoming healthier. In the next section but one, we discuss the cost of eldercare in the future.

For the remainder of this section, we discuss whether an eldercare insurance scheme might provide a possible answer to the growing burden of support and how such a scheme might be organized.

One option when designing an insurance scheme is to invest in a fund, in which case we must also decide the extent. In a distribution system, the future scope of any scheme is “insured” or “guaranteed” by future production, that is, economic growth (and, of course, by future political commitment and the importance accorded to the distribution factor). In a fund-based system, this is governed by the capital market and potential return on investment. In a later section, we present a historical review of the yield from the capital market and discuss some of the problems associated with expected return on investment.

An eldercare insurance scheme – what form should it take?

At present, municipalities are responsible for providing eldercare within the framework of public obligations. In practice, the municipal contribution functions as a complement to that of relatives, but with a “high cost ceiling” above which the municipality assumes main responsibility for the cost of more intensive care. The question for the future is thus: will relatives be forced to contribute more as public resources dwindle – or will society be able to maintain its present level of support to individuals?

Municipal services are financed largely through local taxation. To supplement revenue-based financing, old people pay charges for nursing care, though these cover less than 10 per cent of total costs (estimates vary). Considerable variations exist between municipalities and between recipients with different financial backgrounds.

The thought behind eldercare insurance is that it should take over the financing responsibility of the municipalities. Collecting insurance contributions partially in advance might ease the pressure on the future support system – coming generations smaller than that of the 1940s need to be relieved of some of the burden if equality is to be achieved between generations. Today’s eldercare has also been criticized for being under-dimensioned and below standard. Furthermore, there are fears that “the helping hand” may not be found when the large cohorts need

it. An insurance scheme promises to increase available resources for nursing and care of the elderly, while at the same time providing an element of individual choice.

When designing an eldercare insurance scheme, we are faced with a number of options. An insurance scheme can be voluntary or obligatory, run by the state or by private enterprise and funded or unfunded – in the latter case, often called a pay-as-you-go scheme it would continue to be financed through taxes and charges as at present. Some combinations are out of the question.

For example, it is impossible to have an insurance scheme that is both voluntary and unfunded. On the other hand, an obligatory scheme may be funded or unfunded and be operated by the state or by private enterprise.



Pay-as-you-go system or fund-based system

There are a number of fundamental differences between a pay-as-you-go system and a fund-based system. One is that a fund-based system consists of fund capital, the interest on which can produce a market yield. A pay-as-you-go system is financed by taxes and/or charges, which increase with economic growth. However, as far as financial flows are concerned, a fully fund-based system works like a pay-as-you-go system with a demographic buffer fund (such as the national pension scheme with its AP fund). The net flow of money from the fund is governed by the demographic surplus or deficit of the insured community.

Pay-as-you-go and fund-based systems differ in another respect. In pay-as-you-go systems, there is an implicit social contract between the generations, while in purely fund-based systems the contract is explicit. Regardless of the nature of the contract, however, it is a matter of mortgaging future production results, a mortgage which can vary in size depending on difference in yield from the two forms. If both systems achieve exactly the same yield, the country will have mortgaged the same future share of production potential, irrespective of whether the system is fully fund-based or a pay-as-you-go system with a demographic buffer fund. Something in between a pay-as-you-go system and a fund-based system, with a buffer fund linked to a pay-as-you-go system to balance excessive demographic pressures, would seem to be the most suitable solution for Sweden.

If an "eldercare fund" was able to provide a higher yield than the rate of growth in gross national product (GDP) and revenue basis at unchanged tax rates in per cent, this fund might also ease the general sacrifice necessary to achieve a given level of service in eldercare for some decades to come. The question of the size of the yield is thus of great significance, and is discussed in a later section.

Private or social

Sweden has a long tradition of providing public (and obligatory) state-run social insurance schemes, though with extensive contractual supplements in certain systems. Old age pension, sickness benefit and disability pension are examples of major social insurance schemes.

Eldercare is not in itself a form of insurance. Rather, in its present form, it consists of a guaranteed minimum level of service from the public sector. As with health and medical care, the provision of eldercare is governed by individuals needs, but also by the ability of people to express these needs and request the services of society. Furthermore, the municipalities and county councils alone control the output of nursing and care services and thus influence what is in fact available.

In none of these areas does the difference between private and social insurance constitute a clear dividing line, and many combinations of financing, production and consumption are possible. Admittedly, there are other differences. Private financing almost always means that insurance is differentiated according to risk. The spreading of risks between groups that can be achieved by public insurance is not an option. Even when private insurance is regulated so as to outlaw risk differentiation, there are always ways of discouraging the bad risks and "taking the cream of the crop". Still, the most important dividing line runs not between social and private, but between voluntary and obligatory.

Voluntary or obligatory

Voluntary insurance has the advantage of providing the individual with a choice. However, it gives rise to the kinds of problem that usually justify going for a social insurance scheme instead. Some people choose to "get a free ride", cynically calculating that society will be there to help them even if they do not take out a policy. What usually distinguishes a private insurance policy is that the contribution is differentiated according to risk – those constituting the best risks from the viewpoint of the insurance company pay less, or they might even be the sole category covered. In areas where distribution aspects may be considered to have high priority, Sweden has normally chosen collective obligatory insurance rather than voluntary insurance.

If Sweden decides to introduce an eldercare insurance scheme, it ought to be obligatory. However, this does not preclude the use of insurance products offered on the private market for needs beyond those covered by the public sector. It is, nevertheless, important for individuals to know the full extent of coverage by social insurance schemes so that they may take out private insurance policies on top of these, should they so wish and be able to.

A issue of great interest

In the past two or three years alone, several surveys and proposals have been presented. S. Fölster (Ds 1998:15) and SNS (the Economists' Expert

Group of the Industrial Council for Social and Economic Studies) (U. Jakobsson, ed. [1999]) advocate a voluntary eldercare insurance scheme designed to protect insured persons against the accumulation of separate health care charges. However, the majority of those taking part in the debate – if they advocate insurance at all – have tended to favour the obligatory model. This is true of G. Grip and C. Örtendahl (2000), SNS (L. Söderström, et al. [1999]) and P. G. Edebalk and M. Svensson (2000). Fölster (Ds 1998:15) also discusses the possibility of coping with the expected increase in expenditure by means of a special tax that could be invested in funds.

There has been no shortage of sceptics and critics, even regarding eldercare insurance with obligatory participation – which is viewed as an “earmarked tax”, e.g. G. Wetterberg (2000) and B. Westerberg (2000).

Also Edebalk and Svensson (2000) list some of the many problems and difficult choices associated with the concept of insurance.



What have other countries done?

In the majority of non-Scandinavian countries, eldercare and its financing are organized differently than in Sweden, so the preconditions for eldercare insurance are likewise different.

Voluntary eldercare insurance is primarily known from the USA, where there are in reality two publicly financed systems, the Medicaid and Medicare programmes. Medicare, which is financed by obligatory premiums from gainfully employed persons, pays the cost of hospital and nursing-home care, but only for a relatively short period of time. Otherwise, the Medicaid programme applies. This does not compensate all the types of costs that are associated with nursing and care in Sweden,

and compensation is means-tested. To ensure that people are able to access health care without risking financial ruin, voluntary eldercare insurance schemes have grown up on the American insurance market. Eldercare insurance, however, has not been a great success in the USA. It has been particularly difficult to persuade young people to take out an insurance policy. The reason may be that they see themselves, rightly or wrongly, as belonging to low-risk groups – and they find it difficult to imagine themselves being in need of care in the future.

In Sweden, criticism of voluntary insurance has partly been grounded in the fear that it might encourage municipalities to charge high fees. Experience from the USA also highlights other problems. If the premium is calculated on a strict insurance basis, it becomes more costly for people in high-risk groups, leading in practice to their exclusion. On the other hand, the difficulty insurance companies face when calculating a reasonable premium level can result in insufficient differentiation. This in itself may reduce the likelihood of excluding high-risk groups, but instead it makes it hard for companies to attract the more profitable low-risk groups, since these find the premium too high.

Eldercare insurance schemes account for a negligible part of eldercare financing in the USA, and the proportion of old people with such insurance is equally small. A British proposal for voluntary eldercare insurance was rejected partly on the grounds that not enough people would be willing to pay the required premium. In Germany, a voluntary insurance scheme was discussed but later rejected for similar reasons in favour of an obligatory scheme. As mentioned earlier, the majority of Swedish proposals have deemed an obligatory insurance scheme to be superior, for much the same reasons as those given above.

Germany and Japan are the only two countries so far to have introduced public eldercare insurance schemes. Both schemes are obligatory but differ as regards financing, methods of needs assessment and choice of care providers to exploit the insurance (see Edebalk and Svensson, 2000). In Germany, both the working population and pensioners are charged for the insurance. It is administered by special insurance offices whose own medical advisors assess the level of infirmity and need of care. The insurance covers medical care and personal nursing both at home and in special accommodation. However, it does not cover the kind of services provided, for example, by our own home-help. The insurance does not provide total coverage of costs, but consists of certain fixed amounts determined by the level of infirmity. The remainder is paid by the recipients themselves, by relatives or by social-security payments. In Germany, care of the elderly was earlier based to a much larger extent than in Sweden on support from relatives. Social-security

allowances were granted if there were no children or marriage partners to provide financial help. The insurance scheme has been introduced to curb the growth of social security allowances in the future, when the increased number of old people renders support from relatives inadequate. In the case of Germany, the insurance scheme has thus led to an enhancement of the social rights of old people, while in Sweden most people already view such rights as normal and take them for granted.

Payments from the German insurance scheme may be made both to compensate relatives for their support and to finance professional nursing and care (at home or in special accommodation). The former of these two forms of compensation has dominated, at least up to a few years ago.

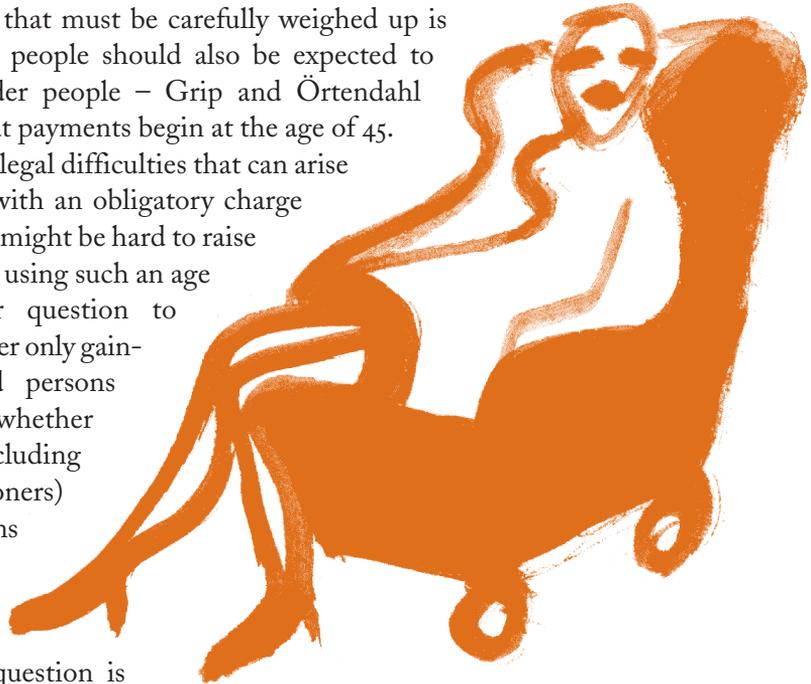
In Japan, too, care of the elderly has traditionally been characterized by sizeable contributions from relatives. In the recently introduced Japanese eldercare insurance scheme, the municipalities are the insurers. Premiums are paid by all people over 40, including pensioners. It is the task of the municipalities to set up a team for conducting individualized needs assessment. The compensation which is then paid out, unlike that in Germany, is related to the actual cost of the care up to a certain maximum limit. Recipients themselves decide the type of care and who is to provide it. However, once again unlike Germany, no compensation is paid to the recipients' relatives.

The debate in Sweden

Swedish proposals for voluntary eldercare insurance so far put forward have roughly the same aim as the American model, that is to say, to provide some kind of cost ceiling. In Sweden, too, the amount individuals have to pay for care is means-tested. Individuals are only entitled to a certain reserved amount once fees have been paid. This has naturally led to frustration for many people. For example, it creates financial difficulties for a spouse wishing to continue living in the joint home after the other partner has been obliged to move to an old people's home. The aim is thus to protect the income and assets of the person requiring care. The proposals have been criticized for giving municipalities an incentive to charge high fees. It requires legislation or other rules to prevent municipalities from including insurance payments as income when charges to individuals are calculated.

With obligatory participation, we no longer have the problem of high-risk groups being excluded or of low-risk groups not joining. It also solves the so-called 'free ride' problem – that is, people not taking out insurance because they are convinced society will help them out anyway when it comes to the crunch.

A question that must be carefully weighed up is whether young people should also be expected to pay or just older people – Grip and Örtendahl recommend that payments begin at the age of 45. Apart from the legal difficulties that can arise in connection with an obligatory charge based on age, it might be hard to raise sufficient funds using such an age limit. Another question to resolve is whether only gainfully employed persons should pay or whether pensioners (including disability pensioners) and other persons with incomes should also be included.



A further question is whether the premium should be the same for everyone or, for instance, comprise a certain percentage of a person's income. In pension schemes, it is usual for contributions to be income-related, at least if pension payments are (the “direct pipeline” principle). Eldercare in Sweden has also traditionally been paid for as a percentage of income (municipal tax). It has thus been part of an equalization policy aimed not only at achieving equality between care recipients and non-recipients but also between low and high earners. A fixed premium must also be relatively low – if everyone is to pay – in which case, once again, it could prove difficult to bring in sufficient amounts.

As regards benefits, the same applies as for voluntary insurance schemes – it is essential to specify the nature of the service, nursing and care that is to be insured. A wide range of solutions have been discussed, from schemes providing increased daily service and care to those covering only more cost-intensive operations – the latter being actually closest to the classic concept of insurance. The scheme could naturally cover both kinds. Grip and Örtendahl (2000) themselves offer three alternatives in this connection. The insurance might also be used to enhance quality of life, provide “that little extra” over and above revenue-financed basic needs. As with voluntary insurance schemes, the difficulty lies in knowing in advance what will be considered to be a desirable level of care in the distant future.

Other questions to resolve are who should decide whether the need of care exists or not, who should be the insurer – private enterprise, the state or possibly the municipalities themselves – and so on. In this connection, the risk of costs spiralling due to being passed on must be calculated and counteracted. Private insurers are scarcely an option if income-related charges are adopted. The idea of eldercare services being dependent on past income and paid-up contributions is foreign to the Swedish way of thinking.

The proposal from the SNS Welfare Policy Board (Söderström et al., [1999]) advocates an obligatory public social insurance scheme. The reasons given are that the municipality is too small an insuring unit to be able to spread the risks of an unfavourable demographic structure and that the municipal equalization system does little to compensate this. Therefore, financing ought to be organized at state level. The production of eldercare may to advantage be decentralized and farmed out to both private and municipal care providers. Assessment of needs is a task for the authorities and should continue under their supervision.

The introduction of an obligatory insurance charge, or "earmarked" tax, could be interpreted as an attempt to exempt one area from the need to save during an economic downturn. But as Westerberg (2000) points out, no form of eldercare insurance will ever be able to guarantee eldercare in every conceivable economic scenario. This circumstance

has been formally taken into account in the "autonomous" reformed pension scheme through the so-called self-correcting mechanism decided on in 2001. In a period of strong economic growth, on the other hand, an insurance scheme might paradoxically have the effect of inhibiting the development of eldercare (Wetterberg [2000]). A discussion of priorities in the

normal budget process might lead to a more favourable result than if the resources for eldercare were limited to the money brought in by the insurance scheme. As pointed out below in the section on the cost of eldercare, it is natural enough to allow the standard of nursing and care to rise in keeping with rises in GDP per citizen and the general standard of consumption.

Proposal for an "eldercare fund"

If we regard the pension problem as having been solved, eldercare is the area of public spending where demographic trends are most likely to cause serious financing difficulties some twenty years from now. This



is naturally worrying to people who belong to the generations that can be adversely affected. An insurance scheme would, in this case, serve to dampen such anxiety. In several of the analyses referred to above, it has been observed that an obligatory eldercare insurance may be combined with saving and fund investment. Saving in one or more "eldercare fund" would even out the cost burden between different generations of gainfully employed and reduce the risk of heavy tax increases being introduced as a last resort to maintain eldercare at a respectable level. It might also be hoped that a positive yield on fund investment would lead to lower taxation and keep the proposed insurance charge down to a minimum. Admittedly, yield from funds is in the nature of a gamble, as emphasized in one of the following sections. The years leading up to 2025 or thereabouts represent too small a time-span to guarantee that actual yield will equal, or exceed by a given margin, real economic growth.

A special savings scheme to finance future eldercare would inevitably cost money. One or two per cent of GDP might suffice to achieve an effective spreading of costs, though with wide variations for different assumptions of growth in expenditure and yield from funds. It is scarcely likely that a similar amount could be raised using a voluntary eldercare insurance scheme, not to mention other questionable aspects of such a form of insurance.

An obligatory eldercare insurance scheme could prove an effective solution to the problem of achieving equal rights for all citizens. It might also solve the financing difficulties of the municipalities and the problem of sharing costs between them. As has been pointed out in the current debate (Edebalk and Svensson), the present system means that those municipalities offering the best eldercare run a financial risk by attracting older people. Financing through a social insurance scheme would ensure that resources went to the people with the greatest need. Thus, money would be available in those municipalities where nursing and care were provided.

However, before an obligatory eldercare insurance scheme can be introduced, there remain many problems to solve and choices to make. It will be some time before an obligatory insurance scheme can be decided on with a reasonable degree of political support, even though eldercare issues are currently being examined in many quarters, including several authorities and organizations, and several reports are expected during the coming year. It will take even longer for such an insurance scheme to be implemented.

However, if a fund for demographic equalization is to be linked to the issue of eldercare, we have to act quickly. Today, the generation of

the forties is still at work, but the time for their retirement is approaching. For another 10–20 years, the ratio of the very old to the rest of the population will be much more favourable than later on. Thus, it is now that the conditions exist for consciously planning an even distribution of costs between the generations.

An obligatory insurance fee is viewed by many as a form of taxation. An obligatory eldercare insurance scheme involving saving would thus require an additional transfer of public funds to the eldercare sector. However, increasing the overall burden of taxation by the necessary amount over the next few years would almost certainly meet with fierce political resistance. Perhaps this might not be necessary. One possibility would be to start out from the current public finances savings target of 2 per cent of GDP. If the target remains unchanged, it should result in public net assets being built up over the next few years. See, for example, the latest Long-Term Planning Commission report (SOU 2000:7, appendix 1), H. Olsson and C. J. Nordén (2000). However, under pressure from those wishing to use any surplus for new expenditure and those who would prefer to lower taxation, it is no easy task to maintain a general surplus target. Perhaps it would be easier to achieve a political consensus for retaining the savings target if the surplus were to be used for financing future eldercare. If so, a first step would have been taken, creating a breathing space for the more detailed work of designing a feasible eldercare insurance scheme. There is a clear parallel here with the launching of the premium reserve scheme in the reformed pension system. Appropriations began long before the design of the system was finalized, the funds being temporarily administered by the National Swedish Debt Office. The parallel with the supplementary pension (AP) funds is also highly relevant.

The AP funds were created at a time when the pressure from pension payments was still moderate. Money from the funds was used to invest in the future, mainly in housing, thus relieving future generations of the need to invest a similar amount in housing construction. Scope was created for future expenditure on pensions.

At the same time, the AP funds will serve as a source of financing when people born in the 1940s retire. But for this, spending on pensions would have had to increase considerably, which will not now be necessary. The pension scheme will survive the demographic trauma created by the generation of the 1940s. Financing has been shared out between earlier generations and the generation that will be working when the large number of retirements with pension occurs.

To "lock away" money now for tomorrow's eldercare may seem to be an unnecessary infringement of the free – and at any given moment

of time, wise – right of disposal of resources. However, it is not certain that such savings in public finances will be available at all unless a broad consensus can be reached on a good cause to save for. If people can be convinced of the wisdom of creating a buffer today for the old people of tomorrow, we will have achieved two aims. The actual savings goal becomes more realistic and easier to understand, while people may be reassured of society's ability to provide many more old people with the care necessary for a dignified old age in the future.



Healthier aging – possible scenarios



The theme of last year's edition of the Social Insurance Book was "After 55 – Welfare, work and leisure". A leading thesis of the book was that there ought not to be so many old-age and disability pensioners as are assumed by current forecasts. Instead, we should continue working longer on average. The public system stipulates no upper age limit for claiming a pension.

Nevertheless, most people are influenced by some such upper limit deriving from contractual agreements. Often people have been obliged to retire at 65. With the passage of time, such contracts have created a norm for what is expected. Most people today take it for granted that they will retire from working life at the age of 65 or, preferably, perhaps at 60. But does the exit from working life have to be so abrupt? Should not health, work capacity and what the individual wants be the deciding factors in the decision to retire, rather than a certain age level?

Statistics reveal that *life expectancy is still increasing and that people retain their health up to ever higher age levels*. On the basis of such statistics, is it not reasonable to assume that we will be able to continue working much longer in future, if we want to and are healthy?

In this section, these questions will be discussed in the light of current medical research into human aging. During the past few decades, the science of aging has made great advances. This may be due to more and more people reaching a ripe old age in the western world, thus providing an economic basis for pharmaceutical and medical technology aimed at the elderly.

To give some idea of where science stands today and how contemporary scientists view the question of aging, we take up only the results of research from more recent years. The data used in our review is drawn partly from scientific publications of the past ten years, and partly from interviews with a number of Swedish experts in different medical specialties.

Life expectancy

People all over the world are reaching ever higher ages. This demographic breakthrough occurred in the twentieth century, when life expectancy in many western countries virtually doubled. (Life expectancy is the number of years that an age cohort in any given year may be expected to have left to live. Often it is given for newly-born cohorts). The immense increase has largely come as a surprise, most forecasts of life expectancy having missed the mark. In most cases, increases have been underestimated.

The reason for this aging of the population is a change in balance between nativity and mortality. We now have a pattern consisting of low nativity and low mortality. This results in a growing number of old people and a diminishing number of young people. The decrease in mortality among old people has been dramatic in European countries over the past half-century. The older the age group, the greater the decrease, as illustrated in the following table.

Age	1980	2000	Difference in per cent
65–69	2.0	1.4	0.6
70–74	3.3	2.3	1.0
75–79	5.7	4.0	1.7
80–84	9.8	7.2	2.6
85–89	16.5	13.3	3.2
90–94	27.3	23.3	4.0
95–	44.6	41.0	3.6

SOURCE: SCB

Mortality in per cent for different age groups. Mortality has decreased during the past 20 years in all age groups over 65.

Developments in Sweden match those of the rest of Europe. In 1968, there were approximately 365,000 persons aged 75 or over. Thirty years later, the number of old people had almost doubled. According to the National Statistics Office (scb), there will be roughly one million people in these age groups by 2020. As shown in the following table, life expectancy is expected to increase by approximately 5 years during the period 2000–2050 (5.5 years for men and 4.4 years for women).

Year	At birth		At 65	
	Women	Men	Women	Men
2000	82.1	77.1	20.1	16.5
2030	85.2	81.0	22.5	19.1
2050	86.5	82.6	23.5	20.3

SOURCE: SCB'S DEMOGRAPHIC REPORTS 2000:1

Remaining life expectancy. Life expectancy at 65 is expected to increase by approximately 3.5 years for both women and men during the next 50 years.

The population is expected to increase from approximately 8.9 million in 2000 to approximately 9.5 million in 2050. In 1950, the population was approximately 7 million. In the following table, we see that the number of persons over 80 will virtually double within the next 50 years. This confirms observations indicating that this is the fastest growing group in the western world.

Year	Over 65	Over 80
1950	10.2	1.5
2000	17.3	4.9
2050	24.4	9.3

SOURCE: SCB'S DEMOGRAPHIC REPORTS 2000:1

Proportion of the population. The proportion of persons over 80 will have doubled by 2050.

Centenarians

Reaching the age of one hundred is no longer the rare event it used to be. The number of centenarians in Europe has been doubling every ten years for the past half-century. The increase in countries with high mortality rates has been just as great

as in those with low mortality rates. One sees the same trend in the USA. In 1950, there were approximately 3,000 centenarians in the USA. Today, this figure stands at 65,000, and it is forecast that there will be approximately 900,000 centenarians by 2050. Of the 65,000 centenarians now living, only 5,000 are men, a gender difference which we cannot fully account for at present. Throughout the world, however, women live six years longer than men on average. In Sweden, the number of centenarians is estimated to have been approximately 1,000 in the year 2000, and according to forecasts from the National Statistics Office (SCB), this number will have reached approximately 6,800 by the year 2050. The proportion of centenarians in relation to the population is thus twice as large in the USA as it is in Sweden.

Slower rate of increase

Although life expectancy is constantly increasing, the actual rate of increase has slowed down over the past few decades. In the USA, for example, life expectancy increased by 27 years from 1900 to 1997. The greatest increase – 21 years – occurred during the first 70-year period, while the increase over the past 30 years has been considerably less (6 years from 1970 to 1997). A similar development can be seen in Sweden, where life expectancy for men and women was just under 60 years at the start of the twentieth century. In 1970, life expectancy for men was 71.7 years and for women 76.1 years. Since then, it has increased by 5.4 years for men and 5.8 years for women.

The slowing rate of increase is mainly due to the dramatic reduction in the incidence of diseases, which took a heavy toll of young persons and especially children at the beginning of the century. Certain diseases,

such as tuberculosis, have been virtually eradicated. Today's increase is due primarily to reduced mortality among old people.

Will the rate of increase continue to fall, as the scb forecasts assume (approximately 5 years during the next half-century)? Or will advances in medical science lead to further dramatic increases in life expectancy?

Life expectancy in the future

When considering various future scenarios, a distinction is made between life expectancy and the maximum number of years a human being can live. The maximum human "life-span" has remained constant at approximately 125 years over the past 100,000 years. What has changed is the length of life a person may be expected to have from the time of birth onwards, i.e. life expectancy

Different conclusions have been drawn regarding the possibility of people growing significantly older than today. Some researchers claim that life expectancy will never exceed a ceiling of somewhere around 85 years. By contrast, others maintain it is quite possible that life expectancy will reach approximately 100–120 years in the not too distant future. In the publications this chapter is based on, the dominant tendency is to anticipate a somewhat more modest increase. Nor did the Swedish researchers interviewed envisage any dramatic increase. An exception was the medical geneticist who guessed that the means to halt aging would be available within the next half-century.

Life expectancy and the eradication of disease

To justify the belief that no dramatic increase is to be expected, estimates were quoted showing that a total eradication of the most common causes



of death before the age of 80 would not increase life expectancy by more than ten years at most (Lithell, Rosén, Saldeen, Strandberg). In Sweden, the greatest effect would be gained if heart and vascular diseases were to be totally eradicated. This would increase life expectancy by 4–5 years. Eradicating all cancer tumours would add approximately three years of life. Eradicating every other disease would give one or two months of increased life expectancy per disease. If an illness such as Alzheimer's disease were to be entirely eliminated, life expectancy would only increase by about 19 days.

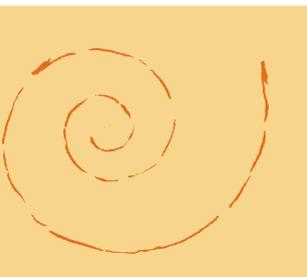
A complete eradication of our national diseases is to be regarded as a utopian dream. Moreover, most researchers believe that a reduction or elimination of one disease would pave the way for other diseases. A person who has been helped to survive a heart attack runs the risk of contracting, for example, cancer (Nyberg, Saldeen, Jonsson). Nor can one ignore the risk of hitherto unknown infectious diseases, such as AIDS and the Ebola virus, ravaging both developing countries and the western world (Pettersson). There seems little probability, therefore, that life expectancy will show any dramatic increase as a result of curing or eliminating diseases. Any significant increase requires, in addition to the elimination of diseases, a slowing down of the "normal" process of aging. If a brake is to be put on aging, we must first discover what it is that controls a person's life-span and why we grow older.

What controls aging?

Most researchers agree that individual life-span is controlled by both internal and external factors. However, they do not always agree about the relative importance of these factors. Some experts maintain that almost 100 per cent of a human being's individual life-span is determined by genes, while others believe that at most 25 per cent can be explained by genes.

Based on what we know today, it is hardly probable that a single gene has any influence on population levels, even though some genes would seem to have greater influence on the length of life than others.

For example, carriers of a gene variant designated APOE e4 have a higher mortality rate than the rest of the population and studies have revealed that centenarians have lower levels of this gene variant. Other research has shown that there seems to be a strong family component in people who live long lives. It has been assumed that this component is genetic and that it may consist of one or more genes. Perhaps we will learn how to influence these genes in the future.



The aging process

The risk of a person dying is least around the age of 12–13, after which it increases with age. Aging can thus be seen as a life-long process and not something that suddenly starts at the age of 65. Many researchers emphasize the importance of distinguishing between changes due to aging and changes due to illness. We must ask ourselves "What would people die of, if all the illnesses listed in the cause-of-death certificate were to be eradicated?". For they are bound to die anyway, but in that case perhaps as a result of the processes which really constitute aging. What, then, distinguishes changes due to aging from changes resulting from illness? One distinguishing feature is that, unlike illness, they happen to every individual who reaches a certain age. Furthermore, they occur in virtually all species and never start prior to sexual maturity in any member of the species. Even animals, which have had no experience of aging during thousands or even millions of years, exhibit similar changes once removed from their wild condition.

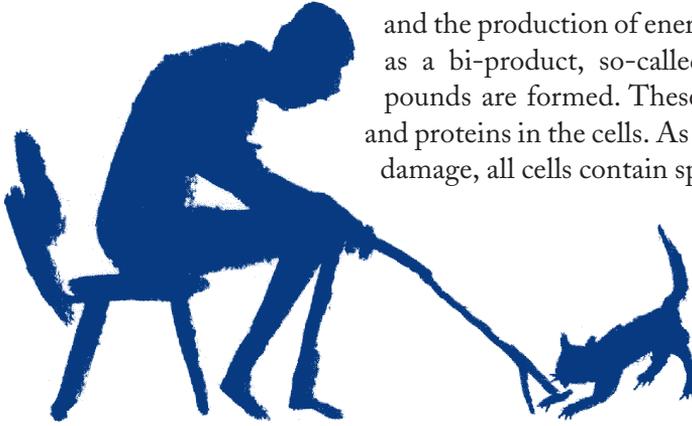
The point is that one cannot understand aging by studying the illnesses of old people. The study of illness tells us nothing about normalcy! One researcher believes that instead of asking "Why do we age?", we ought rather to ask "Why do we live so long?". He justifies this by pointing out that we were never intended, teleologically speaking, to know anything about the aging process. For 99.9 per cent of the human race's time on earth, life expectancy has been about 30 years, with a maximum life-span of about 50 years. Human beings, and those animals we have chosen to protect, are the only creatures on earth that in large numbers get to experience aging.

That humans (and animals in captivity) reach an age well beyond their active reproductive stage may accordingly be regarded as an artefact in nature. This may explain why the actual aging process, as opposed to the life-span of the individual, seems not to be controlled by genes. Genes control biological development up to sexual maturity, but seem to carry no instructions for actual aging. Age-specific mortality is nevertheless strikingly constant over time, between people and at various levels of the total death rate. This has given rise to the supposition that there is some kind of underlying biological pattern related to aging.

If there is no genetic code for the actual aging process, how can one explain aging in biological terms? Studies of the structure and function of the cell have suggested some possible explanations. These discoveries may lead to the development of the means to slow down aging in the future. The most important findings relate partly to *the effect of oxygen on the cell*, partly to the *length of the so-called telomeres*.

Oxidative stress in the cell

Cells have a certain vulnerability in connection with oxygen. Aging may be related to this vulnerability. During the early stages of the development of life on earth, oxygen was in fact a poison, which organisms only gradually learned to handle. Using oxygen, the organism



could render more effective the combustion of food and the production of energy in the body. However, as a bi-product, so-called reactive oxygen compounds are formed. These damage the genes, fats and proteins in the cells. As a protection against such damage, all cells contain special molecules, antioxi-

dants, whose task is to neutralize the reactive oxygen compounds. The body itself can produce antioxidants, but these can also enter the body as food in the

form of vitamins. The balance between the reactive oxygen compounds and the antioxidants seems to have an effect on the life-span of the species. Humans, for example, have a far greater number of antioxidants in their cells than mice, which live far shorter lives than we do.

Experiments on animals have shown that it is possible to create an increased life-span by manipulating the gene pool. The genes involved have been shown in many instances to affect the breaking down of the reactive oxygen compounds. An equivalent of these genes is also found in the DNA of humans, so it is theoretically possible to perform similar surgery on humans. One has also succeeded in producing a chemical that speeds up the degradation of the reactive oxygen compounds. If the chemical is fed to roundworms, their average life-span is prolonged by just over 40 per cent. According to researchers in the field, it is reasonable to assume that within a time-frame of some 20–30 years clinical tests will have been carried out with similar substances (Pettersson).

The role of telomeres in the aging process

What are telomeres? The ends of normal chromosomes are sealed with a specific DNA, which prevents them from fusing with each other or with other chromosomes. These ends, called telomeres, consist of a repeated number of identical short DNA sequences. In the chromosome duplication process preceding every cell-division, the telomeres are not copied in their entirety but are slightly truncated. There seems to be a critical

point in this shortening, beyond which the cell is no longer able to divide. There has been shown to exist a close connection between the length of the telomere in a cell and the number of divisions the cell can undergo. The shorter the length of the telomere, the smaller the number of divisions. It has also been demonstrated that the length of telomeres decreases with advancing age in humans. There is, however, one exception. For example, the length of telomeres in donated sperm was not affected by the donor's age. This could indicate that the reproductive cells include a mechanism for maintaining the length of telomeres.

In the mid-1980s, an enzyme was discovered which was given the name telomeras. It was found that telomeras extended the telomeres. Telomeras is found in large quantities in cancer cells, which do not die – as opposed to normal cells, that have a limited life-span. In approximately 90 per cent of all human cancer tumours, telomeras is found in abundance. In recent years, however, telomeras has also been found in normal cells, such as foetal tissue, bone-marrow cells and testicles. The amount of telomeras in these normal cells is, however, considerably less than in cancer cells.

The discovery of the function of telomeras may stimulate research into ways of introducing telomeras into normal cells, with the aim of slowing down aging. It will naturally be essential to carefully adjust amounts to avoid the risk of normal cells developing into cancer cells. On the other hand, research may also focus on finding inhibitors of telomeras production in order to modify the characteristics of cancer cells and build a limited life-span into these too.

Having found plausible explanations of aging at the cell level, it is merely a matter of time before this knowledge will also be applied to humans. One can be fairly sure that if it proves to be within human ingenuity to genetically slow down aging, it will happen sooner or later. However, it still seems to be a giant step from roundworms to human beings!

So is there any way of slowing down aging today? Some people say there is, and activities aimed at postponing the advent of old age are becoming more and more common. Health food stores are flooded with products claiming to have rejuvenating powers. Every now and again, one can read in the evening tabloids or health brochures about some new miracle pill which will help us retain our youth. Among these offerings, is there any treatment that delivers what it promises, that is, eternal youth? In the USA, there are medical clinics, run by doctors specialized in treating healthy persons with medical preparations, devoted to combating changes due to aging. Their activities go under the name of "anti-aging medicine".

"Anti-aging medicine"

"Anti-aging medicine" is not a new concept in history. Because people have always striven to live as long as possible – without at the same time growing old – the search for the fount of eternal youth has always been going on. At the beginning of the twentieth century, it was discovered that the production of sex and growth hormones decreases as we grow older. Ever since this discovery, people have reasoned that an extra supplement of these hormones ought to counteract aging. In modern times, therefore, "anti-aging medicine" has primarily been associated with hormone treatment. The goal of anti-aging treatment is to restore the hormone system responsible for the preservation and repair of cells. To achieve this goal, one has sought to restore the hormone system to the level found at the age of 25–30.

Oestrogen, progesterone and testosterone control our reproductive functions. Treating women with oestrogen is the field in which we have the longest experience. Replenishing the supply of oestrogen counteracts menopausal problems, such as sweating, hot flushes and fragile mucous membranes. Post-menopausal treatment with oestrogen has been shown to counteract brittleness of the bones. Although oestrogen treatment has a long history, we still do not fully understand what side-effects it may have in the long term. What we do know, however, is that although oestrogen certainly improves health and enhances the quality of life while we are living, there is no evidence that it increases life-span.

We have far less experience of testosterone than of oestrogen. When testosterone was synthesized in the nineteen-thirties, hopes were high that the fount of eternal youth had been discovered. This proved not to be the case and we still know very little about the possible effects of increasing the levels of testosterone. A case in point is impotence. Studies have shown that testosterone deficiency accounts for only a small percentage of cases, and even here testosterone is not always a suitable treatment.

Growth hormone is known for its effect on the skeleton and soft tissues, as well as on metabolism. In Sweden, this is only prescribed for persons unable to produce the



hormone naturally themselves, i.e. on purely medical grounds. A combination of therapy plus growth hormone for persons with inadequate growth hormone production has been shown to improve memory and other cognitive functions. It also influences a person's moods, sense of well-being and level of activity. An additional supply of growth hormone may also produce purely cosmetic improvements. Pot-bellies in men and women are reduced and women's bodies retain their subcutaneous fat so that wrinkles disappear. Constant replenishment is required, however, for lasting results. If treatment is discontinued, the previous condition returns (Nyberg). In the USA, it is also possible to treat healthy persons with growth hormone. Treatment consists of daily injections where the doses are lower than those given on medical grounds.

Research into the protective role of antioxidants is also beginning to have an impact on anti-aging clinics. Extra vitamins are prescribed in the hope of shoring up the antioxidant system. However, research has shown that it is doubtful whether extra intake, over and above what is received in the form of food, has any noticeable effect. On the contrary, it seems that if we add fresh amounts of antioxidants to the body, natural gene-controlled production is inhibited.

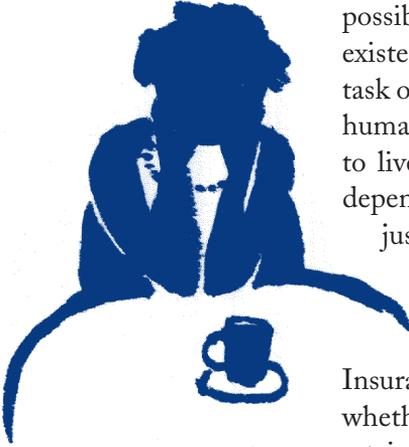
No dramatic increase

To sum up, there is unlikely to be any dramatic increase in life expectancy even if the illnesses we suffer from are reduced or eliminated. The eradication of all illnesses up to the age of 80, in itself a utopia, would at best extend life expectancy by only ten years. Furthermore, it is impossible to protect ourselves against new viruses as yet unknown which could start widespread infectious epidemics.

Nor will the anti-aging medicines of today have any effect on life expectancy. It has been shown that the physical and psychological effects of aging, such as wrinkled skin, dry mucous membranes, pot-bellies, failing memory and deteriorating cognitive functions, can be temporarily counteracted by administering growth hormone, but the effect evaporates as soon as treatment is discontinued. Extra doses of hormone thus appear powerless to influence the aging and death of cells.

On the other hand, we may not ignore the possibility of slowing down the aging process at some future date by modifying genetic make-up. This might lead to an upward shift in the maximum life-span, with more and more people reaching an advanced age. Even though the majority of scientists today express themselves with caution on the subject of future life expectancy, it cannot be ruled out that scb's forecast of only five years' increase over the next fifty years may take its place alongside earlier underestimates.

If the appropriate technology arrives on the scene much earlier than expected, it will spawn a fierce ethical and sociopolitical debate. As yet, we can scarcely imagine what questions will be raised by such technology. Among biogerontology researchers, the debate is already under way.



Some scientists, while by no means excluding the possibility of influencing aging in the future, see no existential justification for it. They do not consider the task of the biogerontologists to be the prolongation of the human life-span, but rather to increase people's ability to live long active lives, free of illness and functional dependency. It is a matter of "adding life to years, not just years to life!", according to Winston Churchill, who, as we know, lived to a respectable old age.

This brings us to the second of the premises underlying the basic thesis of the Social Insurance Book 2000, namely, that elderly people, whether or not life expectancy increases a lot or a little, retain their health at ever more advanced ages.

The health of the elderly

The fact that people live longer today may be due to improved health or to people being kept alive longer during periods of illness. Many different scenarios are conceivable. One is that health remains unchanged, that is, people continue to exhibit the same level of illness as formerly at the same age. In this case, a longer life will mean a longer period of illness. Another scenario is where the period of illness is postponed but is of the same length. A third alternative is that we reach a higher old age and that the period of illness is shortened, due to an increasing number of diseases becoming curable or susceptible to treatment. Questions concerning the length of the period of illness and the time of its onset are important to answer. The implications for society will vary according to the answers we receive, as the discussion in the following section illustrates.

What, then, is the state of health of the older population? How will it develop over the next half-century? In this section, we do not set out to detail the various illnesses that afflict old people. Instead, we discuss in more general terms the state of health of the elderly. In addition, we take up some specific problem areas pertaining to care of the elderly.

The state of health of old people

WHO warns us that we are facing a great challenge. It is essential to ensure that the extra years of life expectancy do not spell additional

suffering for those who grow older. The issue of life expectancy must be supplemented by the equally important issue of health expectancy. Regular surveys of living conditions in Sweden (ULF) are already carried out in order to measure the standard of public health. These are conducted annually by the National Statistics Office of Sweden (SCB) on behalf of the Swedish Riksdag. Using approximately 700 welfare indicators, the aim is to form an impression of how people live and feel in Sweden today. The surveys have been conducted since 1975 and so far approximately 150,000 persons have been interviewed. However, the respondent population is limited to persons aged 16–84, so that information about “the very old” (over 85) is not available.

ULF reveals that the longer people live, the greater the chance of suffering from chronic illness (see the table below). Diseases of the circulatory system, that is, heart and arteries, are by far the most common among the elderly. Nearly half the number of people over 75 report such problems, as against just over a third of those aged 65–74. Of the circulatory diseases, heart disease is three to five times more common after the age of retirement than in the adult population as a whole (ages 16–84).

Illnesses	Age		
	65–74	75–84	16–84
Long-term illness (unspecified)	72	82	46
<i>Disease of circulatory system</i>	39	49	13
Heart disease	17	24	5
High blood pressure	21	24	8
<i>Disease of motor organs</i>	26	34	18
Impaired locomotion	35	66	15
<i>Disease of endocrine system</i>	15	15	5
Diabetes	8	9	3
<i>Disease of respiratory organs</i>	8	9	7

SOURCE: SURVEY OF THE LIVING CONDITIONS OF THE POPULATION (ULF)

The illnesses most frequently reported by old people themselves. In per cent. Diseases of the circulatory system are the most common and of these heart disease is the most frequently reported.

Other illnesses afflicting old people in particular are osteoporosis (brittleness of the bones), dementia – for example, in the form of Alzheimer’s disease – psychological problems in the form of depression and anxiety as well as, according to geriatric expertise, malnutrition (Akner). Often, an elderly person has several illnesses simultaneously. A Swedish study has shown that roughly 80 per cent of all people over 75 suffer from two or more chronic illnesses as reported by themselves. ULF also shows that the older people become, the more frequently they visit the doctor. In

answer to the question as to whether they had visited a doctor during the preceding three months, 41 per cent of the entire group (aged 16–84) answered yes, while the corresponding figure for the age group 75–84 was 65 per cent. Are there grounds for believing that the state of health of older people is destined to improve significantly?

Changes over the past twenty years in Sweden

In comparing the state of health today with that of twenty years ago, statistics from the Survey of the Living Conditions of the Population (ULF) reveal both improvement and deterioration. In the following example, data from 1980 is compared with that from 1996. Health as reported by respondents has definitely improved since 1980. At that time, 12.5 per cent of all people aged 65–84 judged their health to be bad or very bad. In 1996, the corresponding figure was roughly 8 per

cent. Similarly, 10 per cent fewer reported reduced work capacity (25% in 1996 as against 28% in 1980). The proportion of men who smoked declined noticeably, from 28.4 per cent in 1980 to 15.8 per cent in 1996. By contrast, the proportion of women smokers increased from 8.7 to 12.8 per cent.

Chronic illnesses were reported to the same extent as earlier while more people had visited a doctor (see the table below). Diseases of the motor organs increased for the entire group of elderly people (aged 65–84) by 40 per cent (up from 21.5% to 30%). Despite this, the proportion reporting impaired motor functions and motor disorders declined, while backache problems increased (table on page 37).



Age	Chronic illnesses		Visits to doctor	
	1980	1996	1980	1996
65–69	69.2	68.7	43.2	50.4
70–74	73.0	74.7	48.3	55.2
75–79	79.5	79.6	52.4	63.3
80–84	85.3	83.9	58.9	67.5

SOURCE: SURVEY OF THE LIVING CONDITIONS OF THE POPULATION (ULF)

The proportion of people with chronic illnesses and the proportion of those visiting a doctor over a three-month period. The same number of people reported having a chronic illness, but the number visiting a doctor increased.

Age	Reduced locomotion		Disability		Backache	
	1980	1996	1980	1996	1980	1996
65–69	41.3	32.0	14.6	12.4	8.9	11.5
70–74	46.4	38.1	24.9	15.4	5.9	8.3
75–79	65.7	56.0	42.4	28.1	7.8	12.5
80–84	82.1	75.1	53.5	43.0	7.6	8.8

SOURCE: SURVEY OF THE LIVING CONDITIONS OF THE POPULATION (ULF)

The proportion of people with reduced locomotion, disability and backache.

Fewer people reported reduced locomotion and disability, while backache problems increased.

It seems there has been an overall improvement in the health of elderly people and that the increased frequency of certain illnesses is attributable to increased age. The increase in chronic illnesses – such as motor organ problems – is a natural concomitant of living longer. Since heart disease is one of the most common ailments of old people, it may be of particular interest to illustrate any changes using this as our example.

Age	Women		Men	
	1980	1996	1980	1996
65–69	9.4	12.5	10.8	16.0
70–74	16.7	14.9	18.4	19.2
75–79	24.2	16.6	22.2	29.2
80–84	27.7	25.0	23.6	26.1

SOURCE: SURVEY OF THE LIVING CONDITIONS OF THE POPULATION (ULF)

The proportion of people reporting heart diseases. There has been a reduction among women, but heart diseases have increased among men.

While the proportion of women reporting heart diseases decreased, except for the age group 65–69, the proportion of men increased in all groups. One explanation of the increased incidence among men may be lower mortality rates. As more men survive severe heart attacks, there are as a consequence more men living with heart ailments, which are controlled by the use of medicine or other technology. Moreover, this means that more men are likely to suffer additional heart complications later on. How, then, has the mortality rate changed during this same period?

The table below indicates that mortality from heart attacks decreased significantly during these years. The death rate dropped for both sexes. For women, deaths were halved in virtually all age groups, while for men the reduction was greatest in the age groups 65–69, where deaths were more than halved (54%). In the remaining age groups, there was a reduction of 37–45 per cent.

It is interesting to note that not only did the death rate drop but it also shifted upwards to the higher age brackets. The frequency that applied in 1980 to the age groups 65–69 applied in 1996 to the age groups 70–74, the frequency for 70- to 74-year-olds now applied to 75- to 79-year-olds, and so on. This trend is typical for all age groups and applies equally to women and men.

Age	Women		Men	
	1980	1996	1980	1996
65–69	0.4	0.2	1.3	0.6
70–74	0.8	0.4	2.0	1.1
75–79	1.6	0.8	3.1	1.7
80–84	3.2	1.6	4.9	3.0
85–89	5.7	3.0	7.8	4.9
90–	10.0	5.4	13.1	7.7

SOURCE: SURVEY OF THE LIVING CONDITIONS OF THE POPULATION (ULF)

The proportion of those over 65 who died of heart attacks. The death rate dropped for both sexes and also shifted upwards among age groups.

An important factor in the reduced death rate is smoking, which has declined significantly. In 1980, 29 per cent of women were smokers compared to 22 per cent in 1998. The corresponding figures for men were 36 and 17 per cent respectively. The diagnosis and treatment of high blood pressure has also contributed to reducing the death rate, as well as changes in people's lifestyles. There is a greater awareness today than formerly of the importance of keeping fat intake down, drinking alcohol in moderation and getting physical exercise.

Medical technology, with rapid advances both in the field of transplantation and medical genetics, promises improved methods of treatment. Medicines are already available which provide effective help to those who have developed some form of heart problem. Researchers in this field all agree that a continued decrease in mortality and contraction of the disease is to be expected, provided preventive measures increase (Saldeen, Rosén, Strandberg).

We encounter a similar optimism concerning the future state of health of the elderly among researchers within other medical specialties. Research in the field of diabetes and Alzheimer's disease, for example, is constantly making new discoveries which will facilitate the treatment and prevention of these illnesses (Lithell, Jonsson). Similar developments are expected for most of the diseases familiar to us today. Great hopes are pinned on medical genetics regarding both treatment and diagnosis. (Pettersson, Strandberg).

Health-weighted years of life

What is the relationship of “health expectancy” to “life expectancy” when we compare the health of elderly people today with twenty years ago?

In the Social Insurance Book 2000, we used statistics from the Survey of the Living Conditions of the Population (ULF) to calculate precisely the “expected years of health”. We used the measure “health-weighted years of life”, which is a combination of mortality and degree of ill health. This involves “weighting” various levels of ill health. If a person enjoys full health in every respect, the expected years of life are given the “weight” of 1. In the case of slight ill health, the weight drops to 0.9. In the case of severely impaired health, the expected years of life “weigh” only 0.5. Put another way, we might state that for someone with severely impaired health, one year of survival corresponds “quality-of-life-wise” to only half a year lived in full health (Living Conditions – Report no. 93).



The analysis revealed that the expected number of health-weighted years of life had increased somewhat for women and men since the beginning of the 1980s. For women in the age group 65–74, average life expectancy was 8.4 years at the beginning of the 1980s, while at the end of the 1990s it had increased to 8.6 years. The corresponding health-weighted years of life were 6.9 and 7.2 respectively. For men in the same age group, the number of health-weighted years of life increased from 5.9 to 6.6 during the same period. Thus, this age group enjoys good health for approximately 85 per cent of the expected years of life.

A follow-up to the analysis in the Social Insurance Book 2000 indicates that women in the age group 75–84 enjoy good health for approximately 75 per cent of the expected years of life while the corresponding figure for men is a little over 80 per cent. Also in this age group, the number of health-weighted years of life increased from the beginning of the 1980s to the end of the 1990s (for women, from 2.25 to 2.55, and for men, from 1.55 to 2).

Under-diagnosis among the elderly

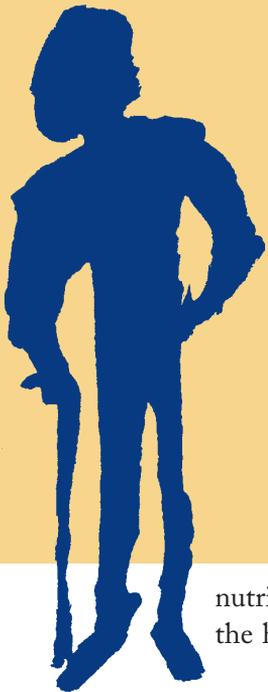
The findings reported in ULF, revealing that the health of elderly people had in their own estimation improved while simultaneously a greater number of chronic illnesses were reported, appear to be self-contradictory.

dictory. An explanation of this paradox may perhaps be found in the improved medical treatment of elderly people's illnesses. As mentioned earlier, we have traditionally divided changes relating to old age into those due to "illness" and those due to the "normal aging process". In all likelihood, this led in the past to an under-diagnosis of illness among the elderly. The increased risk of illness was simply viewed as a natural phenomenon. Today, geriatric researchers agree that many changes earlier classified as "normal aging" are in reality pathological (Akner). This means that there is often a good prospect of a cure. As one doctor expressed it: "If we know enough about our patients' physiology, actual age will cease to be a determining factor in the prognosis for success of the treatment".

Formerly, many clinics also shared the belief that older people lacked the ability to adapt to changes of lifestyle. In accordance with the motto "you can't teach an old dog new tricks", it was believed that old people were unable to change their lifestyle. However, studies have shown that elderly people respond well to preventive measures. One simple example worth mentioning is the 75-year-old man with severe bronchitis who had been a smoker since the age of 14. He received an anti-smoking cure as a Christmas present from his children and succeeded in giving up smoking. The bronchitis disappeared almost immediately and a few weeks later he was climbing the four flights of stairs to the doctor's surgery with ease. Since this man was one of his first patients, the successful outcome created a firm belief in the mind of the young clinician that people were able to change, age notwithstanding!

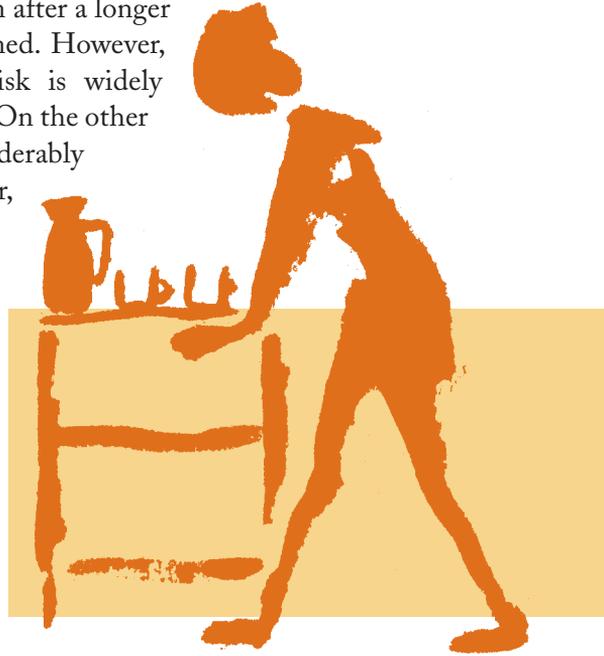
Threats to health among the elderly

A common complaint among gerontologists and geriatric researchers from various countries is that geriatric and gerontological research still lacks adequate funding. They also feel that geriatrics is not regarded as an important medical discipline. They believe this is the reason why our understanding of old people's illnesses is still relatively limited and why the treatment of old people is still below standard (Akner, Lithell). According to these researchers, greater knowledge of old people's illnesses will further improve the health of the elderly. However, major problems remain to be solved, such as institutionalization, malnutrition, multi-medication, passivization and incorrect lifestyle, before the health of elderly people can be optimal.



Institutionalization

One of the major problems to solve within geriatrics is the risk of institutionalization. Institutionalization may be described as a more or less temporary impairment of a set of skills, both physical and psychological, as a result of admission to hospital. This phenomenon does not only affect old people, but old people are particularly vulnerable, due to the naturally lowered state of some of their central functions. A few days in hospital for an uncomplicated infection may severely reduce an 85-year-old woman's ability to make her own way to the toilet. So the degree of institutionalization after a longer period of treatment may easily be imagined. However, doctors in the field claim that this risk is widely recognized within Swedish geriatric care. On the other hand, awareness of the risk may be considerably less within other medical areas (Akner, Lithell). Consequently, there is considerable justification for the fear expressed by old people's of ending up in hospital. They are afraid of losing the functions they still have intact – a fear based, no doubt, on the experience of what happened to relatives or friends after they had been admitted to hospital.



Malnutrition

A sound nutritional balance is a prerequisite for avoiding illness and regaining health. It has been shown that undernourishment is common within Swedish health and medical care. The average incidence of malnutrition is approximately 30 per cent, but it is significantly higher among old people who are chronically ill. Studies have revealed that something like 70 per cent of residents in nursing homes suffer from malnutrition while the remaining 30 per cent lie in the immediate risk zone. We may compare this with 3–6 per cent of people living at home who suffer from malnutrition. However, 40–60 per cent of these also fall within the risk zone. Malnutrition is defined as a condition of imbalance between the intake and conversion of energy and nutritious substances resulting in an increased risk of poor health. The most common form of malnutrition within Swedish medical care is caused by a combination of energy and protein deficiency (the National Board of Health and Welfare report 2000:11). One of the geriatricians interviewed felt that the level of knowledge concerning

nutrition and the treatment of malnutrition within municipal geriatric care still left a lot to be desired. In order to prevent ill health and guarantee quality of life for the elderly, it is thus necessary to attempt to restore a normal nutritional balance in older people (Akner).

Multi-medication and medicinal side effects

Another major problem is multi-medication (Akner, Jonsson, Strandberg). In Swedish nursing homes, an average of 9 medicines per resident is used and a single elderly patient may be prescribed 10–15 different medicines. It has been shown that nearly 20 per cent of residents in nursing homes have serious medication problems. It may be a question of unsuitable combinations of pharmaceutical preparations, duplicate prescriptions or medicines which are clearly inappropriate for older people.

Apart from the risk of medicines neutralizing each other, many of them have undesirable side effects. According to the Book of Medicine, these constitute a major health and medical care problem, since they are a frequent cause of adult patients being admitted to hospital. 2–12 per cent of patients admitted to medical, geriatric and isolation clinics in Sweden have medicinal side effects as the main or contributory reason for admittance. If a patient takes several medicines at the same time, it clearly becomes very difficult to determine which of the patient's symptoms are actually caused by illness and which are unintended interactions between drugs or side effects of medicines.

One side effect is the so-called rebound effect. This is when a medicine causes the very problem it was originally intended to combat. Certain pain-killers, such as those taken for migraine, can after long use actually give rise to pain, just as sleeping pills can produce insomnia and ataractic drugs can cause anxiety. When this happens, it is easy to believe that the dosage needs to be increased. One can end up in a vicious circle, which may lead to addiction if the drug is a narcotic. The



majority of soporific, sedative, ataractic and analgesic drugs are addictive. To complicate matters even further, these preparations, unless phased out very carefully, can give rise to abstinence symptoms very similar to those the medicine was originally taken to alleviate.

Swedish pharmaceutical statistics reveal that prescriptions to the elderly of both soporific and sedative drugs are very common. Apart from the risk of addiction, long-term use of these drugs probably leads to passivization, with impaired functions as a result. The table below shows that purchases of both soporific and sedative drugs containing benzodiazepines and analgesic drugs containing dextropropoxyphene (DXP) increase significantly with increasing age.

Age	DXP DDD/t.i.d ¹	Benzodiazepines DDD/t.i.d ¹
20-29	2.0	4.1
40-49	9.2	30.8
70-79	41.7	97.0

¹ Defined daily dose/1000 inhabitants and day.

SOURCE: JONASSON, 2000

Sales of analgesic drugs with DXP and soporific and sedative drugs with benzodiazepines in 1996 in Central Sweden. Purchases increase significantly with increasing age.

One of the researchers interviewed considered it an organizational blunder to allow a series of different doctors to treat the same patient (Akner). In his opinion, this was the main cause of multi-medication of the elderly and its unfortunate consequences. To rectify this situation, he suggested that a single doctor be given primary responsibility for a geriatric patient's medication. "The doctor must once again be given main responsibility for the patient, and not as now, function merely as a consultant in the eldercare system".

One way of avoiding multi-medication is to create a patient case-book database allowing doctors to check which drugs have already been prescribed to patients. This is also one of the action points proposed by the National Board of Health and Welfare to the government with the aim of improving medical and financial follow-up of the prescription and use of medicines. The Board argues that if patients are to gain the maximum benefit, it is essential for them to get the "right" treatment. This in turn presupposes that the doctor making out the prescription is aware of any other treatment the patient may be receiving in order to take into account interactions, etc, that can neutralize the effect of the current medicinal treatment.

”Use it or lose it”

In order to postpone the period of illness, it is essential to keep both physical and psychological functions in trim. The expression ”Use it or lose it” is highly relevant to our basic functions. It has been demonstrated that if strong young men are confined to bed for a couple of weeks, their muscles regress to such an extent that it takes considerable time to rebuild lost muscular strength afterwards. It is thus easy to understand that the risk of regression of vital powers in an elderly person is even greater. As one expert put it: ”The bed’s a dangerous place to be” (Jonsson). In Sweden, this knowledge has, for example, been put to use in special stroke wards. In these, the aim is to prevent people who have suffered a stroke from losing more of their powers than necessary. The patient is literally forced up straight from the ambulance stretcher and activated. This has been shown to have a beneficial effect on survival rates. It is the same story with the rehabilitation of patients suffering from back and neck injuries.

Risk-enhancing lifestyles

Even if it is never too late to change lifestyles and by so doing make considerable gains in health, health is something that should be built up in one’s earlier years. Researchers and clinics universally agree on this. When the experts being interviewed were asked what they themselves did to ensure the longest and healthiest life possible, all of them

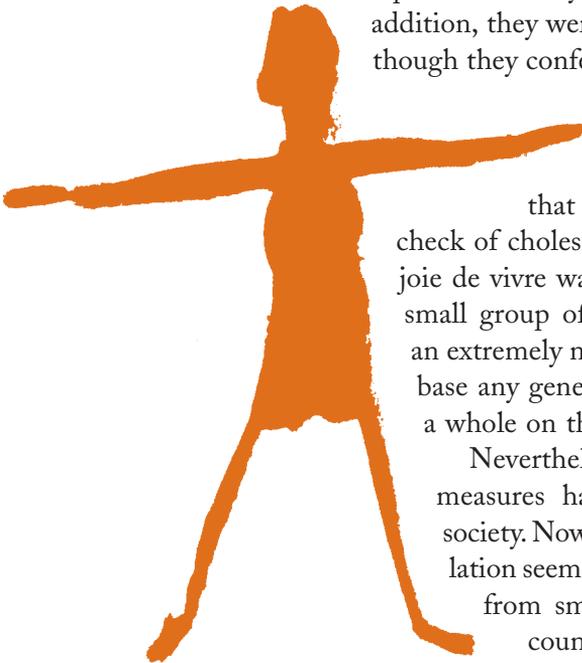
replied that they had always liked to exercise. In addition, they were careful about what they ate, even though they confessed to liking good food and wine.

None of them smoked and none seemed to suffer from overweight problems. One of them thought

that it was important to make a regular check of cholesterol levels, etc. Quality of life and *joie de vivre* was emphasized by all of them. This small group of male experts naturally represents an extremely narrow selection and thus we cannot base any generalizations about the population as a whole on their healthy lifestyle.

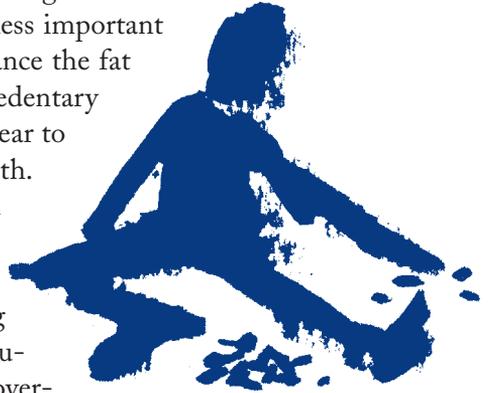
Nevertheless, it seems that certain preventive measures have really taken root in Swedish society. Nowadays, for example, the whole population seems to be conscious of the risk to health

from smoking. Sweden is one of the few countries to have fulfilled the WHO goal



of a population where at least 80 per cent are non-smokers. It is disquieting, however, that many young women are starting to smoke these days, and that this is still a question of "inequality", that is to say, most smokers are recruited from groups living in the poorest socio-economic conditions.

More and more people have also come to accept the need to reduce fat intake, and this is reflected in the decreasing number of cardiac and vascular disorders. It is nevertheless important to get plenty of exercise in early years to balance the fat level in one's diet. However, the increasingly sedentary lifestyle of the younger generation would appear to pose a serious threat to national health. Gymnastics, which is of vital importance in this connection, has declined in the schools, as have many natural opportunities for exercise, such as climbing stairs, walking or cycling to school, etc. This lack of exercise may eventually swell the numbers of those suffering from overweight.



Many researchers and clinics consider the problem of overweight to be a serious threat to national health in the future. They speak about it in such strong terms as "the fat epidemic" and "the ticking fat bomb" (Akner, Jonsson, Nyberg, Rosén). Obesity has now been recognized as a health problem in a number of countries, for example, Australia, England, France, Canada and the USA, as well as in Sweden. In Sweden today, there are approximately 2.5 million overweight people, half a million of whom suffer from genuine obesity. Overweight and obesity are defined by BMI, which stands for Body Mass Index. $BMI = \text{weight in kilograms}/(\text{height in meters})^2$. A BMI higher than 25 is considered as overweight and higher than 30 is regarded as obesity. Over the past twenty years, the number of overweight people has increased by approximately 45 per cent. The increase has mainly taken place in the age groups 16–44, primarily among young adults (18–25 years old). There is no sign of our having reached the upper limit of this growing problem.

By far the most important cause of obesity is an imbalance between the intake and conversion of energy over an extended period of time. A serious risk with obesity is that it easily becomes permanent, since it is extremely difficult to treat. There are few treatment programmes today leading to a lasting reduction in weight. Moreover, obesity in itself may lead to several other types of illnesses, in particular diabetes, increased blood pressure, cardiac and vascular disorders as well as premature death. Other consequences are excessive load on joints, increased susceptibility

to certain forms of cancer, breathing problems during sleep, infertility and psycho-social problems. In countries where this problem has been studied over a longer period of time, it is estimated that treatment of obesity and obesity-related conditions accounts for approximately 5 per cent of total health and medical costs. Translated to Swedish terms, this would amount to approximately 5–7 billion kronor. (Jonsson).

Furthermore, public health researchers warn us that the national diseases of the future will consist of so-called combined illnesses – including, among others, psychosomatic problems, stress, depression, anxiety, phobias and addiction (Rosén). What characterizes these illnesses is the fact that they often exhibit a diffuse pattern of symptoms and that new diagnoses replace old ones. Thus, for example, "psychic insufficiency" has been replaced by the more up-to-date "burnout". Diffuse pains in joints and muscles can now be diagnosed instead as fibromyalgia. We already know that these conditions are difficult to treat and that rehabilitation will therefore be time-consuming. What effect these illnesses will have on the health of elderly people in the future is at present beyond our knowledge.

Healthier old-timers

To sum up, the evidence suggests that our traditional picture of the frail and helpless old person is already out-of-date. Today, many old people are physically active, mobile, independent and healthy. This is partly due to improved medical treatment, partly to a more active and health-promoting lifestyle among older people. Although future scenarios appear bleak in the light of the threats to health described above (especially obesity and physical passivity), most researchers are of the opinion that the conditions exist for continued progress towards even better health.

Our knowledge of the illnesses of older people has increased, and we are still learning. This means that more and more people will be offered treatment for the chronic diseases that afflict them as a result of living longer.

This future scenario will naturally be influenced by how old one is today. It is a reasonable assumption that the older one is today, the less "benefit" one will derive from current developments in medicine. Nevertheless, many clinics and researchers believe that even those who have already reached a high old age today may gain increased quality of life as a result of the discoveries of medical science. Increasing numbers of old people are being treated for a wide variety of diseases. This enables



them to live at home longer instead of requiring long-term nursing care.

As for those who are middle-aged today, it is reasonable to assume, on the basis of the optimism expressed by many researchers, that they may look forward to a healthy old age. More and more of those destined to pass the 65-year-old mark in twenty years' time, will live to a ripe old age with enhanced health. Many scientists are even more optimistic about the very young. Some go as far as prophesying that most of the common diseases threatening us today will have been eradicated within 50 years, that is, by the time today's 15-year-olds reach the age of 65.

However, from the point of view of the medical and health care services, there is a reverse side to the coin. The fact that ever more diseases are susceptible to treatment leads inevitably to the demand that public health care should offer the methods of treatment that exist, even if they are expensive. As more kinds of treatment become possible, doctors and patients will face more choices and alternatives. They will expect the public health care system to provide a greater range of treatment for individual patients. It will not be cheap for clinics to apply the dazzling advances of medicine science! Another problem is that the cure of one disease may lead to others gaining a foothold. A person who has been helped through a stroke or a heart attack may later go on to be struck down by cancer. This in turn will lead to additional costs for medical services.

In the long run, therefore, the cost of health care will not drop as a result of people becoming healthier for longer periods. However, referring back to the main thesis of the Social Insurance Book 2000, older people will probably be able to go on working longer in the future. They will thus be able to contribute to the national economy for a longer period. If healthy old-timers can stay on at work for a few extra years, this means that more people will share the cost of mounting health care expenditure in general and of care of the swelling numbers of really old people in particular.

Finally, since the older population is certain to continue increasing, research into aging and its pathology may not be neglected. No society can afford to ignore this group. As someone put it: "A society's survival will hinge on how intelligently it handles the age bomb". With all due respect to medical technology, the last word lies with the politicians to decide whether our nation is to succeed in "aging" gracefully or not.

The future cost of eldercare

Total public expenditure for care of the elderly in 2000 amounted to more than SEK 60 billion. This figure includes municipal costs for nursing and care of people aged 65 and older, irrespective of whether they live at home or in so-called 'special accommodation'. Also included are estimated expenses for transportation services of approximately SEK 2 billion. After deducting the charges paid by old people themselves, net public expenditure is somewhat less than SEK 60 billion. It must be emphasized that the accounting system for municipal operations does not provide a detailed picture of aspects such as the distribution between younger and older disabled people, and that different estimations lead to differences in net expenditure of up to approximately SEK 1–2 billion. Estimates in this section tally with estimates of costs for care of various age groups in 2000 used by the Ministry of Health and Social Affairs and the Ministry of Finance in reporting to Eurostat, the statistics office of the EU.

It should also be especially noted that the general concept of eldercare includes the medical care taken over by the municipalities as a result of the so-called Ädel Reform in 1992. The figure given for expenditure corresponds to approximately 6.5 per cent of the total wage amount for the country. Eldercare thus accounts for over a quarter of combined public spending on old age pensions and eldercare. Thirty years from now, the ratio of eldercare expenditure to the wage amount will in all probability be much higher. How much higher depends on a number of factors – some of which will be discussed in this section –

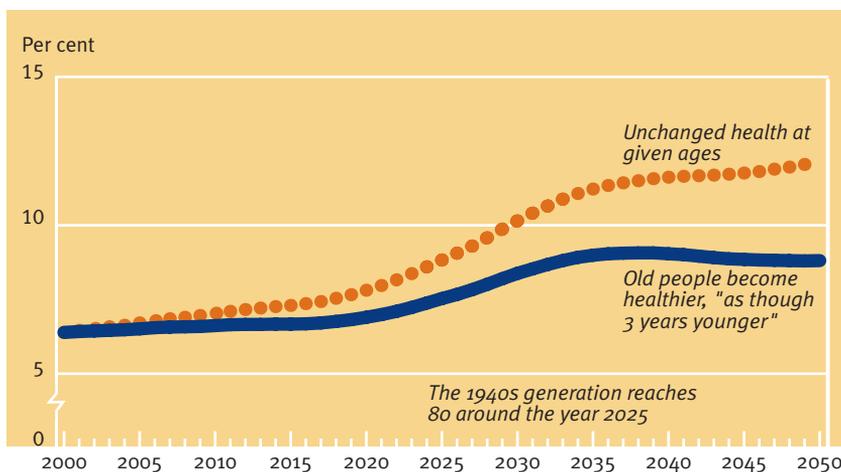
but a major cause is the increasing proportion of old people in the population.

In a few years, the working population will stagnate, after which it will decline in absolute numbers – a consequence of the low birthrate registered during the 1990s, which is expected to recover only slowly. The number of old people, on the other hand, is about to



increase explosively. This is partly due to increasing life expectancy. The latter is estimated to show a further increase of approximately 3.5 years up to 2030, according to the main alternative in SCB's most recent population forecast, after which it will continue to show some increase up to 2050. At present, there are 29 persons aged 65 and older for every 100 persons aged 20–64. In 2030, this figure will be 44. However, the burden of providing support for the elderly is destined to become heavier even without the continued increase in life expectancy. This is because the earlier generations (especially the generation of the 1940s) are so very much larger than the later ones, reflecting the historical development of the birthrate. Even without any increase in life expectancy, there would still be 39 old people for every 100 persons aged 20–64 in 2030.

The main estimate in the diagram below is based on the assumption that the need of nursing and care shifts upwards in age at roughly the same rate as life expectancy calculated from the age of 65 shifts upwards. It is thus not assumed that increased life expectancy for the average individual means more years of ill health towards the end of life. The reason for this has been discussed in the preceding section "Healthier aging", and the question is briefly touched on below. If the assumption that older people will be healthier at given ages – a view held by most experts – were to prove false, costs would increase far more dramatically. This would mean that the volume of eldercare consumed per person remained constant for each age group and for each sex. The national economic background required by the estimate is given in the following fact box.



Expenditure on eldercare as a percentage of the wage amount.

Prerequisites for the calculation

The growth of the wage amount is determined by changes in the number of hours worked and changes in the real hourly rate of pay. The number of hours worked is in turn determined by the number of persons employed and their average working hours. The number of employed persons has been calculated on the assumption that the proportion of the working population of both sexes and in each age group remains constant, and – as a first step – that the average working hours of employed persons in these groups remain constant. Changes in the size of the gainfully employed population and age distribution contribute to a long-term decline in the number of hours worked of 0.1 per cent per annum on average during the period 2000–2050, with the greatest reductions, 0.3 per cent per annum, in the 2020s. Here we have assumed a general reduction of annual working hours of 0.4 per cent per annum for all persons. In terms of reduced weekly working hours, this represents approximately 1.5 hours a week per ten-year period. In total, the number of hours worked decreases by 0.5 per cent on average during the period 2000–2050.

The real hourly rate of pay is assumed to rise by 2 per cent per annum. This is significantly more than the average for 1975–2000, when the increase was limited to some few tenths of a per cent per

annum, but significantly less than for 1950–1975, when the increase was approximately 4 per cent per annum. The growth of the wage amount in fixed prices is thus 1.5 per cent per annum.

There is a successive increase in the price of care production relative to business sector production. This is due to the fact that productivity growth in the care sector is assumed to be small or non-existent. Growth in the real hourly rate of pay by 2 per cent per annum is assumed to be equivalent to growth in industrial productivity (production per hour worked). A nominal rate of wage increase of e.g. 4 per cent per annum is thus consistent with a rate of inflation of 2 per cent per annum with unchanged profit margins in industry. A prerequisite is that the real rate of wage increase in the care sector is as high as in industry. In the event of zero productivity growth in the care sector, this would lead to a relative price increase in care consumption of 2 per cent per annum. However, a part of care consumption, approximately 25 per cent, consists of goods and services bought in or procured from the business sector and thus can be assumed to have productivity growth. The relative price increase would then be 1.5 per cent per annum, which is what has been calculated for the curve in the diagram.

Old people are becoming healthier

The continuing increase in life expectancy that may be observed over a long historical period has not led to any corresponding increase in the number of years of cost-intensive ill health. The extra years of life have

not consisted solely of years of ill health. As older people become healthier, their need of nursing and care (at any given age) naturally grows less.

It is not in itself an easy task to measure developments in the state of health. In the surveys conducted by the National Statistics Office of Sweden (SCB) of the living conditions of the population (ULF), respondents are asked to give their own estimation of their current state of health. The results would seem to indicate that the health of older people has improved over the years. The proportion experiencing full health or slightly poor health has increased since the beginning of the 1980s both among "younger old people" and "older old people". The increase is somewhat greater for men than for women. It is conceivable that such subjective findings underestimate more objective improvements in health if it is true that norms for good health have risen in the population.

In Appendix 8 of the Long-Term Planning Commission report, LU 2000, I. Batljan and M. Lagergren, Ministry of Health and Social Affairs (2000), there is a theoretical and empirical analysis of different hypotheses concerning developments in the state of health of old people. The authors conclude that the hypothesis with the greatest empirical support is the one which views state of health as being determined more by the number of years a person has left to live than by the number of years already lived. Health deteriorates the nearer a person comes to death, regardless of the age at which death occurs. An increase in life expectancy would thus seem to mean that ill health, too, is postponed until a higher age. The number of years of ill health in old age remains constant, despite increasing life expectancy.

A more radical hypothesis is that ill health is shifting upwards in age even faster than the occurrence of death. It would accordingly be easier to improve health at advanced ages than to postpone actual death. The period of ill health preceding death would thus become ever shorter.

Postponed illness leads to a reduction in illness within given age groups. If the reduction in illness is accompanied by a proportionate reduction in eldercare costs, costs for eldercare will decrease by the amount illustrated in the table below. Here it is assumed that that consumption of eldercare shifts progressively



upwards in age by 5 or 3 years during the period up to 2050. For example, it is assumed that an 85-year-old in 2050 will require the same amount of care that an 80-year-old (or 82-year-old) requires today, and so on. A similar standard technique is used by C.J. Nordén and H. Olsson (2000).

	If old people become as though ...	
	5 years younger	3 years younger
2000	0	0
2010	10	6
2020	19	12
2030	29	17
2040	37	22
2050	46	28

Reduced need of eldercare due to improved health of older people. Comparison in per cent with a situation where health in given groups remains unchanged.

If old people in terms of health become progressively "as though 5 years younger" up to the year 2050, the need for eldercare will drop dramatically. For example, by 2030 it will have fallen by approximately 29 per cent. Batljan and Lagergren arrive at similar results based on projected trends in health development described in the above-mentioned ULF surveys.

However, to assume that old people will become "as though 5 years younger" in respect of health is a lot to expect. Remaining life expectancy from the age of 65 is assumed by the main alternative in SCB's latest population forecast to increase by approximately 3.5 years up to the year 2050. Possibly, therefore, the alternative that old people become "as though 3 years younger" is more consistent with the hypothesis of a more or less unchanged period of illness towards the end of life.

Causes of increased life expectancy and improved health

It has been argued above that steadily improving health among different age groups will lead to a fall in age-specific consumption of eldercare. But we could perhaps turn the argument around: do we not owe increased life expectancy and improved health primarily to an increase in the consumption of eldercare?

The National Statistics Office (SCB) bases its assumption of increasing life expectancy on a number of factors: progress in medical science and medical care, better living conditions, healthier lifestyles, etc. Improved health and increased life expectancy in nearly all the nations of the world is related to economic progress in its widest sense. Genetic changes surely play a negligible role – there are scarcely any biological advantages to living to twice the normal reproductive age as people do today in the West. Consequently, this development is not on the whole "for free". On the other hand, there is no general scientific consensus as to which factors are decisive.

One cause of longer life and better health, especially in the early stages of a country's economic development, is improvement in the standard of private consumption: more and better food, housing, hygiene, and so forth. Public expenditure has, in this context, normally played a minor – though perhaps not non-existent – role. Another cause is healthier lifestyles: less tobacco and alcohol addiction, more exercise and less overweight, etc. Such improvements do not cost much in themselves, but naturally stem in part from scientific research and public information campaigns. A third factor is progress in the field of medicine and health care, which in Sweden, of course, has been closely linked to public sector activities. It is partly a matter of an overall rise in the standard of living of people of all ages – which may be termed "primary preventive medical care" – and partly of specific measures aimed at postponing death, eradicating disease and relieving pathological symptoms. As regards the latter, increased consumption of eldercare has played a special role.

That life expectancy and health vary between different socio-economic groups within one and the same country has been proved to be the case in both the USA and Sweden. As regards Sweden, this has been established by, for example, M. Thorslund and O. Lundberg (1994). The problem is, of course, that elderly people in different socio-economic groups enjoy – and have enjoyed throughout the whole of their lives – different standards of private consumption and lifestyle and probably also of health care resources. The importance of individual factors is thus difficult to quantify.

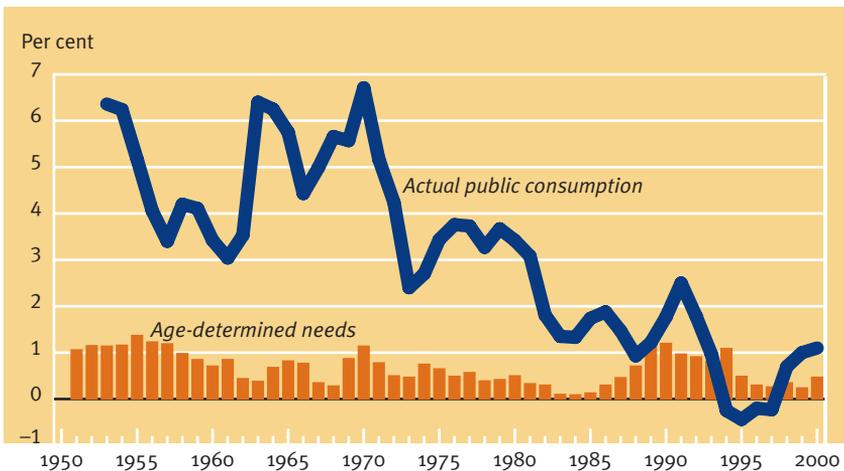
We might also mention the so-called iatrogenic need of care, which is taken up by Baltjan and Lagergren. Care itself may create a need for further care, sometimes as a result of erroneous treatment, sometimes as a result of excessive treatment (institutionalization).

Thus, even though we cannot be sure to what extent increased eldercare contributes to higher life expectancy and improved health, it is clear that over time the volume of care in Sweden has risen considerably more than can be explained by changes in the age structure of the population. This does not apply, however, to the 1990s, when the trend was reversed. If the volume of medical care continues to decrease from now on, this may have a negative effect on life expectancy and health.



Growth in the standards of eldercare

The long-term increase in the consumption of eldercare beyond what can be explained by changes in the age structure of the population (and despite reduced illness within every age group!) is not a trend unique to Sweden. In many different countries, we find a strong link between medical care consumption per citizen and the general standard of living, measured, for example, as GDP per capita. Nor is the trend restricted to eldercare, but has affected most kinds of public consumption – child care, schools and medical services in general. The diagram below illustrates how the volume of individually consumed but publicly financed consumption would have developed from 1950 onwards if the consumption of each service had remained constant per person and age group – that is, assuming no improvement in the health of old people – projected backwards in time instead of forwards. The curve bulges up and down, mainly reflecting changes in the number of children and old people. However, actual public consumption (which here, admittedly, includes collective consumption such as defence, the judicial system, etc.) has shown a far greater increase. Only from the end of the 1980s onwards has there been a slower increase during some years, mainly the years of severe cutbacks occasioned by the depression of the 1990s. In essence, this last period reflects falling standards, while in the long-term historical perspective we have thus witnessed a dramatic increase in standards.



Note. Age-specific needs calculated on the assumption that the volume of medical care, nursing, etc, has remained constant per person and age group from year to year during the whole period. Three years moving average for actual public consumption.

SOURCE: SCB'S NATIONAL ACCOUNTS AND POPULATION STATISTICS AS WELL AS C.J. NORDÉN AND H. OLSSON (2000).

Growth in volume of public consumption since 1950. Percentage of preceding year.

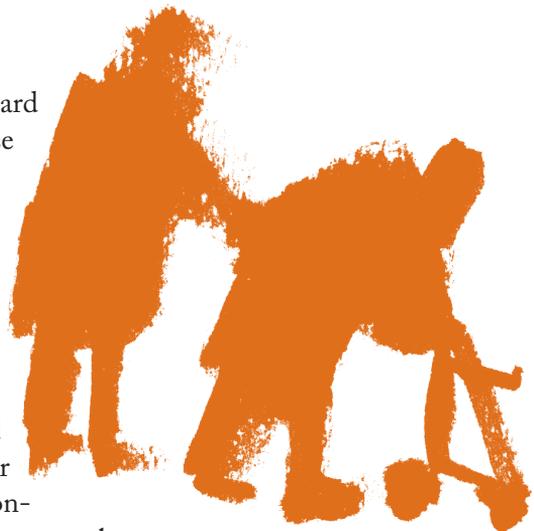
Increasing life expectancy and improved health may be due, at least in part, to improved standards within eldercare itself, as a result of scientific advances and of a general approach promoting the will to live. Such a rise in standards costs money. Moreover, given improved standards in other sectors of society, it is hardly surprising if standards also rise in this consumer sector, regardless of developments in people's state of health. A better standard of eldercare is no less reasonable a demand than a better standard of food and drink, clothes, travel, etc, and thus may have little to do with health improvement. For example, one might anticipate a future increase in the volume of eldercare consumption – per eldercare consumer – that was proportional to the growth of GDP per capita.

The estimate in the diagram on page 49 is based on an assumed growth rate in business sector productivity of 2 per cent per annum and a standard rate of zero for productivity growth within wage-intensive public production. Combining this with current forecasts for developments in total population and volume of work, we arrive at the following per capita growth in GDP in per cent per annum:

2000–2010	0.9
2010–2020	0.8
2020–2030	0.8
2030–2040	1.3
2040–2050	1.0

With an equivalent growth in the standard of eldercare, expenditure would increase considerably more than under the conditions stated earlier. This is illustrated in the diagram at the end of this section. From a historical point of view, however, a growth in standards matching GDP per capita is not particularly high. It may be noted that total public consumption during the period 1960–2000 rose by approximately 2.7 per cent per annum, which, spread over con-

sumers in relevant age groups, represents a growth in standard of 2.2 per cent per annum. (This is essentially the average difference between the curve and the columns in the diagram on page 54). GDP per capita likewise rose during the same period by just over 2 per cent per annum.



The question naturally arises whether it makes sense to fund such continued growth in standards in the traditional way. One could imagine a system where "basic needs" were financed through taxation and higher standards were something that could be purchased by those with the desire and the means. But how are we to define basic needs? Do we mean approximately the standard we enjoy today, or somewhat lower or higher?

Higher growth in industrial productivity

It might be objected that the rate of growth in business sector productivity assumed here, 2 per cent per annum, is too low an estimate. On the assumption that profit shares remain constant (see the preceding fact box), faster growth in business sector productivity would mean corresponding increases in real wages and thus provide a stronger base for taxation and fees. However, this does not mean it would be significantly easier to finance health care consumption. For we may reasonably assume that employees in the care sector would demand the same increase in real wages as industrial workers, even if there was no equivalent increase in productivity in their own sector. This would lead to a corresponding increase in the cost of health care consumption. In relation to the wage amount, the cost of eldercare would remain more or less the same. On the other hand, it is naturally possible that higher charges for care would be less of a burden for people whose incomes were proportionately higher. Even a future increase in real hourly wages of 2 per cent per annum would be quite large compared to what has been achieved on average over the past 25 years. By 2030, this would mean an hourly wage that was 80 per cent higher than that of today.

Increased supply of labour

The outcome would be quite different if faster economic growth was based on a greater amount of work being performed in the economy. In the estimates presented earlier, the number of hours worked was assumed to decrease by 0.5 per cent per annum up to the year 2050. See the fact box on page 50. An especially large decrease in the supply of labour, 0.7 per cent per annum, is forecast for the 2020s. If the decrease in the number of hours worked could be avoided, the income base for financing eldercare would grow while the cost of wages per hour would remain unaffected. As an example, we could mention that up to the year 2030, this would be equivalent to a development where future costs for eldercare were approximately 15 per cent lower than in the main estimate presented.

A reduction in the number of hours worked could be counteracted by an increase in the proportion of people working in the population.

In the basic estimate, the proportion of people working in each age group is assumed to be constant, including the older generations of gainfully employed. In the Social Insurance Book 2000 published by the National Social Insurance Board of Sweden (2000), it was asked whether it might be possible to stem the downward trend in the participation of older people in the workforce. The conclusion was that the prerequisites existed but that the stumbling block was the traditional conviction – firmly rooted among both employee and employer and among their organizations – that it was best for employees to retire from working life well before the age of 65.

Furthermore, the basic estimate assumed a decrease in the average working year per person of 0.4 per cent per annum (which in terms of weekly working hours would mean 1.5 hours per ten-year period). Such a decline may be described as fairly small in relation to long-term European trends. See, for example, the regular publication of statistics in OECD's Employment Outlook. Over the past 20 years – though not earlier – Sweden has proved to be an exception to the rule, with slowly increasing average working hours. This is probably to be explained by the virtually non-existent growth in real wages up to a few years ago. Longer working hours have been a way for employees to achieve at least a minimal real increase in annual income. There exists, both over time and between countries, a clear inverse ratio of growth in real hourly wages to annual working hours. See, for example, H. Olsson, the National Institute of Economic Research (1996). With such a positive long-term prospect of growth in real wages per hour as 2 per cent per annum, as has been assumed here, it is probable that part of the potential for increased income will be taken out in the form of increased leisure.

Labour and wages in the care sector

The supply of labour in Sweden is thus likely to diminish in absolute numbers from the end of the present decade. However, given the developments in eldercare consumption outlined above, the number of people employed in eldercare will need to increase by a few per cent per annum during the period 2010–2030. (This assumes that older people will become "as though 3 years younger" while standards of medical care per consumer remain constant.) Bearing in mind that the care sector today also has a more problematical age structure than the economy as a whole, with many people scheduled to



retire in the next few years, recruitment problems may arise. As shown in the diagram below, nearly half of those employed in the municipal sector are now over 45, compared with only a third of those employed in private industry. Moreover, there is a large overrepresentation of women. In 2000, 38 per cent of municipal employees were women over 45.

	Women	Men	Both sexes
State	21.0	29.1	50.1
Municipalities and county councils	38.1	10.5	48.6
Private employers	12.4	22.0	34.4
Self-employed persons	14.0	41.9	55.9
Total	19.9	21.3	41.2

SOURCE: SCB'S LABOUR FORCE SURVEYS.

The proportion of persons aged 45 or older in employment in 2000.

There are already signs of an imminent shortage of, among others, nursing staff and teachers. Even so, a few years remain before the large generation of the 1940s reaches the age when, following historical precedent, they begin to leave the workforce en masse. The next table shows the result of an estimate based on the assumption that the proportion of employed people in the population in various age groups remains unchanged relative to the year 2000 and that there is no transfer between sectors of people who have established themselves in given sectors from the age of 25–30.

Sector	Number of persons	Change in %
State	-20,000	-9.1
Municipalities and county councils	-105,000	-9.5
Private employers and self-employed	+119,000	+4.2
Total	-6,000	-0.2

Note. Estimates of total employment assume an unchanged proportion of employed persons in the population in respect of age and sex from 2000. Development per sector has been estimated assuming that the various sectors up to 2010 maintain their share of employment of the different age groups made up of cohorts who are today 25 or older. For younger cohorts, it is assumed that employment in 2010 will be distributed according to the pattern that applied to the same age groups in 2000.

SOURCE: SCB'S LABOUR SURVEYS AND POPULATION FORECASTS; ANALYSES OF THE NATIONAL SOCIAL INSURANCE BOARD.

Hypothetical changes in employment 2000–2010 if no transfer of labour occurs between sectors.

In these circumstances, municipalities and county councils will suffer a net loss of over 100,000 persons in the space of 10 years. One way of preventing this from happening would be a successful recruitment campaign among young people entering the labour market for the first time. Of those employed today aged 20–30, approximately 20 per cent work in the municipal sector. This figure needs to increase to well over 30 per cent in the next 10 years. To a certain extent, it may also be possible to attract labour from the private sector. In both cases, however, a major effort will be required. Changing the structure of operations by increased privatization and conversion to independent companies is naturally not a universal cure: the mere fact of people switching institutional sectors does not change the market situation in any essential way. Of course, recruitment might become easier, if it is true that private employers are seen as being more attractive than public ones. The fact that municipal employers are not particularly popular among employees (including municipal employees themselves and privately employed persons) has been shown, for example, in a survey presented by the Association of Local Authorities. See the Association of Local Authorities (2001).

It might well prove necessary in the long run to raise relative wage levels in the care sector, which would inevitably involve increased costs. As an arithmetical example, let us assume that a rise in pay of 0.75 percentage units per annum over and above the average for the rest of the labour market is required up to the year 2020. This will eventually result in approximately 16 per cent higher costs for nursing and care if the volume of consumption remains the same. This increase in expenditure would thus approximate to the savings up to the year 2030 deriving from the feeling among old people that they are "as though 3 years younger", as calculated in the estimate above. Baltjan and Lagergren (2000) present an estimate with a similar outcome, where, however, the relative wage level is adjusted by 0.5 percentage units per annum extended to the year 2030.

Reduced expenditure on child-care and schools

The decrease in the number of children threatens to create a national economic supply problem in the long term but from the point of view of public finances it will naturally be a relief when the baby-boom children born around 1990 reach school-leaving age a few years from now. The ratio of expenditure on child welfare, schools and paediatric care to the wage amount is about to diminish if we merely look to population trends and assume the same standards and scope of activities as today. In the 2010s, the need for expenditure on children and young

people will drop dramatically due to demographic developments. If we assume that the number of children born will eventually increase – reaching a level of 1.8 children per woman after 2010 compared with just over 1.5 today – this financial “savings potential” relative to today will nevertheless be exhausted by the end of the 2020s.

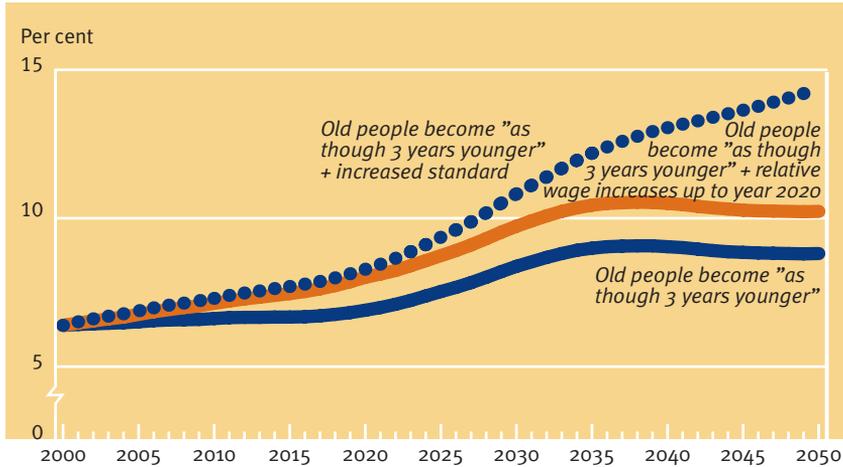
It is thus not true that increasing expenditure on eldercare can be compensated by reduced expenditure on children due to falling birth-rate, other than in the short term. If there is no recovery in the birthrate, the potential will of course be greater, but in that case the problem of maintaining our national economy will be gravely aggravated in the long-term perspective beyond 2030.

Uncertain cost trends

A more or less significant increase in the future cost of eldercare appears to be inevitable. The rate of increase will accelerate in the 2020s, when the 1940s generation starts to be increasingly in need of care. The exact course of this development is naturally difficult to forecast in any detail. It will depend, among other things, on developments in health, but the future level of ambition regarding standards of care will be an important factor. Developments in life expectancy will also certainly exert an influence. Here we have used the main alternative in the latest population forecast from SCB, which states that the expected remaining average length of life at the age of 65 will increase by approximately 3.5 years up to the year 2050. This forecast is predicated on continued advances in medical science, but it is impossible to prophesy future developments in detail or what the costs of these will be. At one extreme, we can imagine that it will be relatively cheap to “buy” both longer life and better health. In that case, the increase in costs for eldercare will not be so onerous. At the other extreme, the discoveries of medical science will be very expensive to apply. In this case, a long life and constantly improving health will not be something available to everyone, but rather a luxury commodity, purchasable by those who desire it and can afford it.

During the past 10–15 years, there has been a trend towards increased private production both in nursing and care and other traditional areas of public consumption. The aim of privatization has generally been to render production more effective through increased competition – also in those cases where production is still collectively financed by taxation. Within certain areas of care, the use of new technology can certainly contribute to improving efficiency and keeping costs down. However, a high staff ratio constitutes in many respects a quality dimension in its own right, making it difficult to reduce costs without reducing standards.

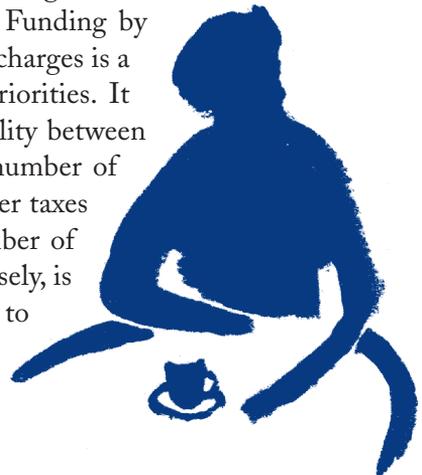
Regardless of whether the element of private enterprise grows or diminishes in the coming decades, the need for extra staff is likely to increase.



Note. Increased standard refers to increased volume per patient proportionate to growth of GDP per capita. Relative wage increase means 0.75 percentage units per annum in higher costs within the care sector up to the year 2020.

Expenditure on eldercare as a percentage of the wage amount.

There is also a private component in the area of financing – individual charges for treatment. An ever larger part of consumption could be paid by consumers themselves by means of such charges. In terms of national accounting, this means that public consumption becomes private consumption, even though production continues to be publicly owned. In formal terms, this provides a means of keeping taxation down, but a given volume of nursing and care costs the same regardless of whether it is paid for privately or collectively. Funding by taxation versus funding by individual treatment charges is a political choice determined by redistribution priorities. It can also be seen as a question of ensuring equality between different generations. Is it fair that the small number of people born in the 1990s should pay much higher taxes in the 2020s in order to provide the large number of people born in the 1940s with eldercare? Conversely, is it fair that those born in the 1940s should have to pay expensive private charges for medical care simply because their children did not provide them with enough grandchildren to support them?



Saving and getting a return

Sweden is currently in a rather favourable demographic situation. For some years to come, there will be only a slight increase in the number of people so old as to make major demands on eldercare. It is even possible that in the early 2010s the number of people over 80 will decrease in absolute numbers. The reason for this is that the generation born in the 1930s is small. When the large number of people born in the 1940s cross the 80-years-old threshold in the 2020s, costs will soar, even if health improves dramatically and illness is progressively postponed until nearer the end of life. This has been discussed in earlier sections. If we wish to do something about smoothing out the financially embarrassing bulge in costs that is destined to appear then, now is the time to start.



Several public opinion polls have revealed that people are concerned that they might not receive adequate care in old age. For example, in a survey which TCO (The Swedish Confederation of professional Employees) presented in May 2001, 40 per cent of respondents stated that they would have to take out some form of insurance in order to feel more secure.

Insurance and saving

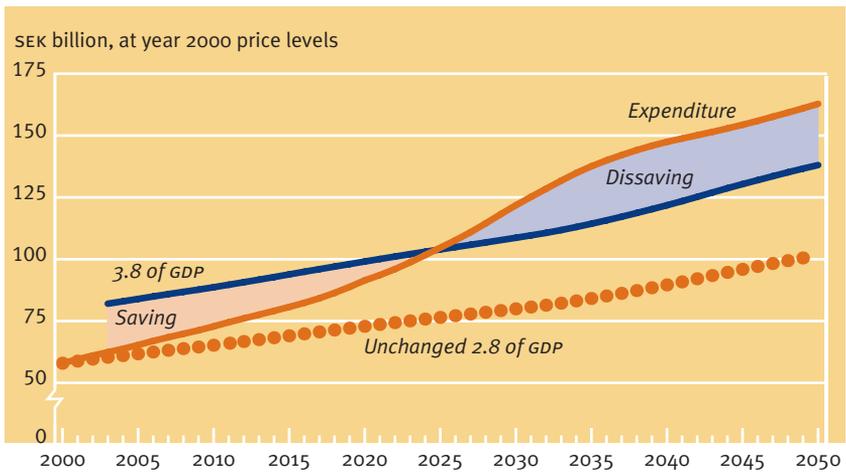
It is possible, however, that eldercare insurance schemes from private insurance companies have only a limited prospect of reaching the market. This has been discussed in the section "Eldercare insurance? – some conclusions". There are many indications that this type of insurance scheme, in order to be profitable, requires such a high premium that it would be difficult to market successfully.

A major reason for this is that eldercare is something most people need during a few years towards the end of their lives. Insurance in its classic form means that an insured person receives compensation for an *unusual* event involving great expense *if* it happens. Risks are thus spread among the insured community. A typical example is fire insurance. In an eldercare insurance scheme, where the majority of the insured would claim compensation, risk-spreading would be less. The premium must therefore be set high – the insurance policy in reality taking on the character of a savings account.

In a similar way, a pension insurance scheme may largely be regarded as a form of savings, since there is high probability of receiving an insurance payment. Logically enough, one speaks of "saving in a pension insurance scheme" (but never of "saving in a fire insurance scheme"). The difference between an eldercare insurance scheme and a pension insurance scheme is nevertheless considerable. Certainly, many people are interested in saving up for their old age, for example, in pension insurance schemes. But they do not wish to withdraw their savings capital in the form of a certain specified "emolument paid in kind" (in this case, eldercare) that they possibly feel they have no use for. It cannot be converted to anything else or be passed on to heirs. The individual's savings goal is ready cash, which can be used for any purpose the day the capital is withdrawn. Another reason for being reluctant to take out an expensive eldercare insurance is presumably the conviction that eldercare is something one has a right to in any case, because of the tax one has already paid throughout one's working life.

If we wish to spread costs fairly over time – that is, not charge old people high fees for individual treatment nor impose excessively high taxes on the young – it will presumably be necessary for the state to take responsibility for, or stimulate, some form of "buffering". This problem and its possible extent is illustrated in the diagram below. Eldercare at present costs just under 3 per cent of GDP, that is, the amount of revenue from taxation that goes to financing eldercare. Very soon, however, an amount of 3 per cent of GDP will not be enough to cover expenditure. Just how inadequate will in itself depend on which assumptions we base our estimate on. See the preceding section for more details. Here we have chosen the cost alternative based on the assumption that older people will get progressively healthier ("as though 3 years younger" in 2050) and that there will be no increase in standard for those receiving care, but that there will be a relative wage increase for employees in the care sector, giving a relative average wage just over 15 per cent higher in 2020 than it is today. In the diagram, it is assumed that from 2003 onwards a supplementary amount equivalent to 1 per

cent of GDP is put aside for eldercare. Eldercare is thus allowed to "cost" 3.8 per cent of GDP as of 2003 – the current level of 2.8 plus the supplementary amount of 1 per cent of GDP. In this way, financial savings arise that initially amount to 1 per cent of GDP but later progressively decrease. From approximately 2025 onwards, 3.8 per cent of GDP (in the illustration below) will no longer be sufficient to cover expenditure, but now the accumulated savings can be used. This is where "dissaving" starts. These savings may be sufficient to finance eldercare up to the year 2050 in combination with a continued supply of "fresh" money equivalent to the current level of 2.8 per cent of GDP. Whether this turns out to be the case or not will depend on the yield from the savings. The higher the yield, the lower the savings need to be to meet the requirements of the dissaving phase. This is a question we will return to later.



Note. Expenditure calculated according to the alternative where older people become healthier "as though 3 years younger", described in the section "The future cost of eldercare", and on the assumption that those employed in eldercare receive a relative wage increase of 0.75 per cent per annum up to the year 2020.

Illustration of buffering of eldercare costs.

Forms of state influence

The state has always attempted to influence savings in society in one form or another and to a greater or lesser degree, largely via the insurance business and the credit market. Some measures have been temporary, primarily of a politico-economic nature, while others have been institutional and more long-term.

Until the late 1980s, the market for long-term credit was regulated, with tight controls of credit volumes, interest rates and other credit conditions. The overriding aim was to secure the credit requirements of the state and of housing production, but also – especially during the 1970s – to control the aim and direction of industrial investment. When the major part of the regulatory framework was dismantled some 15 years ago, this was partly due to a renaissance of liberal thinking on market economy, and partly to the fact that increasingly effective international capital markets – despite currency controls – rendered domestic regulatory systems ever more ineffectual.

In the field of pensions, state influence still makes itself felt. The National Pension Fund (AP) was created at a time when regulatory thinking still held sway. It was set up to compensate the fall in people's individual savings that was anticipated – quite correctly as it turned out – after the introduction of the national supplementary pension scheme (ATP). The fund was built up using a higher pension contribution than was necessary to finance the initially modest ATP pension payments. A large amount of fund capital was used, with the support of a regulated credit market, to finance the extensive house-building program of the 1960s and 1970s.

The recently introduced premium reserves in the general pension system are distinguished, like the AP Fund in its initial stages, by the fact that contributions paid in initially exceed pensions paid out. The difference is that the state now exerts only minimal influence on how the capital is invested, contenting itself with deciding the size of contributions. One of the original aims of setting up the premium reserves was, according to the directive given to the Pensions Work Group established at the beginning of the 1990s, to increase savings in society. During the boom years of the late 1980s, household savings were distinctly negative.



Both the AP Fund and the Premium Reserve Scheme were thus established with the aim of exerting a positive influence on total savings in society. Historically, it has been a somewhat different story with regard to the subsidy given to private pension insurance schemes in the form of tax-deductible premium payments. Admittedly, income from the insurance must eventually be declared as taxable income, but the tax credit thus extended has meant in practice that the yield is tax-free. More recently, these favourable terms have been limited by a special tax on yield. The origin of the subsidy, which has a long history, is to be traced to a desire to give self-employed persons the same pension conditions as employed persons with contractual pensions. For the latter group, the employer pays premiums or contributions, which are not taxed as income for the employees. Although the deduction was thus not specifically aimed at increasing pension savings, it has nevertheless been an important contributory factor in the strong growth of individual savings. Subsidized savings programmes with the express purpose of stimulating savings have also been set up at intervals, for example, the so-called National Savings Scheme that was set up in 1978.

There are thus many ways in which the state may exert an influence – granting savings subsidies, prescribing compulsory savings as in the Premium Reserve Scheme or managing its own investments as in the AP Fund.

Finally, the state can also set up a savings target for its own budget. A surplus in state finances allows amortization of the national debt and by extension the creation of net state capital. This provides greater scope for running up a deficit to cope with critical periods in the future. Currently, there is a parliamentary resolution stipulating that the public sector in its entirety should have a financial surplus equivalent to 2 per cent of GDP over a trade cycle. This savings target originates from the so-called convergence programme that was set up to prepare Sweden for participation in the European Monetary Union.

Future 'dissaving' in pension funds

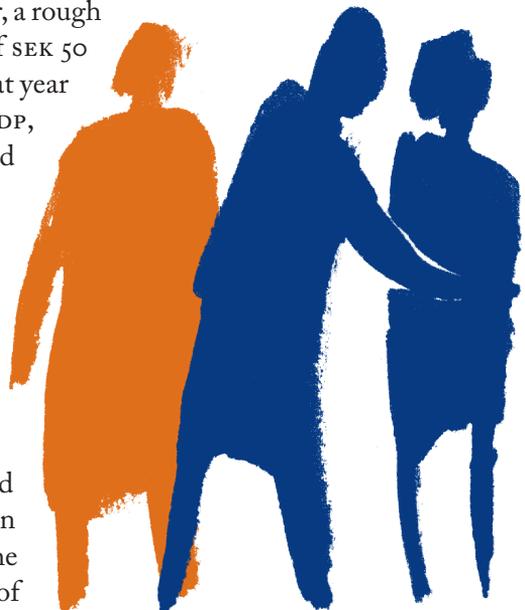
When the large 1940s generation starts to retire towards the end of the present decade, the size of pension incomes will increase in relation to salary incomes. This will be made possible by running down the pension funds. The long process of reforming the National Pension Scheme is finally over. One aim has been to plan for the expected strong increase



in the number of old people relative to the working population. The extra strain will be felt in the pension system before it starts to affect eldercare, since pensions are normally claimed well before the age at which the need for eldercare becomes acute. The primary goal has been to finance pensions in such a way that contributions and taxes paid by the gainfully employed to the pension scheme need not be raised in relation to their income. The solution has two main features. One is that the size of payments will be related to the incomes earned by the gainfully employed at the time, to continuing developments in life expectancy and to the yield from both premium reserves and the AP fund. In the worst case, a so-called automatic balancing mechanism will be activated, ensuring that the commitments of the scheme are trimmed to match current economic and demographic developments. The second feature involves exploiting the capital that has accumulated in the AP funds over the past four decades. According to most reasonable scenarios of demographic and economic developments, the AP funds will be drastically run down during the period 2010–2040, that is, during the years of retirement of the 1940s generation. See O. Settergren, et al., the National Social Insurance Board (2000). According to the chosen model, only by using the AP fund and its yield may a successive reduction in future pension levels be avoided, given the forecast increase in the number of old people per gainfully employed.

Considerable 'dissaving' will also occur in contractual labour market pension schemes and private pension schemes from around 2010 onwards. It is extremely difficult to calculate how large the total dissavings from the pension funds will be. However, a rough estimate is that it will be in the range of SEK 50 to 100 billion a year during 2010–2040 (at year 2000 price levels), or 2 to 3 per cent of GDP, depending on which assumptions are used in the forecast, and with significant variations over time. This money naturally constitutes income for pensioners, but to a certain extent it also generates revenue for the public sector (since it is classed as taxable income). Fund investment for pensions also means fund investment for tax revenue.

The ability to exploit "fund-invested tax revenue" (not deriving from taxation of current GDP) has a certain effect on the illustration given in the diagram above of



how a distribution of eldercare costs over time may be effected. Assuming that the extra tax revenue is shared proportionately among various public undertakings, the illustrated level of 3.8 per cent of GDP in the diagram would fall by something like one or two tenths of a per cent.

What is saving?

From the point of view of the national economy, neither an eldercare insurance scheme nor an eldercare savings scheme differs in principle from similar arrangements for cash pensions. It is a question of saving (in centralized or individual forms) during the years that remain before the heavy increases in expenditure occur, and from that point on 'dissaving', that is, disposing of the accumulated capital.

Saving means refraining from using the entire amount of one's income for consumption. In an economy sealed off from the rest of the world (or in the world as a whole), it is only possible to save by investing in real resources, fixed capital, that can be used as the means of production at some future date. This may consist of houses, industrial or office real estate, machines, transport or communication facilities, and other forms of so-called infrastructure, but also of so-called intangible assets like education and scientific resources. In order to constitute saving in a proper sense, a net saving, investments must be greater than the ongoing erosion of capital due to wear and tear or to other causes of its becoming less usable. Only investments in excess of this (net investments) increase future production and income potential.

For an individual country, there is the additional possibility of foreign investment – to acquire foreign capital or lend money to other countries. This type of saving gives rise to future income in the form of dividends, interest, etc. From a national perspective, saving abroad requires that the country exports more than it imports, that is, it consumes fewer goods and services than it produces.

Increased saving *ex ante* (planned in advance), which is not matched by real investments or export surplus, leads *ex post* (as actual outcome) not to increased saving but to reduced income. The attempt at saving leads to reduced production since consumption falls while investments and exports remain constant. The reduced production leads to incomes in society in the form of wages and profits decreasing proportionately.



Elementary national accounting:

$\text{GDP} = \text{production} = \text{income}$

$\text{GDP} = \text{consumption} + \text{domestic investment} + \text{export surplus}$

$\text{Saving} = \text{income} - \text{consumption}$

$\text{Saving} = \text{domestic investment} + \text{export surplus}$

Individuals in a given country can save by purchasing securities from (that is, lending to) other individuals in the country. However, from the national standpoint, such individual saving does not constitute saving unless it is later invested by the borrower. Otherwise, it is merely a matter of securities changing hands within the country.

The distinction between what constitutes saving and what does not, is important if one is to introduce a nation-wide system of saving for, let us say, future eldercare. There is no guarantee that saving in the country as a whole will be greater as the result of such a system, even if contributions are compulsory. A major deciding factor is what those paying the contribution do next. If they react positively, convinced that the insurance really means guaranteed care in old age, they may decrease their saving in other ways and thus maintain the same volume of consumption as before. In that case, there will be no additional resources available to the gainfully employed of the future, who in the end will have to foot the bill for eldercare costs. One has merely created a mechanism, an alternative to the taxation system, for extracting money.

If increased saving results, the question remains: to which investments do the savings correspond? In a country without access to the international capital markets, the result would be that the price of shares and bonds rose and that yields fell. Real industrial investment would be stimulated due to lower costs for capital, but it is not certain that demand for capital would match the initial increase in supply. Reduced consumption might have a negative effect on industry's belief in the future and dampen investment. Lower growth and recession would be the result. This is an analysis in the spirit of the famous economist, J.M. Keynes, by now more or less upstaged by more modern theories and by changed institutional conditions, but still of some interest for large countries with economic problems like Japan and the USA.

Illustration of successful and less successful buffering

The economy is assumed to be stationary with three generations: the old (no earned income), the middle-aged and the young (earned income of 1000 each). The old live by selling securities 200 (dissaving) which they bought when they were middle-aged in the preceding period. Any yield is ignored. The middle-aged buy securities 200 (saving) from the old to live off when they become old in the following period. The young neither buy nor sell securities, but are assumed to pay for society's real investments 200. In this stationary economy, the investments consist only of replacement of worn-out real capital. The economic structure is stable for each period:

Period 1

Gener- ation	Income (GDP)	Securities Buy	Securities Sell	Invest- ment	Consump- tion
1			200		200
2	1000	200			800
3	1000			200	800
Total	2000	200	200	200	1800

Period 2

Gener- ation	Income (GDP)	Securities Buy	Securities Sell	Invest- ment	Consump- tion
2			200		200
3	1000	200			800
4	1000			200	800
Total	2000	200	200	200	1800

Now, suppose that in period 1, the middle-aged generation 2 decide to increase their consumption in period 2 when they become old by 100 to 300; they do this by saving 100 more and consuming 100 less. The old in period 1, however, only have 200 securities to sell. The young generation 3 then borrow 100 from the middle-aged, i.e. they sell securities 100 to the middle-aged, who can now purchase their desired 300.

For everything to work, the young must invest the 100 they borrowed, i.e. totally 300. They can invest in domestic long-life real capital or in foreign countries by exporting. The

investment corresponds in real value to the consumption 100 that the middle-aged have abstained from. In period 2, the old generation 2 sell their securities 300; 200 to the now middle-aged generation 3 (who resume the earlier saving pattern of the middle-aged) and 100 to the young generation 4, who only need to invest 100, providing the extra investment of 100 that was made in period 1 is usable. Generation 2 achieve their desired consumption 300, and the two other generations receive the traditional consumption amount 800:

Period 1

Gener- ation	Income (GDP)	Securities Buy	Securities Sell	Invest- ment	Consump- tion
1			200		200
2	1000	300			700
3	1000		100	300	800
Total	2000	300	300	300	1700

Period 2

Gener- ation	Income (GDP)	Securities Buy	Securities Sell	Invest- ment	Consump- tion
2			300		300
3	1000	200			800
4	1000	100		100	800
Total	2000	300	300	100	1900

Let us assume that the young in generation 3 instead consume the 100 they borrowed from generation 2. They only invest 200 (as young people usually do in the stationary economy) and inherit the potential for consumption left by the middle-aged; they consume 900 instead of 800. Now a number of things may happen in period 2. One possibility is that the young generation 4 who take over actually buy securities 100 from the old, as was intended. However, they need to invest an additional 200 (not as above 100) to keep the country's

real capital intact (alternatively, the country must borrow from abroad). They can also lower their consumption to make room for investment, which was naturally not the idea from the beginning. A third possibility is to resist buying the old people's securities and focus on investing what is necessary 200 and consume their 800. The old would thus be unable to consume 300 as they had planned. In this situation, they presumably lower the price of their securities and in so doing possibly persuade both earning generations to buy 25 each. The result in that case is:

<i>Period 1</i>					
Gener- ation	Income (GDP)	Securities Buy	Sell	Invest- ment	Consump- tion
1			200		200
2	1000	300			700
3	1000		100	200	900
Total	2000	300	300	200	1800
<i>Period 2</i>					
Gener- ation	Income (GDP)	Securities Buy	Sell	Invest- ment	Consump- tion
2			250		250
3	1000	225			775
4	1000	25		200	775
Total	2000	250	250	200	1800

All generations have in period 2 had a smaller consumption than was planned. It is, however, important to note that total GDP and total consumption over both periods has not been affected. In the example, generation 3 turn out to be the winners, while both the others are losers. The example shows that opportunities for consumption are governed by production capacity and that the creation of a buffer must be matched by real investments within or outside the country if the desired result is to be achieved.



In a small country like Sweden, which now enjoys free access to the large international capital markets, and where industry consists for the main part of powerful multinational companies, it is unlikely that increased domestic savings have any significant effect on domestic capital formation. Return on interest and other yield from capital is largely determined by international factors. Nevertheless, it is naturally possible for governments to guide a number of public investment projects in a direction which supports the goal of a demographically-determined capital growth in coming years. Increased savings will otherwise in all likelihood be mainly seen in foreign trade surplus, in the balance of payments. In recent years, a great deal of Swedish savings have been invested abroad. See the table.

	Per cent of GDP						SEK billion Per annum 1995– 1999
	1950– 1959	1960– 1969	1970– 1979	1980– 1989	1990– 1994	1995– 1999	
Gross investments	22,0	25,3	21,7	17,9	17,2	16,4	301
./. Capital erosion	9,6	10,0	10,5	11,9	14,1	13,7	252
= Saving in Sweden (net investment)	12,4	15,3	11,2	6,0	3,1	2,7	49
+ Saving abroad (balance of trade)	0,2	–0,3	–0,7	–1,4	–1,7	3,4	62
= Total saving	12,6	15,0	10,5	4,6	1,4	6,1	111

SOURCE: ADAPTATIONS OF SCB'S NATIONAL ACCOUNTS.

Swedish saving 1950–1999. Average for 10- and 5-year periods.

The long-term problem

The heavy running costs of eldercare a couple of decades hence must, like pensions, be paid by those gainfully employed at the time. One aim in establishing a savings scheme today should be to compensate for this by reducing other expenditure during the years when eldercare costs soar. As mentioned earlier, this can be accomplished by investing in domestic real capital during the coming years to such an extent that the need for future investment is reduced. Another way is to create a reserve of capital abroad by means of a trade surplus that can later be 'dissaved', thus reducing the need to produce exports to finance imports in the future. An export surplus today may balance an import surplus tomorrow.

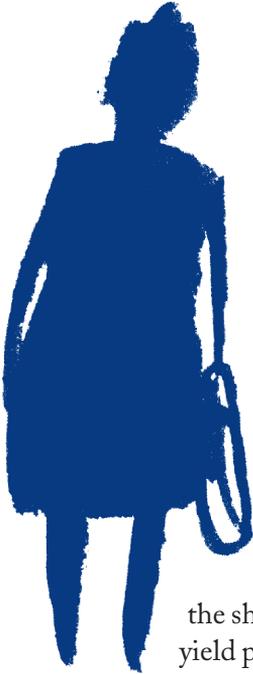
As far as domestic investments are concerned, there are limits to how far it is possible or meaningful to increase these. The likeliest candidates are various infrastructure projects. To produce machines, etc, and then mothball them for 20–30 years is naturally not well-advised. They will be obsolete long before it is time to use them. In any case, this will not happen so long as investment decisions are made on market economy terms.

The alternative of buffering based on balance of payments raises special problems. This strategy assumes that the future working population of other countries will through an export surplus supply part of Sweden's need of goods and services. Many of the leading economies in the world, including several EU countries, are facing the same demographic problem that confronts Sweden and may be tempted to adopt an identical strategy. In that case, there will be competition in achieving an export surplus in the coming years, followed by competition in achieving an import surplus. Especially if we look beyond Europe, it can be difficult to decide which countries to invest our export surplus in at reasonable risk. Poorer countries' export potential and capacity to pay in 20–30 years' time is uncertain. Moreover, the fact that international trade and capital exchange function more or less smoothly today is no guarantee that this will be the case several decades from now.

An eldercare fund can no more than a pension fund, barring exceptional circumstances, directly finance large infrastructure projects. This would amount to taking an almost maximal risk of not being able to sell the assets of the fund when the money was needed. Solely to invest the capital abroad is likewise one-sided and full of risks. Large infrastructure projects and the management of total national assets relative to foreign countries are properly the domain of the government budget and national economic policy. One way of tackling the eldercare problem might therefore be to take the coming increase in eldercare costs into account when deciding the surplus target of the national budget. Eldercare fund investment would thus become an integral part of long-term national debt policy. One disadvantage of this approach is that the buffering would be hidden from sight and not easily understandable by the general public. The claims of eldercare would be weakened in competition with other areas of public expenditure.

Eldercare fund investment outside the national budget could either be regulated in roughly the same way as the AP funds, or be based on obligatory premium contributions invested according to the wishes of individuals, much like the premium reserve funds in the general pension system. The latter alternative would, however, if it functioned as

intended, lead to people receiving different standards of care depending on which funds they happened to invest in. Such redistributionistic consequences have been deemed acceptable in the general pension system but are likely to be less palatable in a public eldercare system. That individual saving for eldercare would occur to any great extent solely through the operation of market forces must be considered, as mentioned earlier, rather unlikely.



Regardless of the exact form that eldercare fund investment assumes, an important consideration affecting its dimensioning is the yield that may be expected from fund capital. Referring back to the diagram on page 64 at the beginning of this section: the higher the yield, the smaller the amount that needs to be apportioned during the saving phase of the coming years in order to achieve a given level of financing support during the difficult period beginning in the 2020s.

Yield from financial markets

The yield from a financial investment (in shares, bonds, etc.) is the annual profit as a percentage of the invested capital. The profit consists of two parts: the profit that has been realized during the year in the form of dividend, interest, etc. (sometimes called direct yield) and the profit (or loss) which has arisen as a result of changes in the market value of the shares. If we deduct the percentage of inflation from this nominal yield percentage, we get what is usually called the real yield. In certain theoretical circumstances, expected future inflation is used instead, but we ignore this complication here.

Up to the beginning of the 1990s, it was a generally accepted convention when making long-term estimates – for example, of the development of the AP funds – to assume that real yield was equal to assumed economic growth (the growth of GDP in per cent). The reason for this was partly theoretical, partly empirical. Under certain restricted conditions, we can theoretically demonstrate that the real yield on capital over a very long term is equal to economic growth. During the 60-year period up to the end of the 1970s, it was possible to claim that this "golden rule" worked very well. See the table below. The average real yield on shares and government bonds was less than economic growth by a few tenths of a percentage unit per annum. Share yield was a few tenths of a percentage unit higher and yield from bonds just over one percentage unit lower. The past 20 years, up to the recent dramatic fall on the stock exchange, present a completely different picture, not least

in regard to shares, whose real yield was never less than 16 per cent per annum. During the 80-year period up to the end of the 1990s, the average real yield from shares was thus 7 per cent per annum, while during the 60-year period up to the end of the 1970s it was just over 4 per cent per annum.

The difference between yield from shares and interest on government bonds is an expression of the *risk premium* that investors demand in order to buy shares in preference to less risky government bonds. Most people are assumed to prefer a guaranteed return to a return which is equally large but runs the risk of variations upwards or downwards. This is called risk aversion. The difference in yield must, however, also cover the difference in administration charges, monitoring charges, brokers' charges and other so-called transaction costs. A share portfolio generally entails higher costs of this kind than a bond portfolio. The risk premium ought really to be calculated net, after such costs. During the 80-year period 1918–1998, the gross risk premium was 3.7 per cent (the difference between 7.0 and 3.3) but during the period 1918–1978, it was only 2.0 per cent.

	1918–1978	1978–1998	1918–1998
Real yield, shares	4.2	15.7	7.0
Real yield, government bonds	2.2	7.2	3.3
Real yield, average	3.2	11.5	5.2
Real growth of GDP	3.6	1.7	3.1

SOURCE: SETTERGREN, ET AL., NATIONAL SOCIAL INSURANCE BOARD (2000) AND SCB'S NATIONAL ACCOUNTS.

Real yield from capital and real growth of GDP. Per cent per annum.

It is primarily thanks to rising market values that yield from shares has been high over the past few years, and viewed in a longer perspective it has only marginally been affected by the stock exchange decline since the spring of 2000. Direct yield, the dividend, is on the other hand a very stable component, which has seldom deviated very much from 3–4 per cent in real value.

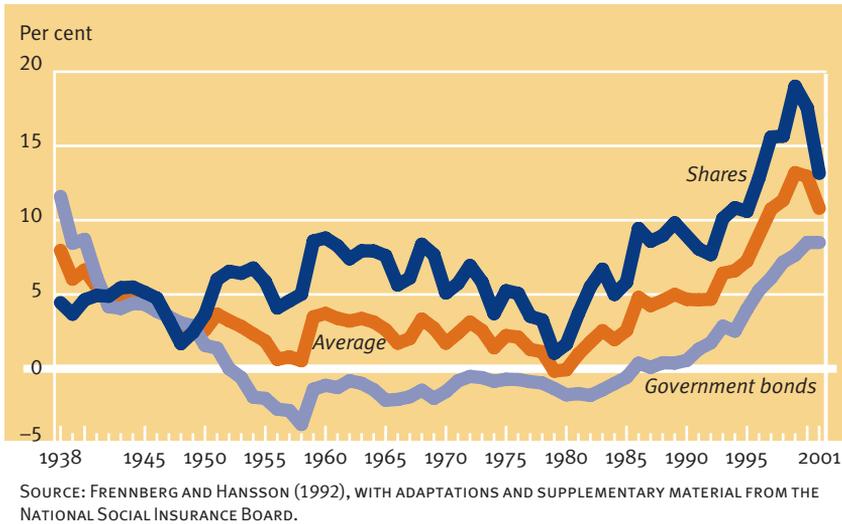
It is important to point out, as has often been done in the debate following in the wake of the latest fall on the stock exchange, that investment in shares and funds have to be evaluated over a longer period. Market values have fluctuated dramatically from year to year, not least over the past 20 years. This also applies to highly diversified portfolios with extensive risk-spreading. There is an extremely wide range of annual variations in real value on the stock exchange. During the course of 1999, the rise in the Business World general index for quoted shares,

after deductions for inflation, was over 60 per cent and rises of 40–50 per cent have been noted during several of the past 20 years. However, there have also been examples of severe annual declines in real share price during the same period.

In order to ensure, with any degree of certainty, a positive real yield of a few per cent, share investments must therefore be very long-term. An investment period of 20 years is short in this context, even if investment is made in the broadest possible portfolio with extensive risk-spreading. The diagram below shows that yield during different 20-year periods has fluctuated greatly. For example, an investment on the stock exchange made in 1960 gave hardly any real yield at all up to 1980. A record yield of over 17 per cent per annum could on the other hand be obtained during the 20-year period from 1980 to 2000 (but some percentage units per annum lower if the investment was retained for just three months into 2001).

Investment in long-term bonds, that is, promissory notes made out by the borrower, has a lower risk than investment in shares, particularly if they are kept for the full duration of the period. In the latter case, the capital is refunded together with the agreed nominal interest. There is always a risk that the lender might become insolvent and be unable to pay, that is, the risk of bankruptcy. As far as Swedish government bonds are concerned, this risk may be considered to be non-existent. If one combines a stock exchange share portfolio with an equal amount of government bonds, the variations in long-term yield will therefore be lower (again, see the diagram). Meanwhile, the yield has nearly always been lower, whichever 20-year period is studied, than that of a stock exchange share portfolio – reflecting the above-mentioned risk premium.





Real yield on Swedish shares and government bonds, including direct yield.

Per cent per annum for investments made 20 years ago.

A major risk factor in bond investment is, however, uncertainty concerning future inflation. The main reason that a 20-year bond investment made in 1980 yielded more than 5 per cent in real value was that inflation during the 1990s turned out to be much lower than anticipated at the time of the emission. Partly for the same reason, a bond investment made in 1920 gave a 5-per-cent real yield per annum up to 1940. Between these years, the general price level fell by approximately 25 per cent as a result of the economic crises of the 1920s and 1930s.

Anyone looking back year by year at 20-year-old bond investments from the mid-1950s to the end of the 1980s would have noticed that they had produced a negative real yield. This was partly due to strong waves of inflation but also to the fact that the financing of state expenditure and house-building during this period was facilitated by government control of loan volumes and interest rates.

The uncertainty associated with share investment is mainly in the nature of a business risk – uncertainty as to the prospects of the real economic activities one invests in. Investment in bonds, at least as far as government bonds are concerned, is more typically characterized by the risk of inflation. In addition, there is always the risk that one might be forced to realize one's holdings before the date of maturity. If so, the issuer has no redemption obligation but instead the realizable outcome is decided by the market in much the same way as for shares.

Yield on capital and "the golden rule"

The same method of calculating long-term yield on capital that is used in the diagram on page 77 and the preceding table is in all essential respects employed throughout the world. For Sweden, the result gives a yield on capital in real value over the past 80 years of approximately 5 per cent per annum, and approximately 7 per cent per annum if one only considers stock exchange share capital. Such figures have been frequently quoted and are sometimes used to indicate what may be expected in the long term as regards growth of assets in, for example, fund-based pension systems.

Estimates of capital yield include the appreciation in value of securities as well as dividends and interest (direct yield). This applies in principle to both shares and bonds but the situation is more complicated when it comes to share capital. Most listed companies are noted for not normally sharing out the whole of the profit that is formally available for distribution. Often, a sizable portion is retained by the company to be used in its continuing operations. The size of the dividend varies between companies and over time. Policy on dividends influences stock exchange prices: if only a minor part of the profit is paid out as dividend, the share price rises and vice versa. To be able to compare the profits of different companies, this interaction between dividend policy and share prices must in some way be taken into account.

If a large part of the profit is retained by the company, this is equivalent to shareholders *reinvesting* dividends that they would otherwise have received if the company had had a policy of paying out a greater share. The current method for calculating yield on capital involves the *assumption* that all dividends are reinvested in the same securities. Then the *assumption* is made that these assumed reinvestments give the same yield as the existing shares. The estimate will thus show what a shareholder, who had reinvested his dividend in the hypothetical manner described, would have received as yield and increased assets with "interest on interest".



In real life, all dividends are not reinvested in this manner. The estimate merely shows what yield an individual shareholder, who is too small to be able to influence the stock exchange price of the share capital, might be able to accumulate. A larger investor can only reinvest the dividend at an unchanged share price if there are shares for sale on the market at the same price.

The following is an extremely simplified example of one possible scenario: Investor A owns shares worth SEK 100 in a company. The company regularly pays out 2 per cent per annum as dividend. We assume that the share price remains unchanged. After one year's dividend, A, if he reinvests it, has SEK 102; after one more year SEK 104.04 (through "interest on interest"), etc. Investor A's annual growth in assets is 2 per cent per annum, equal to what the current method for calculating yield on capital gives. Assume now that investor B is the only remaining shareholder, originally also owning shares worth SEK 100. The company's total share capital is thus SEK 200. Unless the company issues new shares, A can only reinvest his dividend by buying shares from B: in the first year SEK 2, the next year SEK 2.04, etc. Possibly B is prepared to sell at the current price, and if he also refrains from reinvesting his dividend he has after the first year shares worth SEK 98, after the second year SEK 95.96, etc. B's assets are in fact decreasing. The value of A's and B's combined holdings after one year is still SEK 200, after one more year still SEK 200, etc. The common growth in assets is thus 0 per cent per annum, equal to growth in the company's total share capital, also 0 per cent per annum. (It has been assumed that no changes occur in share prices and that no new issues take place.) The current method for estimating yield on capital naturally still gives 2 per cent per annum. This is what investor A, who is the one who behaves according to the assumptions of the method of calculation, also gets in the form of growth in assets. It is however impossible for both A and B to do so.

The paradox implicit in this simple example is resolved if the company, by means of new share issues, augments its capital by 2 per cent per annum, thus SEK 4 the first year, etc. Now there is nothing to prevent both investor A and B from reinvesting their dividend and by so doing achieving a growth in assets equivalent to the estimated yield on capital of 2 per cent per annum. If the company is to be motivated to increase its capital, however, assuming the need of capital is constant relative to production, the latter must also grow by 2 per cent per annum. This means that the yield on capital is equal to the growth in production – in national economic terms, growth in GDP. This is the so-called golden rule.

"The golden rule"

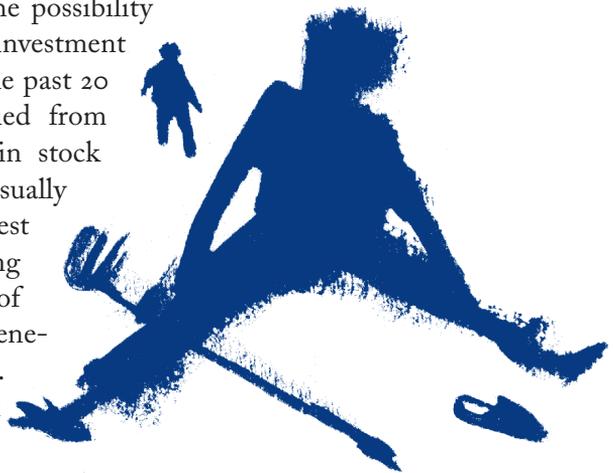
If the need of capital in relation to production in the economy is constant over time, a yield on capital of a certain per cent per annum is consistent with a growth in assets of the same size for all capital owners in the economy, providing that production also grows by this percentage. Everyone then has the opportunity to add the yield to the capital and receive interest on interest.

With some imagination, this can perhaps be seen as a parallel in the financial world to the real golden rule: Therefore, whatever you want men to do to you, do also do them, for this is the Law and the Prophets. (Mathew 7:12)

The comparison between yield on capital and growth in GDP needs to be modified for various reasons. One is that, as far as assets in the form of listed shares issued by the corporate sector are concerned, this sector may have a different growth in production in per cent than growth in GDP. Another is that capital intensity, that is to say, the amount of capital required in relation to production, may vary. A third reason is that the country's capital owners have investments in other countries where economic conditions are different, and that foreigners have investments in Swedish stocks.

In the extremely simplified example given above, investor A's strong desire to reinvest would lead to a rise in share price if B was more reluctant to sell. There would be "capital inflation". The rise in share price does not affect (in fixed prices) the company's capital requirements and production under the otherwise obtaining conditions, and an overvaluation of the share capital arises. This overvaluation drops again if A (who may be taken to represent a pension fund in its early stages) becomes less inclined to reinvest, or if B should once again become extremely reluctant to sell.

We cannot exclude the possibility that the high return on investment in shares achieved over the past 20 years (admittedly modified from time to time by a fall in stock prices) is rooted in an unusually strong tendency to reinvest dividends, not least among the increasing number of people from the 1940s generation who invest in funds. New issues of share capital have been limited in rela-



tion to the need for reinvestment, and share prices have been forced up. This building-up phase will ebb out once the 1940s-generation begin to claim their pensions, and when payments from the general premium reserve system eventually get under way on a large scale. As indicated in the above table, "the golden rule" worked reasonably well on average during the 60-year period 1918–1978. The fact that the yield during the following 20 years was significantly higher might turn out to have been a more ephemeral phenomenon.

Yield on capital in the real national accounts

We can approach the question of yield on capital in the economy from a completely different angle to that of the financial markets: the national accounts produced by the national Statistics Office of Sweden (SCB).

It is impossible to equate the yield on capital that individual players in the economic system may achieve for limited periods of time with the realized and consumable income from capital that a nation has at its disposal. A country's real disposable income is limited by GDP, supplemented by the yield on capital that can be gained from net financial investments accumulated abroad. Beyond this, the country can from time to time expand the scope for consumption by running a deficit in the balance of payments. In the latter case, the country takes foreign loans, or reclaims capital lent out previously. If any group in society wishes to achieve a growth in consumption beyond these limitations, it can only do so at the expense of other groups who thus suffer an equivalent reduction in theirs.

GDP is the value of all goods and services produced in a country over a certain period of time, usually one year. GDP and its various elements are calculated each year in the national accounts. However, only goods and services received against payment are included. Payments are made via selling in markets or via national budgets. Work in the home, non-profit activities, etc, are thus not included. GDP is the equivalent of the incomes of those who produce the goods and provide the services. Incomes are of two types: wages and profits. No incomes beyond those included in GDP are generated in the country. Such incomes cannot exist, since there would be nothing to buy for them. A number of people admittedly live off social insurance benefits, etc, (for example, pensioners), but these incomes are transfer payments (transferences) from incomes that are included in GDP.

In the strictest sense, not even GDP consists solely of incomes. A part of production must namely be used for replacing worn-out parts of the capital stock (machines, buildings, plant, etc) used in production. If we were also to consume this part, we would be consuming a part of

capital, not just income. Income is not considered to have been created until measures have been taken to maintain capital intact. The part of production used to replace worn-out capital is referred to in the national accounts as capital erosion. In company accounting, etc, the same "Hicksonian" principle (named after the economist Hicks) is employed, but in this case the term "writing off" is used to describe what more or less amounts to the same thing. The part of GDP remaining after deductions for capital erosion is the net domestic product, where income is divided up into wages and (net) profits. The latter component of income is usually referred to in national accounting terminology as operating surplus (net, after deductions for capital erosion).

The annual variations in the operating surplus of Swedish companies have been considerable. A distinct peak in the share of operating surplus in value of production was reached towards the end of the depression of the 1990s, that is, around 1995. During the last years of the 1990s, this share once again fell, reflecting the increasing growth in real wages that took place at that time.

Operating surplus and yield on capital

Operating surplus is produced in two sectors of the economy, the corporate sector and the household sector. The operating surplus of households is partly made up of the incomes of self-employed persons (for example, many farmers). In addition, an important item in the national accounts is the exploitation value of private houses and summer cottages. Households are perceived as paying rent to themselves. This "imputed" operating surplus is necessary in order to equate people living in their own homes with people living in rented accommodation and may be viewed as yield on the capital invested in the property. The share of households in the total operating surplus is large, around 50 per cent during recent years. In a long-term historical perspective, the share of households has nevertheless fallen, despite the

increase in home-owners. This is mainly due to the relative decline in agriculture.

When discussing yield on capital, it is normally the yield in the corporate sector that is referred to. (Income from dividend, etc, that households receive from their share holdings belong to the corporate sector, the deciding factor being which sector the surplus is produced in.) The corporate sector comprises not only companies listed on the stock exchange but also unlisted companies, large and small. State-run enterprises and public utilities are included. Gross production (production before deductions for capital consumption) has risen since 1950 by 2.8 per cent per annum in fixed prices, somewhat more than total growth of GDP. As with GDP, growth in the corporate sector was considerably lower during the later years of the half-

century. Net production (after deductions for capital consumption) has increased at the same pace as gross production. Looking at the whole period since 1950, operating surplus in the corporate sector is seen to have grown as much as production. There is, however, a considerable difference

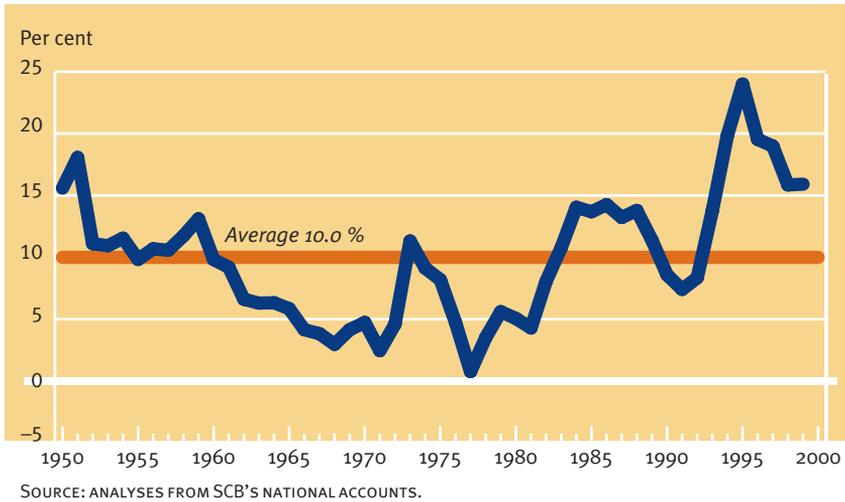
between the half-century's both halves. During the period 1950–1975, the share of operating surplus in production fell dramatically, despite a significant revival during the boom of 1972–1974. Since the late 1970s, the share has increased equally dramatically.

	Growth, % per annum		
	1950–1975	1975–1999	1950–1999
Gross national product (GDP)	3.7	1.7	2.7
Corporate gross production	3.9	1.6	2.8
Corporate net production	3.9	1.6	2.8
Corporate operating surplus	1.2	4.4	2.8

SOURCE: ANALYSES OF SCB'S NATIONAL ACCOUNTS.

Yield on capital in the corporate sector may be calculated by studying the ratio of operating surplus to the value of capital stock. Operating surplus in the national accounts equates to the concept of operating income after capital depreciation in company accounts. However, in making the calculation, resource consumption is valued at what it would cost to replace the resources consumed (in company accounts, the historical value at the time of acquisition is often used). This partly means that a deduction is made for the erosive effect of inflation on capital when the deduction for capital erosion is made (calculated at the price of replacement). The calculation thus results directly in a real measurement of yield.

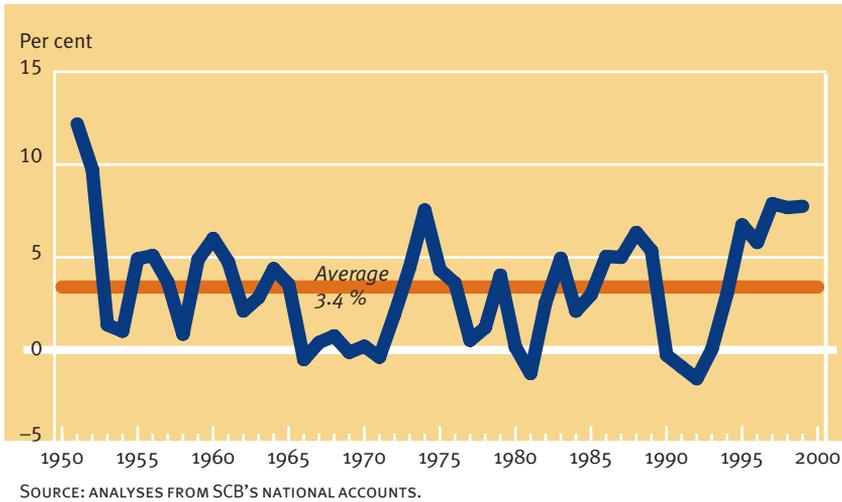
However, if the rise in price of fixed capital (buildings, machines, etc) should be greater than the rise in consumer prices, the purchasing power of the yield will be underestimated. In calculating real yield in the corporate sector, as shown in the diagram below, allowances have therefore been made for inflation, so that profits from appreciation of fixed capital have been added to the operating surplus, after which losses due to inflation, calculated using the consumer price index, have been deducted. This method of so-called inflation-adjusted profitability assessment is described in detail in the Long-Term Planning Commission's report from 1984, appendix 3.



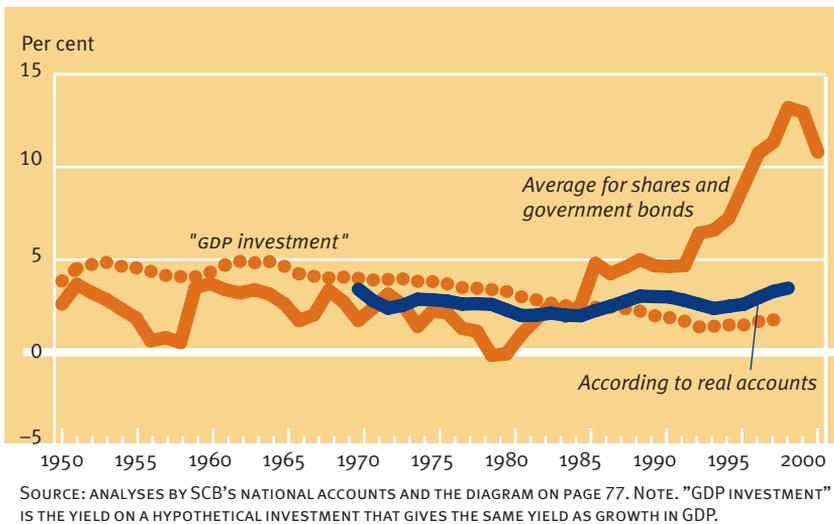
The operating surplus of the corporate sector (net) as a percentage of net production value.

It is also possible to calculate real capital yield in companies by studying the ratio of operating surplus (net) to the volume of fixed capital stock in the companies (see the fact box above and the reference given there). The yield calculated in this way has, since 1950, been 3.4 per cent on average, with considerable variations from year to year. During the second half of the 1990s, it was significantly higher, 7–8 per cent. The yield refers to the total amount of capital invested in companies, and thus includes both borrowed capital and owner capital. During the past 20 years, this yield has been far below the (realized and unrealized) yield reported on the securities market, as indicated in the diagram on page 77. Since 1986, the average yield on a 20-year-old combined share and bond portfolio has been higher than the yield in the corporate sector, as has been shown by the real national accounts. See the diagram on page 85. From 1970 to 1986, however, the opposite was true.

"The golden rule" has been mentioned earlier. This states that under certain conditions real yield in the economy over the long term is theoretically equal to growth in GDP. In recent years, this assumption has been challenged on both theoretical and empirical grounds. The diagram on page 85 also shows the yield on a 20-year investment in a hypothetical security that gives the same real yield as growth in GDP. That this holding from the middle of the 1980s has been inferior to the real yield on capital – also calculated according to the national accounts – is shown clearly. Before that date, however, the situation was reversed. Over a long period, the real yield from "GDP investments" exceeded both the other yield estimates.



Real yield in the corporate sector calculated according to real national accounts.



Real yield in a 20-year perspective. Percentage per annum for investments made 20 years earlier.

In a still longer perspective, consisting of the half-century since 1950, the differences are less pronounced:

Growth in GDP	2.7 per cent
Real yield according to the national accounts	3.4 per cent
Real yield on shares and bonds on average	4.4 per cent

Several reservations must be made concerning the above comparison. In the first place, there is a high level of general uncertainty regarding the statistical data and methods of calculation. Then there are a number of specific reservations. The national accounts cover the whole of the corporate sector, including unlisted companies, etc. Yield in the latter may have been different from that in listed companies. Furthermore, foreign subsidiaries of Swedish companies are not included in the national accounts, although these may have a significant influence on the parent companies listed on the Swedish stock exchange. Finally, it should be emphasized that interest rates for the borrowed capital of companies is not the same as for government bonds. They are often higher, but may also be lower, for example, for certain forms of commercial credit.



The general impression is, however, that differences follow expected lines and are not particularly pronounced. That the average yield on shares and bonds has been one per cent per annum higher than the yield calculated according to the national accounts may be due to the fact that the strong upswing on the stock exchange over the past 10–20 years has driven up share prices beyond the long-term reasonable break-even level – a so-called speculation bubble has been created. The calculated risk premium of quoted shares relative to government bonds, as shown in the table on page 75, was as much as 8.5 per cent per annum for the period 1978–1998. That the yield calculated according to the national accounts has in turn exceeded growth in GDP by 0.7 per cent per annum over the past 50 years may be taken as evidence that “the golden rule” does not hit the mark exactly – but that it is not far out.

Future yield on capital

The relatively long period of high real yield on capital that now lies behind us – mainly the result of rising share prices – induced many market commentators and financial analysts to spread the gospel of continued high yields in the future. High capital yield was one of the many ingredients in descriptions of “the new economy” circulating towards the end of the 1990s. Those who continued to assert the validity of “the golden rule” found it difficult to make their voice heard at the time.

The National Social Insurance Board and other authorities have abandoned the earlier practice of solely reckoning with a future capital yield equal to assumed growth in GDP. In the Board's estimates of developments in the AP fund, various alternatives are used which exceed estimated real growth by up to approximately 3 per cent per annum. However, a further reason for this changed approach is the fact that the AP fund now increasingly invests in shares. In its information to insured citizens in 2001, the premium pension authority used yields that were 3.5 and 4 percentage units higher than the real growth of 0 and 2 per cent per annum respectively. This was done because premium pension capital mainly consists of shares. Some people advocate that an even higher yield ought to be assumed.

The decline in share prices 2000–2001 has cast new light on the question of future capital yield and has intensified the debate. In the USA, the issue was debated long before the latest economic downturn began to make itself felt towards the end of the year 2000. In the mid-1990s, The social insurance administration in the USA began to use a 7 per cent yield as the standard assumption for share investment, more than 5 percentage units higher than assumed economic growth. The forward projection of the assumption was no less than 75 years.

The assumption of such large discrepancies between return on share capital and economic growth has been criticized because it leads to unreasonably large increases in the ratio of market value to GDP, in the case of the USA by, among others, D. Baker (1998). At the end of the 1990s, the ratio of market value to GDP in the USA had risen to approximately 2, that is, market value was twice as high as GDP. At the beginning of the 1990s, the ratio was 0.7, having exceeded 1.0 on only few occasions in the post-war years (this happened during the late 1960s). As demonstrated by P. Diamond (2000), a 7 per cent yield, given the rather conservative assumptions concerning growth, would mean that the ratio of market value to GDP had increased twenty-fold over a period of 75 years. It would thus rise to approximately 40. Against the background of related developments over the past 50 years, this would indeed be most remarkable.

In Sweden, the corresponding ratio between market value and GDP at the end of the 1990s reached an even higher value than in the USA, approximately 2.5. The increase during the 1990s had also been significantly greater. The American criticism ought therefore to be equally applicable to Swedish conditions.

The recent stock market decline, which first hit Sweden in the late winter of 2000, has so far (the time of writing is mid-October 2001) almost halved average share prices since their earlier peak. If, for example,

we spread the decline in share prices over 20 years, this represents a reduction in annual yield roughly in excess of 2 percentage units. At a rough estimate, we could conclude that if yield from now on were to be 6 per cent per annum, annual yield on a 20-year investment made in mid-2000 would be 4 per cent per annum. One possible standpoint is therefore that the reasonability of assuming a high yield on shares (from now on) has increased.

However, the drop in share prices might be a confirmation of the view held by others, namely, that the earlier boom was a development out of balance, and that a speculation bubble had been created at the end of the 1990s. The ratio of the Swedish market value to GDP can now be estimated at from 1.3 to 1.4. It thus represents a considerable drop from approximately 2.5 at its peak, though it is still a much higher ratio than the average ratio prior to the 1990s. One possible interpretation would therefore be that the ratio still has considerable way to fall before it reaches a level of equilibrium, and that share prices for some years to come are likely to continue falling.

It is therefore reasonable to ask how such a drastic upswing, filled with so much air, could earlier have happened. One explanation might be people's rapidly growing interest in shares due to rising income levels, and that the large 1940s generation has begun seriously to invest in pensions. This has been analysed by P. Diamond (2000), using the concept "required risk premium" and "realized risk premium".

With increased public interest in owning shares (at given prices and prospects), the required risk premium falls. As a result, the price of all share stock rises, leading to an increase in the realized risk premium over a transitional period. In such a transitional phase, it would be a mistake to base future expectations on what might prove to be a temporarily enhanced yield.

It is also conceivable that a part of the share-buying public, due to ignorance or lack of experience, base their expectations on the price trends they have observed during an all too brief historical period. Evidence of such "extrapolative" expectation errors has been found by K.E Case and R.J Shiller (1988).

Finally, it should be emphasized that both the soaring share price of the 1990s and the following slump were largely due to developments within IT companies. This is particularly true of



Sweden. Stock exchange trends in more traditional business areas and companies has been far less dramatic.

To make a more reliable forecast of the real yield on capital is not possible. Many unknown factors are at work and it has proved difficult even to explain what has happened in a well-known historical context. The best we can hope to achieve is to pinpoint probable developments based on a few alternative assumptions.

Based on the conditions of labour supply and productivity described in the preceding section, GDP is estimated to be 1.2 per cent per annum on average during the next half-century. This in itself is obviously a highly hypothetical assumption. The historical statistics presented above seem on the whole to suggest that yield on capital (the sum of share capital and borrowed capital) has over the very long term been somewhat higher than growth in GDP. As a main or intermediate alternative for the next 50 years, we might use 2.5 per cent real yield per annum, that is, 1.3 per cent higher than growth in GDP. If international markets continue to be unregulated in the future, this might justify Sweden setting yield somewhat higher than growth in GDP, since yield on capital is internationally determined. In common with many other European countries and the USA, Sweden is destined to be overtaken in terms of growth by the economies of other countries of the world. A higher yield on capital in those economies may have an influence on the yield that can be achieved here.

A feasible lower alternative is provided by the "golden rule", that is, 1.2 per cent per annum. As a logical upper alternative, we may then assume a yield of 3.8 per cent, an alternative that deviates upwards from the medial alternative as much as the lower alternative deviates downwards.

Alternative	Growth in GDP	Yield on capital	Difference
Low	1.2	1.2	0.0
Medium	1.2	2.5	1.3
High	1.2	3.8	2.6

The yield value is assumed to apply from 2002 onwards, that is, after the fall in share prices continuing up to the end of the year 2001.

If we assume that the risk premium for share capital is likely to be 2 to 5 percentage units higher than the interest on government bonds, the yield on quoted shares should exceed the given values by 1 to 2.5 percentage units. Yield on shares might thus range from just over 2 to just over 6 per cent per annum.

Assuming that a fund for equalizing eldercare costs gave a yield equivalent to the national average (that is, holdings would consist of

both shares and bonds), an estimate of required fund investment can be made. We start out by building up fund capital during the coming relatively unproblematical years with the limited ambition of covering costs up to 2050 in conjunction with tax revenue corresponding to current expenditure in per cent of GDP. Future developments in expenditure are assumed to be those that arise if old people become progressively healthier ("as though 3 years younger") while employees in the care sector receive a raise in their relative salaries. See the preceding section on eldercare costs for details. Working backwards, we can now calculate the amount, let us call it the eldercare contribution, that must be paid into the fund annually. The results, for the three alternative yields presented above, are summarized in the table below. The lower alternative, with a yield 2.6 percentage units lower than that of the upper alternative, requires a contribution that is 25 per cent greater. If the fund capital can be invested so as to produce a high yield, at home or abroad, the cost burden for the working population will diminish accordingly.

The eldercare fund would, when it reached its maximum size in the period 2025–2030, be roughly half as large as the current AP fund. Savings in the eldercare fund would thus partially compensate the reduction in national savings due to the future running down of the AP fund – much as the AP fund in its time compensated the decline in household savings resulting from the introduction of the ATP system.

	Yield		
	1.2	2.5	3.8
Eldercare contribution, % of GDP	1.09	0.98	0.87
Fund capital, SEK billion, year 2000 prices			
2010	165	151	136
2020	337	325	306
2030	373	377	370
2040	211	224	224
2050	0	0	0

An eldercare fund.