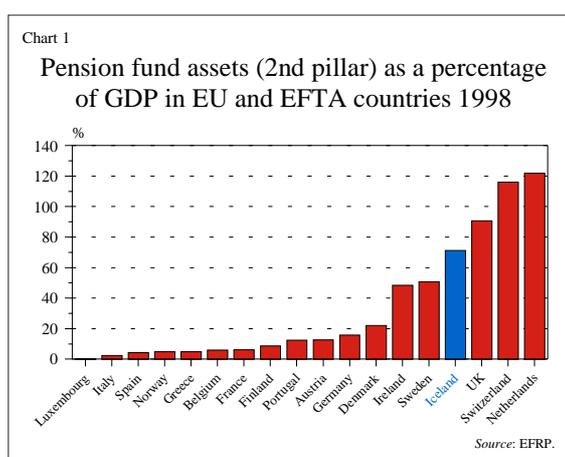


The Icelandic pension system

I. Introduction

This paper describes the Icelandic pension system. The dominant feature of the system is the role of strong occupational pension funds. It is mandatory to pay at least 10 per cent of total wages and salaries to these funds. Many of the funds were established through a collective labour agreement in the late 1960s. Most of them are managed jointly by representatives from the trade unions and employers. The funds have grown by leaps and bounds in recent years as their coverage has become almost total and return on their assets has been good. Assets were equivalent to more than 80 per cent of GDP in 1999 and are predicted to reach at least 1½ times GDP around the middle of the twenty-first century. Pension funds in Iceland are large relative to GDP by international comparison. Chart 1 shows that Iceland ranked fourth in 1998 among EU and EFTA countries on this measure. Only the Netherlands, Switzerland and the UK had second-pillar pension fund assets that were higher as a percentage of GDP.

The Icelandic pension system is based on three pillars. The first pillar, according to the accepted terminology in this field, is a tax-financed public pension. The occupational pension funds mentioned above are the second pillar. The third pillar is voluntary pension saving with tax incentives. A comprehensive pension reform took place in 1997 and 1998 that affected the second and third pillar. The pension systems of public employees were reformed, a framework legislation on mandatory contributions



and the operation of pension funds was adopted and tax incentives for voluntary pension saving were established. With these changes the foundations of the pension system were strengthened.

This paper is divided into four chapters apart from this introduction. The structure of the pension system is analysed in Chapter II. It discusses the structure of the three pillars, the legal basis of the system, the benefits provided and the tax treatment of pensions. Chapter III gives a short history of the pension funds. Chapter IV describes the pension funds' assets and performance, including their investment strategies, return on assets, operating costs and financial position. Finally, Chapter V analyses the economic and financial effects of the pension funds. It is found that the build-up of the pension funds has contributed significantly to the development of financial markets in Iceland. The effects on saving and growth are harder to ascertain so far. Finally, it is argued that for funding in the macroeconomic sense to take place, it has to be man-

1. The author is the Chief Economist of the Central Bank of Iceland. The views expressed in this paper are those of the author and do not necessarily reflect the views and policies of the Central Bank of Iceland.

ifested either in a higher domestic capital stock and/or in net foreign assets. There are thus significant long-run benefits to investments by pension funds in equity and foreign assets.

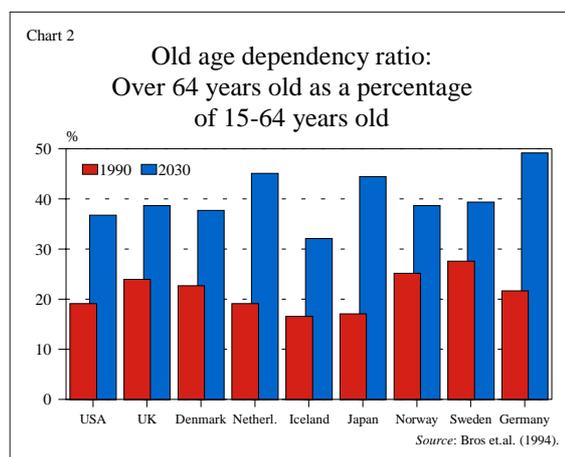
II. The structure of the Icelandic pension system

The Icelandic old age pension system is composed of a tax-financed public pension scheme, mandatory funded occupational pension schemes and voluntary pension saving with tax incentives. The public pension scheme pays a basic pension from the age of 67 and a means-tested supplementary pension after retirement. Occupational pension schemes are mostly run by private pension funds governed jointly by unions and employers. They pay somewhat different old age pensions depending on their financial position and the relative weights of other forms of pensions. It has been estimated that a typical general occupational pension fund will, at full maturity, be able to pay a pension amounting to 50-60 per cent of full-time earnings,² giving a total replacement ratio of 60-70 per cent when the basic public pension is added. Means testing will wipe out the supplementary public pension for most people who have paid into occupational pension funds during their working life. On present trends, the provision of retirement income this century will thus be based on three pillars, which are a relatively small public pension, dominant mandatory funded pension schemes and voluntary private pension saving with tax incentives.

II. 1 Demographics and labour market participation

Iceland faces smaller problems due to the ageing of the nation than most developed European countries. There are several reasons. Firstly, the Icelandic nation is younger and will remain so during the middle of the twenty-first century, as can be seen in Chart 2. Secondly, labour participation rates of the elderly are also higher than in most developed countries and the effective retirement age is higher. The reason is that public pensions are not paid before the

age of 67 and regulations governing the pension funds do not give any incentives for early retirement. Thirdly, mandatory membership of fully funded pension funds will reduce the pension burden of future generations.



II. 2 Public pensions

Public pensions in Iceland are fully financed by taxes. The public pension system provides an old age pension, disability pension and survivors pension. The old age pension is in most cases paid from the age of 67. It is divided into a basic pension and supplementary pension. Both are means-tested but pensions received from other sources are treated differently from other income. These do not affect the basic pension and the level at which they begin to reduce the supplementary pension is much higher than for other income.

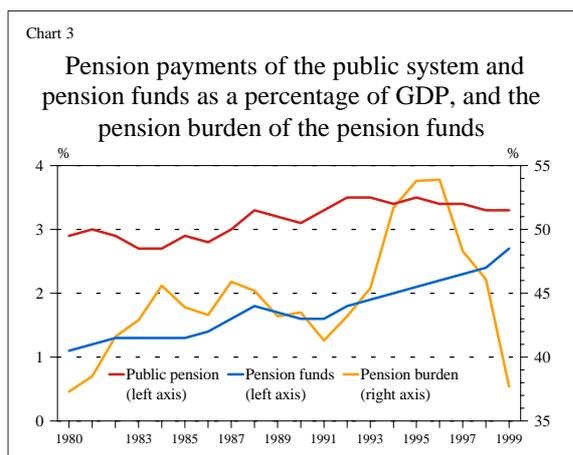
The basic pension has fallen relative to labour earnings in recent decades. In April 2000 it amounted to roughly 13 per cent of the average earnings of unskilled workers but was around 18 per cent in the late 1960s.³ This has been more than compensated for by a higher supplementary public pension and pension paid by pension funds. In April 2000 the maximum total old age pension was around 52 per cent of the average earnings of unskilled workers. There is a significant redistribution built into the public pension system. It operates both through means testing and the fact that it is independent of

2. See Gudmundsson, G. (2000).

3. OECD (1999).

the income that the pensioner had during her/his employment. To take an example, for someone who had 25 per cent lower income during employment than the average earnings of unskilled workers, the replacement ratio will be 69 per cent.

The public pension system still pays a higher total in pensions than the pension funds. In 1999 the amounts were 21 b.kr. or 3.3 per cent of GDP in the case of the public system and nearly 17 b.kr. or 2.7 per cent of GDP in the case of pension funds. Pension funds have been increasing in this respect relative to the public system, as can be seen in Chart 3. They will overtake the public system in the years to come as they approach maturity and means testing reduces the public pension. It is an indication of how far the funds are from maturity that their pension burden, i.e. the ratio of pension payments and contributions, is still well below 50 per cent, as can be seen in Chart 3.⁴



II. 3 Occupational pension funds

At the beginning of 2001 there were 54 pension funds in Iceland. Of these, 11 were no longer receiving contributions and 13 had employer guarantees from the government, municipalities or banks. There were 30 fully operational occupational pension funds that do not have an employer guarantee.

4. The figure for 1999 is distorted due to a big one-off payment from the government to the pension funds of public employees. The payment was prompted by the big financial surplus of the government which was partly used to reduce the large un-funded liabilities towards the public funds.

The pension fund scene is dominated by a few big pension funds with a very high share of total assets and several small pension funds. The ten biggest pension funds had around two-thirds of the net assets of all pension funds in 1999, and the two biggest ones accounted for over a quarter. The average fund had net assets of around 8½ b. kr. (120 m. USD) but the biggest had assets of 75½ m.kr. (over 1 b. USD). Thirty-five out of sixty pension funds had assets that were less than 5 b. kr. (under 70 m. USD).

Legal framework

Pension funds in Iceland operate on the basis of legislation that came into force in the middle of 1998. The main elements in the law are:

- Definition of which entities are allowed to call themselves pension funds and receive mandatory contributions for pension rights.
- Minimum pension rights and forms of pension are defined.
- General requirements for operating pension funds regarding size, risk, internal auditing and funding are defined.
- Guidelines and limits for the funds' investment policies based on the risk diversification principle.

Only those entities that offer retirement pension until the time of death, disability pension and survivors pension, are legally entitled to call themselves pension funds and receive mandatory contributions. With this definition, pension funds that only provided defined contribution schemes with individual accounts had to change their regulations or move into the third pillar of voluntary pension saving. All pension funds that receive mandatory contributions, and thus belong to the second pillar, henceforth have some form of risk sharing between members.

The law codifies the principle of a mandatory payment of at least 10 per cent of wages and salaries in order to acquire pension rights. The form of the payment, including how it will be split between the employer and the employee, can be decided according to special legislation, wage contracts, employment contracts or in a similar way. The contribution can be split into two parts. The first part goes towards acquiring pension rights which, for a 40-year period

of contributions, should give a lifelong pension amounting to at least to 56 per cent of wages during the contributions period. Similar conditions apply to minimum disability and survivors pensions. The second part can go towards acquiring additional pension rights, including defined contribution schemes with individual accounts. Banks, insurance companies, securities firms and pension funds can receive contributions for additional pension rights. Married couples are allowed to split their contributions in order to generate rights for both. The State Tax Authority is entrusted with supervising the mandatory payment of contributions.

The law stipulates that membership of pension funds will in general be defined in general wage contracts or in special legislation. People not covered by this are free to choose their pension fund provided that the regulation of the fund in question permits it. A special fund operated according to specific legislation is obliged to accept all people who are active on the labour market and do not belong to other funds. Employers are free to choose their provider of additional pension rights, i.e. rights in excess of the 56 per cent minimum mentioned above.

The law defines the minimum size of a pension fund to be 800 contributing members, provided that it does not guarantee a satisfactory risk profile for its liabilities through other means (such as by buying insurance). All pension funds shall be fully funded except those that are guaranteed by central or local government or a bank. Full funding is defined in such a way that the divergence between the present value of assets and liabilities cannot be more than 10 per cent for one year or 5 per cent over a period of five years.

The law stipulates that the investment policies of the funds should aim at achieving the best return-risk composition that is available at any given time. The law includes certain ceilings on the asset composition of the funds, based on the principle of diversification of risk. Total foreign exchange risk was initially limited to 40 per cent of assets but in the spring of 2000 was increased to 50 per cent. This means that if funds invest more abroad they will have to hedge the excess position. The ceiling for equity, municipality bonds, bank bonds and other bonds is 50 per cent for each class of assets. There is no ceiling on mortgage bonds, although their loan-to-value ratio

must not exceed 65 per cent in general and 35 per cent in the case of specialised commercial property. The general rule is that bonds and equity should be listed on recognised, organised exchanges. But the funds are allowed to invest 10 per cent of assets in unlisted securities, provided that they are issued by entities within the OECD countries.⁵ Unlisted equity has, though, to be fully transferable and the annual statements of the companies involved have to be public. Regarding individual credit risk, exposure of funds towards a single entity is limited to 10 per cent of assets, 15 per cent of the stock of a single firm and 25 per cent of the shares in any mutual or equity fund.

Different types of pension funds

There are significant differences between funds with employer guarantees and ordinary private funds regarding the level of contributions and benefits and also regarding risk-bearing. Guaranteed funds are exempted from the requirement of full funding. However, only the government, municipalities and banks can guarantee pension funds. Furthermore, full funding will become the general rule for public sector and bank employees in the future. The recent reforms of public sector pension funds imply that all new employees will become members of fully funded schemes with a similar system for accumulation of pension rights to that prevailing on the private market. Present employees could choose whether to stay in the old scheme or switch to the new one. For younger employees who had significantly higher incomes than the basic daily salary it was beneficial to switch to the new system. Contributions were paid on total income in the new system and not only on the basic salary as in the old. Furthermore, the old pension scheme was favourable for employees with longer tenure. A similar reform was made to bank employees' pension schemes. Most people belong to the fund associated with their occupation.

Little experience is available as yet of the degree to which people will invest contributions in excess of the minimum outside their occupational fund. But the legislation that came into force in 1998 has

5. Unlisted bonds issued by the government housing funds and bought during the years 1972-1994 are not included in the 10% ceiling on unlisted securities.

Table 1 Old age pension benefits of different types of pension funds

	<i>Private sector funds</i>	<i>Public sector A-Department</i>	<i>Public sector B-Department</i>
General retirement age	67	65	65
Accrual of benefits per annum	1.4-1.8% of total wages	1.9% of total wages	2% of fixed salaries (for 32 years), 1% to 65 and 2% > 65
Indexation of benefits	CPI	CPI	Government wages
Early/late retirement adjustment	±7.2-9.6% per annum	±6% per annum	Not applicable

increased the scope for choice of pension providers. That point, along with the growth of employment outside traditional sectors covered by existing pension funds, is likely to increase movement between pension providers in the years to come.

The Pension Fund of State Employees is the biggest public sector pension fund. The total contribution to the A-Department of the fund, which is the new fully funded scheme, is currently 15.5 per cent of total salaries. Thereof, the employee pays 4 per cent and the employer 11.5 per cent. Since the benefit level of the fund is fully defined, it is the employer who bears the investment risk. The employer's contribution will thus be variable. In the old B-Department the contribution rate is 10 per cent of wages, whereof the employee pays 4 per cent. The government will then in the end pay into the fund whatever is needed for meeting current pension payments.

The ordinary private sector funds are hard to classify exactly using terms such as *defined contribution* or *defined benefits*. They are similar to defined contribution funds in the sense that contribution levels have in most cases been stable for a long time at 10 per cent. But there are no individual accounts and the investment risk is borne collectively by the members of the fund. Moreover, the funds are far from being actuarially "fair" among members. In fact, they have a high degree of solidarity and co-insurance since the relation between contributions and rights to benefits is in most cases the same for young and old, men and women, those with spouses and children and those without. Furthermore, they guarantee a lifelong old age pension in all cases. The benefit level is defined in every period by the funds' regulations. But if there is a mismatch between a

fund's returns and the benefit level, the latter is usually changed at discreet intervals by changing the regulations, although in principle the contribution rate could also be changed. These funds are thus akin to defined benefit funds where members bear the investment risk collectively.

Benefits

All pension funds in Iceland pay lifelong old age and disability pensions, and survivors pensions. The main rule in the private sector is that members can begin to withdraw old age pensions at the age of 67, while in the old public sector scheme the limit is 65. It is possible, however, to start withdrawing pensions in the private sector as early as 65, but then with a reduced benefit, or as late as 70 with additional benefits. The benefit rule in the new public sector scheme and in the private sector is in general neutral towards the choice of early or late retirement.

Benefit level can vary significantly between pension funds. Firstly, there is a difference between funds with employer guarantees and others. The benefit level is usually higher in guaranteed funds. Secondly, there are differences between the old (B-Department) and new (A-Department) public sector schemes. Thirdly, the benefit level of ordinary private sector funds will ultimately depend on their investment returns, which will in turn be variable between individual funds. Table 1 compares certain aspects of the benefit rules of different types of funds.

There are at present three systems for the accumulation of pension rights. Most of the private sector funds and the A-Departments of the public funds use a system where members earn points based on the

amounts they pay in contributions.⁶ The points system is simply one technique for calculating the pension benefits, since equivalent percentages of the contribution base could be used. Moreover, pension rights in private sector funds will ultimately depend on the return on their assets, as discussed below. In the B-Departments of public sector funds members earn pension rights that are a certain percentage of fixed salaries for a certain numbers of years (see Table 1).

In both these systems the benefit formula is linear in terms of the age of the contributor. The contribution of a 25-year-old will thus give rise to the same pension benefits as the contribution of a 64-year-old, even if the former is much more valuable than the latter as it will earn a return much longer. This is of course not actuarially fair. But as membership is mandatory, members will in general gain when they are older what they lost when they were younger. Furthermore, it is difficult to design transitions from a linear system to an age-dependent system that will not hurt the generations that have already lost when young and have yet to gain when older. A few pension funds have age-dependent benefit formulas. This creates a challenge for the system as a whole. It might become unstable if linear and age-dependent formulas exist side by side and the possibility of moving between funds is further enhanced. With full freedom to move between funds, members would choose funds with age-dependent benefit formulas when they are young and those with linear formulas when they are old. That is clearly not sustainable.

The benefit level of ordinary private pension funds will depend on their investment returns. As a ratio of the general wage level at the time of retirement they will also depend on real wage growth over the investment period, which in the long run will be determined by productivity growth. As the accumulated pension rights in these funds are price-indexed and not linked to wages and salaries, the ratio of benefits to the wage level will then gradually fall during the retirement period, provided of course that long-

6. Members of these funds accumulate points that for each year are the ratio between their earnings (the contributions base) and the reference amount of the fund. The reference amount is recalculated monthly on the basis of the CPI. The old age pension each month is the reference amount for that month times 1.4-1.8 the accumulated points of the member, divided by 100.

term productivity growth is positive. On the basis of these relationships and the starting position of the funds, Gudmundsson G. (2000) has calculated the replacement ratio when the funds have reached the steady state equilibrium. He assumes that the real rate of return will gradually fall to 3.5 per cent, which is the rate used in actuarial assessments of the funds. He then proceeds to calculate the ratio of the first year's old age pension of a person retiring at 69 to the average wages of 40-60-year-olds during the same year. He obtains the result that the ratio will be 62 per cent if productivity growth is 1 per cent and 47 per cent if it is 2 per cent. By international comparison this is a relatively good performance for only a 10 per cent contribution rate, but it is of course partly a result of the relatively high effective retirement age. As the basic public pension can be expected to add another 10 per cent, the total replacement rate is likely to be around 60-70 per cent.

II. 4 Voluntary private pension saving

Legislation on tax incentives for voluntary private pension saving was adopted in 1998 as a part of the general pension reform. Employees were allowed to deduct from their taxable income a contribution to authorised individual pension schemes of up to 2 per cent of wages. Employers contribute in such cases 0.2 per cent of wages, which is financed by lowering the social security tax to an equal degree. In the spring of 2000 these figures were increased to 4 per cent and 0.4 per cent respectively. The pension schemes have to be authorised by the Ministry of Finance. They are in most cases defined contribution individual accounts. The pension saving is not redeemable until the age of 60 and has to be paid in equal instalments over a period of at least seven years. It is too early to judge the success of these changes but it is estimated that 20 per cent of wage earners were paying into such schemes at the end of 1999.

II. 5 Tax treatment

The contribution rate to pension funds is usually 10 per cent of wages. Formally this 10 per cent is split between a 4 per cent contribution from the employee and a 6 per cent contribution from the employer. The employee part is fully deductible from taxable income if it does not exceed 4 per cent. The employ-

er can charge his part as a cost in his accounts, making it fully deductible for tax purposes, even when it exceeds 6 per cent as is the case with the public sector and the banks. The investment returns of pension funds are tax-free. Pension benefits are taxed in the same way as income from employment.

III. A short history of the pension funds

The foundations of the present-day pension fund system in Iceland were laid by general wage settlements in the spring of 1969, whereby the labour unions traded wage increases for the setting up of fully funded mandatory occupational pension funds from the beginning of 1970. This increased the number of pension funds in Iceland from 66 to 90.⁷ This development was without doubt prompted by the low level of old age pensions paid by the public system at that time. The system only paid a flat-rate old age pension amounting to 17 per cent of the average earnings of male workers.⁸ The real benefit level of public pensions had been eroded by inflation due to two big devaluations during the recession of 1967-68.

Part of the settlement in 1969 stipulated special measures guaranteeing an immediate rise in pension to members of trade unions who were too old to accumulate significant rights to benefits in the new system (born before 1914). This was financed by the Unemployment Insurance Fund and the government. It is estimated that these measures nearly doubled the pension of those retiring in 1969/70 from the level provided by the basic public pension.⁹

Membership of occupational pension funds was made compulsory for wage earners in 1974. In 1980 this obligation was extended to the self-employed. Until 1987 contributions were only paid on basic daytime earnings, but in a general wage settlement in February 1986 it was decided to introduce the payment of contributions based on all earnings, including overtime, piece-work and bonuses, in even steps from 1 January 1987 until 1 January 1990.

In 1991 a law was adopted on the annual accounts and auditing of pension funds, giving the Bank Inspectorate of the Central Bank of Iceland some

supervisory role over them. Harmonised accounts of individual pension funds were subsequently made public by the Bank Inspectorate. There was therefore more pressure on individual funds to earn reasonable returns. Funds with unsustainable financial positions came under special scrutiny, which gave impetus to their closure for further contributions and/or their merger with other funds. Certain pension funds operated according to specific legislation, such as the pension funds of public employees, mariners, farmers and nurses.

Work on framework legislation on pension funds had started in 1976. But achieving the consensus necessary for its adoption proved difficult. Among the main issues of contention was the employer-guaranteed pensions of public sector employees. In 1997 a consensus on changes to the pension system was reached. An agreement between the Minister of Finance and public employees paved the way. It entailed that they would gradually move over to a fully funded pension system with a similar system for accumulation of pension rights as on the private market, but that the government guarantee would be kept. The next steps were the adoption of framework legislation on pension funds in December 1997 and tax incentives for voluntary pension saving. With these changes a new chapter in the history of pensions in Iceland began.

The number of funds has been falling in recent years due to mergers aimed at improving efficiency. They were around 90 at the beginning of the eighties and before that their number reached nearly 100. In the beginning of 2001 they had fallen to 54, as mentioned before.

IV. Assets and performance of pension funds

This chapter will discuss the development of the pension funds' assets, the return on them and the financial position of the funds. These factors will determine the level of benefits that funds without employer guarantees will be able to sustain. The composition of pension fund assets has been evolving from a dominant share of government bonds and loans to members towards a higher share of equity and foreign assets. Gross return of the funds has been relatively good and stable. A higher share of more risky assets in the pension fund portfolios has the potential

7. Sigurdsson (1972).

8. Stefánsson (1994).

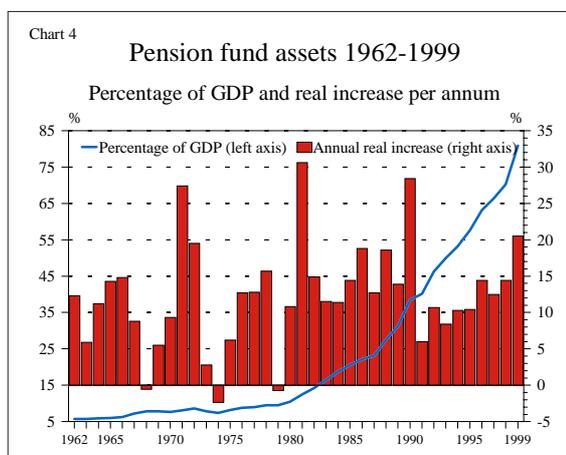
9. Ibid.

for increasing the return significantly but make it at the same time more volatile. Operating costs of pension funds have been falling in relation to assets and contributions, and are relatively low by international comparison. Further growth and mergers of funds creates potential for improving this record still further. The financial position according to actuarial assessments is in most cases solid.

IV. 1 Assets and investment policies

Assets of Icelandic pension funds amounted to 515 b.kr. at the end of 1999 or almost 80 per cent of GDP. These assets had more than tripled in real terms from 1980 or on average by over 12 per cent per annum. Chart 1 shows the development of pension fund assets from 1962 to 1999 as a percentage of GDP and the real increase per annum. The Chart shows that pension fund assets grew very slowly in relation to GDP during the 1970s although membership had been made mandatory for wage earners. Part of the reason is that economic growth was strong during this period. The main reason, however, is that return on the funds' assets was very poor and in many cases negative due to limited investment opportunities and highly negative real interest rates on nominal bonds and loans in Iceland at the time. The growth of the funds really took off in the 1980s. The real returns of the funds took a dramatic turn for the better as widespread indexation of financial assets was introduced in the beginning of the eighties¹⁰ and domestic interest rates were liberalised around the middle of that decade.¹¹ Real interest rates on un-indexed bank loans in Iceland went from being on average negative to the tune of more than 8 per cent during the first four years of the 1980s to being positive by nearly 5 per cent in 1987 and a hefty figure of almost 12 per cent positive in 1988. Indexed government bond rates increased from 3-3/2 per cent in the early 1980s to 8.7 per cent in 1987/1988, as can be seen in Chart 8. Added to this was the move to pay contributions on all wages instead of only basic daytime wages, which took place in the second half of the eighties.

The funds are already bigger than the banks in



terms of assets. Pension funds have been growing fast in recent years in relation to GDP and are expected to do so in the immediate future. They have locked high real returns into their portfolios and real interest rates are expected to be significantly above GDP growth for at least some years. Contributions will exceed pension payments for several years as the funds are far from maturity. Although the pension burden, namely the ratio of pension payments to contributions, has been increasing over the last two decades, it is still below 50 per cent as can be seen in Chart 3. Pension fund assets will therefore continue to grow strongly during the next decades, both in real terms and as a percentage of GDP. It has been estimated that pension fund assets will be at least 1½ times GDP around the middle of the twenty-first century.¹²

Initially, the funds invested mostly in domestic bonds and lent directly to their members. Domestic bonds were predominantly with government guarantees and a significant part of them went to finance the public housing loan system. In 1990 claims on the government, local authorities and the public housing system accounted for 43 per cent of pension fund assets and lending to members accounted for a further 22 per cent. Equity was only 1 per cent and foreign assets were non-existent. As can be seen in Table 2 and Chart 5 this composition changed dramatically during the 1990s. At the end of 1999 claims on public authorities were down to 32 per cent

10. See Jónsson (1999) on financial indexation in Iceland.

11. See Guðmundsson and Kristinsson (1997) and Davíðsson and Guðmundsson (2000) on financial liberalisation in Iceland.

12. Guðmundsson, G. (2000).

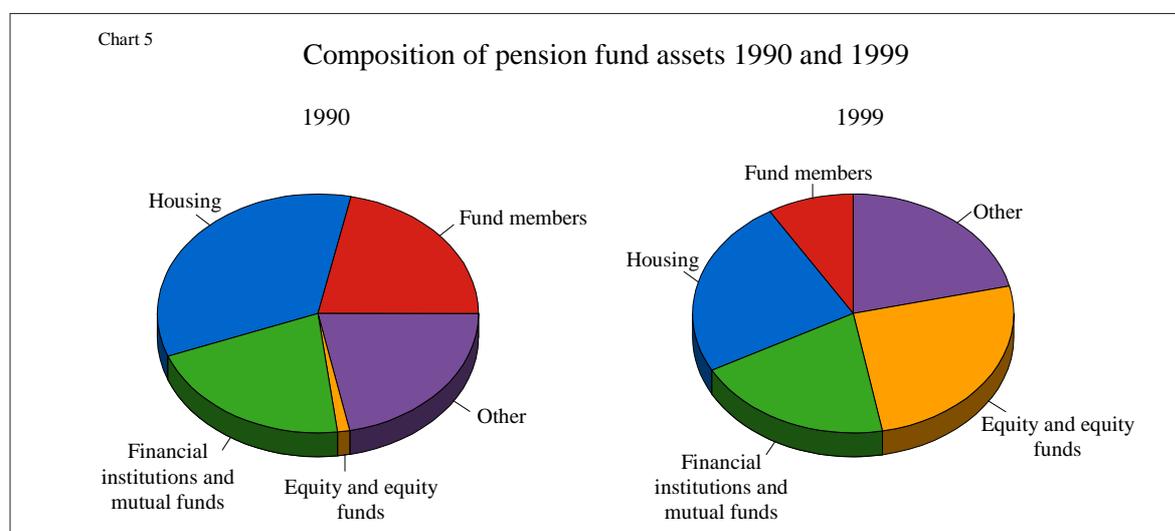


Table 2 Composition of pension fund assets*

Percentages	1990	1995	1999
Marketable bonds and mutual funds	21.6	47.9	47.1
Other bonds and loans	68.9	41.1	23.8
Equity and equity funds	1.2	2.8	25.8
Foreign assets	0.0	1.9	18.7
Central and local government	9.5	12.6	7.6
Housing sector	33.9	40.7	24.2
Other financial institutions and mutual funds	21.2	14.6	20.0
Fund members	21.8	14.3	8.6
Lending to enterprises	4.2	5.1	8.2
Foreign bonds	0.0	1.8	2.3
Domestic equity and equity funds	1.2	2.7	9.4
Foreign equity and equity funds	0.0	0.2	16.4
Other	8.3	8.1	3.2

Source: Central Bank of Iceland.

*The higher part of the Table does not sum to 100 due to the double counting of *foreign assets* and the absence of the category of *other assets*.

and lending to members was less than 9 per cent. The share of equity, however, had increased to 26 per cent and foreign assets were 19 per cent. Behind this shift was a change in rules and legislation governing limitations on pension fund investment. But there was also a growing awareness among pension fund managers that they needed to move more into equity and foreign assets to earn a satisfactory return as total assets approach the figure of 1½ times GDP mentioned before.

IV. 2 Returns

The first year covered by the annual reports of the Bank Inspection (later Financial Supervisory Authority) on pension funds was 1991. Before that, information on the return on pension fund assets is not available in a relatively comparable form. Table 3 shows the average real return over the period 1991-1999 for different types of funds, both the gross real return and the net, i.e. after deducting operating expenses. The gross real return of all pension funds

Table 3 Return on pension fund assets (per cent p.a.)

	<i>Funds with employer guarantee</i>		<i>Occupational private sector funds</i>		<i>DC funds with individual accounts*</i>		<i>All pension funds</i>	
	GRR	NRR	GRR	NRR	GRR	NRR	GRR	NRR
Average 1991-1994	6.0	5.8	7.2	6.8	8.6	7.7	7.0	6.7
Average 1995-1998	6.0	5.7	7.9	7.7	8.0	7.7	7.6	7.4
Average 1991-1998	6.0	5.7	7.6	7.3	8.3	7.7	7.3	7.0
1999*		8.1		12.7		...		12.0

Note: GRR = gross real return, NRR = net real return = GRR – operating costs as a percentage of assets.

* After the new legislation on pension funds came into force in the middle of 1998, pure DC funds with individual accounts were no longer allowed to receive mandatory contributions and are not defined as pension funds according to the law.

in Iceland during 1991-1998 amounted to 7.3 per cent per annum. It was fairly stable during this period as it fluctuated between a low of 6.5 per cent in 1991 and a peak of 8.1 per cent in 1997. Table 3 reveals that the gross return has been significantly lower on funds with employer guarantees than on those without them. The gross return was 6 per cent on funds with employer guarantees on average during the period 1991-1998. At the same time it was 7.6 per cent on occupational private sector funds and 8.3 per cent on the defined contribution funds with individual accounts. These differences are mostly reflected in net real rates of return, as the cost ratio has on average been very similar among the two types of occupational pension funds. However, it was higher among DC funds with individual accounts. The net real rate of return 1991-1998 was thus 7.3 per cent on average among occupational private sector funds but 7.7 per cent among DC funds with individual accounts. The rate of return on all types of pension funds increased significantly in 1999 as can be seen in the Table. The net real rate of return for occupational private sector funds went from 7.5 per cent in 1998 to 12.7 per cent. The reason was a very high rate of return on equity in Iceland and abroad in 1999 and the increased share of equity in the funds' portfolios.

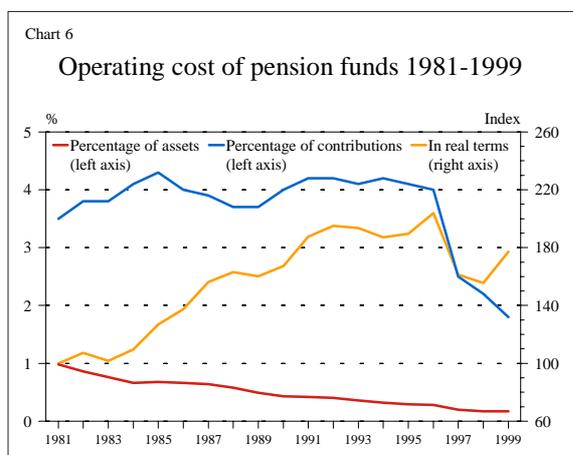
The benefits that pension funds will be able to provide will ultimately depend on the rate of return of their assets. Contributions to pension funds are mandatory and most people belong to their occupational funds, with only limited scope so far to choose between funds. Sustained significant differences in

the rate of return of different funds could therefore be a serious source of tension for the system and could undermine its legitimacy and long-run viability. In 1999 there were 33 fully operational pension funds without employer guarantee. The biggest of those had assets amounting to nearly 76 billion ISK and the smallest had assets of only 1 billion ISK. The average net real rate of return on these funds during 1995-1999 was 8.3 per cent with a standard deviation of 1.6 per cent. But the total variation was quite significant with the lowest return being 5.5 per cent and the highest 12.6 per cent. There might be some scope to reduce the difference between rate of return of the funds through mergers.¹³ More professional investment strategies should also be able to contribute to levelling out this difference, as the investment opportunities of the funds are broadly speaking similar.

IV.3 Operating costs

The operating costs of pension funds fluctuated around 4 per cent of contributions during the 1980s and the first half of the 1990s, as can be seen in Chart 6. They have since fallen towards 2 per cent of contributions, due to strong growth in contributions and lower operating costs in real terms. Operating costs as a ratio of assets have fallen constantly throughout the last two decades and were 0.17 per cent in 1999. As a percentage of assets they were slightly higher in

13. The simple correlation coefficient between the size of pension fund assets for these 33 funds at the end of 1999 and their average net real return during 1995-1999 was 0.27, which is not significant.



1999 among funds with employer guarantee.¹⁴ There is a considerable variation in the cost ratio among fully operational pension funds without employer guarantees. The unweighted average of cost as a percentage of assets was 0.17 per cent, with a minimum of 0.03 per cent and a maximum of 0.43 per cent. Some of the low outliers might be receiving open or hidden grants from employees or trade unions towards their costs. If those cases are excluded the minimum seems to be nearer to 0.1 per cent of assets. The author found a significant negative relationship between the size of fully operational funds without employer guarantees in 1993¹⁵ but that seems to have disappeared in 1999, possibly through mergers and a higher cost awareness among members.

IV. 4 Financial position

Since the adoption of the current legislation, all pension funds are assessed actuarially every year. Before that, up to five years could elapse between these assessments. During the 1980s there was widespread concern that the funds were not actuarially sound. That was mainly caused by negative real interest rates in Iceland during the 1970s but also by rela-

tively high operating costs and misguided investments. Actuarial surveys in recent years have shown that this situation has been radically reversed. Furthermore, many funds have increased their benefit level in recent years on the basis of actuarial surpluses. All funds without employer guarantee that are receiving contributions were actuarially in a surplus at the end of 1999 according to the definition used in the legislation.¹⁶ The main reason for the turnaround is the fact that real interest rates in Iceland have for several years now been far above real economic growth. There have been other contributing factors, such as the change in indexation of benefits from wages to prices and the lowering of operating costs, partly through mergers.

At the end of 1999 the surplus of 31 fully operational pension funds without employer guarantee amounted to 32 b. kr. or 4.7 per cent of pension liabilities.¹⁷ Only three funds were in a deficit, thereof two only very slightly, while one had a deficit amounting to 6.9 per cent of liabilities. Three funds had a surplus exceeding 10 per cent of liabilities and will therefore have to increase benefits or cut the contribution rate.

V. Economic and financial effects

The growth of the fully funded mandatory pension system in Iceland will have significant economic and financial effects. Firstly, it could potentially increase the savings rate and the capital stock, which in turn might increase the growth rate. Secondly, the accumulation of foreign assets by pension funds will change the net asset position of the country and its risk profile. Thirdly, the funds will have significant effects on the development of domestic capital markets. Finally, foreign investment by pension funds will have effects on the foreign exchange market and the exchange rate. These effects will be considered in this chapter.

The theoretical and empirical literature on the

14. The reverse was true as a percentage of contributions, but that figure is distorted by a big one-off payment in 1999 by the treasury to the state employees' pension funds, with the purpose of reducing the unfunded liabilities of the treasury towards them. The payment amounted to 7.8 b.kr. and is counted as contribution in the pension funds' books. This payment also distorts the development of operating costs as a ratio of contributions for the funds as a whole. Without it the ratio would have been 2.1 per cent in 1999, or similar to the ratio in 1998.

15. Gudmundsson, M. (1995).

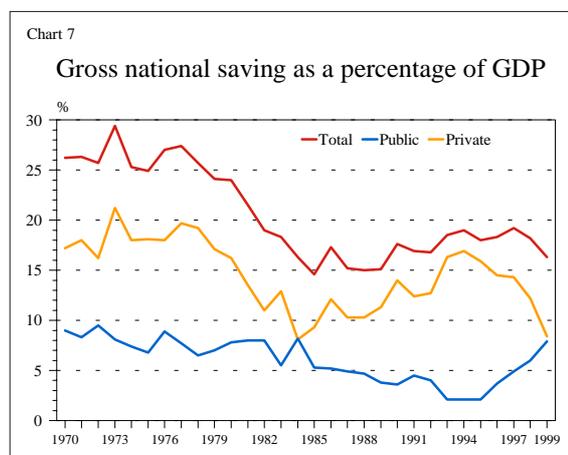
16. The funds are not allowed to have a surplus or a deficit on the net present value of assets relative to the present value of total pension liabilities which is in excess of 10 per cent for a year or 5 per cent over a period of 5 years.

17. There were 33 fully operational pension funds without employer guarantee but actuarial assessments were lacking for 2.

effects of pension arrangements on savings is far from conclusive.¹⁸ Mainstream theories of savings that assume full information and perfect markets would predict that the introduction of a mandatory pay-as-you-go pension system would reduce the private savings rate. The reason is that the first generation of pensioners gets a windfall gain at the same time as the consumption of other generations is unaffected, since income and payroll taxes introduced to finance the new system simply replace free private saving. Similarly, these models would predict that the introduction of a fully funded mandatory system would have no effect on the savings rate as mandatory contributions are simply substituted for free saving. It follows that the savings rate should be higher with a fully funded system than with a pay-as-you-go system.

In practice there are many factors that distort this picture. Individuals tend to be myopic and do not provide sufficiently for their retirement on their own account. Capital markets are not perfect. Consumption and saving are partly based on habit formation and are therefore inertial. Public pay-as-you-go systems may not be fully credible. All these factors will tend to reduce the negative effect that introducing a mandatory pay-as-you-go system would have on the savings rate. They will similarly create a positive effect on the savings rate with the introduction of a fully funded system. This is partly supported by empirical studies.¹⁹ If a fully funded system leads to a higher savings rate it will contribute to a higher capital stock.²⁰ Economic growth will increase during the period that a higher equilibrium capital stock is being built up. The increase in the growth rate could be long-lasting and in some cases even permanent, especially if it is associated with increased research and development, human capital accumulation and other factors that affect the rate of technical progress.

It is hard to identify the effects of accumulation by pension funds on the savings and growth rates in



Iceland. The private savings rate has been on the decline in recent years as can be seen in Chart 7. This decline is not fully understood, but is at least partly explained by the relatively recent financial liberalisation that lifted credit constraint on firms and households.²¹ Furthermore, an economic upswing and a high level of optimism during the last years of the 1990s increased expected permanent income with the immediate effect of lowering the private savings rate. The fall in the private savings rate cannot therefore be taken as an indication that accumulation by the mandatory pension fund system did not contribute positively to it. The problem here is to identify what would have happened in the absence of this system.

Pension fund assets were equivalent to more than 80 per cent of GDP in 1999. It has been estimated that they will reach at least 1½ times GDP around the middle of the twenty-first century.²² Private sector funds will become twice as big as the public sector funds. Voluntary pension saving (third pillar) will be added to this but its future level is hard to predict. This means that pension assets will double in relation to GDP from their level in 1999. Investment by these funds on the domestic bond market is not feasible. It would create a strong downward pressure on the domestic interest rate, which would in turn reduce

18. Discussion is to be found in Kohl and O'Brien (1998), Orzag and Stiglitz (1999) and Sinn (2000).

19. See for instance World Bank (1994), p. 307 and Davis (1995), p. 14-15.

20. In an open economy setting, the increase in the domestic capital stock could be partly replaced by the accumulation of foreign assets, as discussed later.

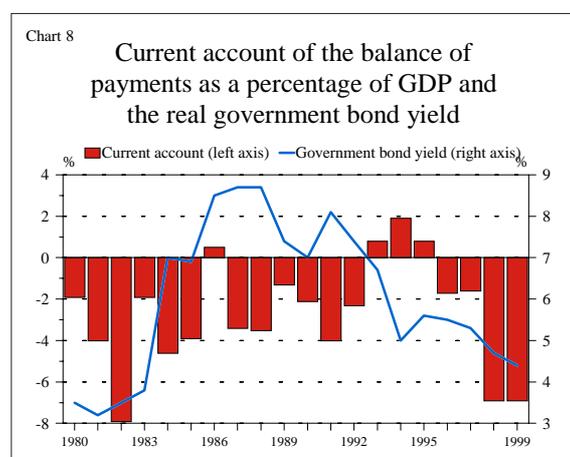
21. Gudmundsson and Kristinsson (1997) and Davidsson and Gudmundsson (2000) analyse the process of financial liberalisation in Iceland.

22. See Gudmundsson, G. (2000).

other private saving.²³ Lower real interest rates will stimulate investment somewhat with beneficial effects on growth. But what is more important is that the supply of domestic bonds will only be forthcoming if the government sector has very significant deficits in the first half of the twenty-first century and households and firms are increasing their debt level further. Fortunately, government finances have moved into a surplus in recent years and there is a consensus that the government should at least have a balanced budget over the economic cycle. Icelandic households are already highly indebted with gross household debt reaching 146 per cent of disposable household income in 1999.

The funds have been moving their investments increasingly into domestic equity and foreign assets. This development has been motivated by the need for a more diversified asset portfolio and better risk and return composition. But it is also the best strategy from a long-run macroeconomic perspective. Investment in domestic equity will contribute more directly to higher domestic investment in productive assets than investing in the bond market and it will improve the risk profile of Icelandic enterprises. Higher investment will, in turn, leave future workers with a higher and better capital stock and thus make it easier to provide for retirees. Investment in foreign assets will have a similar effect. Income from foreign assets will go towards paying retirement pensions with a lower demand on domestic production. There is no funding in a macroeconomic sense if it is not manifested either in a higher domestic capital stock or in foreign assets. In the final analysis, consumption by retirees comes out of current production. What funding can do is to increase domestic production in the future through a higher capital stock or give entitlements to foreign production. Both will reduce the pension burden on producers in the future compared to the case of pay-as-you-go systems. But from the standpoint of the nation as a whole, full funding through the accumulation of foreign assets requires that net foreign assets of the nation increase.

23. Such a tendency for domestic interest rates to fall due to accumulation by pension funds probably already manifested itself during the 1990s, when real government bond yields fell during the decade, as can be seen in Chart 8. But other factors were also at work, such as the economic stagnation during the first half of the 1990s and the effects of the liberalisation of capital movements that was finalised in 1995.



That in turn requires a current account surplus over a period of some years.

It is much easier to identify the significant effect that the pension funds have had on financial markets than on saving and growth in Iceland. They have increased the size and depth of these markets through their need to invest ever larger sums in financial assets. In addition they have increased the relative share of long-term funds on these markets. That has contributed to the development of the long-term bond market, especially for housing finance. During the latter half of the 1990s the funds became more active on the domestic equity market as that market developed and the funds were increasingly looking for alternative investment opportunities to the domestic bond market. Moreover, the funds have been active buyers of privatised assets during the 1990s.

A few figures will indicate the relative importance of the pension funds for domestic financial markets. Their assets were equivalent to 13 per cent of the size of the credit system in 1980 but that share had increased to 38 per cent in 1999. The development of their share in domestic financing of the credit system is even more pronounced as it went from just over a fifth to over a half during the same period. It is an indication of the importance of pension funds for the domestic bond market that their share of the total stock of marketable bonds is estimated to have been 60 per cent at the end of 1999. At the same time they are estimated to have held over half of the stock of housing bonds. At the end of 1999 the funds owned domestic equity and shares in equity funds

that amounted to around 13 per cent of the size of the organised equity market. This figure really underestimates their importance for the equity market, due to extensive cross-ownership of listed companies.

The build-up of the pension funds has probably made financial markets less volatile than otherwise. The funds have a steady flow of new resources that need to be invested. Furthermore, they can afford to have a fairly long horizon in their investment decisions. Funds have therefore traditionally not been very active in buying and selling financial assets in order to maximise their expected return in the short run. A few years ago they almost never sold assets from their existing portfolios, but this has changed in recent years. In 1999, 44 per cent of their disposable funds came from the sale of existing financial assets. This, however, can probably partly be explained by the funds' long-term investment strategy of increasing foreign assets at the expense of domestic bonds.

The foreign assets of pension funds were less

than 2 per cent of their total assets in 1995 but had reached almost 19 per cent in 1999. The bulk of their foreign assets are in the form of equity and shares in open-end and closed-end mutual funds.²⁴ This foreign asset accumulation is very significant in terms of the national economy. Pension funds' foreign assets accounted for over 70 per cent of all foreign portfolio assets of Icelandic residents at the end of 1999 and over 40 per cent of total foreign assets as recorded in the international investment position of the country.

The long-run benefits of pension fund investment abroad are beyond doubt. But, as mentioned before, full funding in the macroeconomic sense requires a bigger domestic capital stock than otherwise would have been the case and/or an increase in the net foreign assets of the nation. The latter requires in turn a surplus on the current account of the balance of payment over some period. That way the full benefits of a funded system will be reaped.

24. At the end of 1999 bonds were 3.6 per cent of foreign assets, open-end mutual funds 44.9 per cent, closed-end mutual funds 9.3 per cent and shares 42.3 per cent.

Bibliography

- Baldursdóttir, Kristína (2000), "Pension Funds' Assets and Return on Investment", *Monetary Bulletin* 2000:3, Central Bank of Iceland, <http://www.sedlabanki.is>.
- Blöndal, Sveinbjörn and Stefano Scarpetta (1998), "The Retirement Decision in OECD Countries", *OECD Economics Department Working Papers No. 202*.
- Bos, E., M. T. Vu, E. Massiah and R. Bulatao (1994), *World Population Projections, 1994-95*, World Bank.
- Central Bank of Iceland, *Annual Report*, various issues, <http://www.sedlabanki.is>.
- Central Bank of Iceland (Bank Inspectorate (1992-1998), *Pension Funds in Iceland*.
- Davíðsson, Tryggvi Björn and Már Gudmundsson (2000), "Iceland's Experience of Financial Instability in Recent Decades", in Gudmundsson, Már, Tryggvi Thor Herbertsson and Gylfi Zoëga (Eds.) *Macroeconomic Policy: Iceland in an Era of Global Integration*, University of Iceland Press.
- Davis, E. P. (1995), *Pension Funds. Retirement-Income Security and Capital Markets. An International Perspective*, Clarendon Press-Oxford.
- Disney, R. (2000), "Crises in Public Pension Programmes in the OECD: What are the Reform Options?", *Economic Journal*, February 2000.
- European Federation for Retirement Provision (2000), *EFRP Activities Report 1999*.
- Gudmundsson, Gudmundur (2000), "Prospect of Icelandic Pension Funds", *Central Bank of Iceland Working Papers No. 6*, Central Bank of Iceland, Economics Department, <http://www.sedlabanki.is>.
- Gudmundsson, Már (1995), *The Icelandic Pension System: Current Situation and Prospects*, (in Icelandic), Federation of Pension Funds and Federation of General Pension Funds.
- Gudmundsson, Már and Yngvi Örn Kristinsson (1997), "Monetary Policy in Iceland during the 1990s", in *Monetary Policy in the Nordic Countries after 1992, BIS Policy Discussion Papers*.
- Gudmundsson, Már (2000), *The Icelandic Pension System*, National Association of Icelandic Pension Funds.
- Financial Supervisory Authority (1999 and 2000), *Pension Funds in Iceland*, <http://www.fme.is>.
- Hagemann, R. P. and G. Nicoletti (1989), "Population Ageing: Economic Effects and Some Policy Implications for Financing Public Pensions", *OECD Economic Studies* 12/Spring 1989.
- Herbertsson, Tryggvi Thor, J. Michael Orszag and Stefán Svavarsson (1999), "Reassessing Iceland's Public Sector Pension Liabilities", *Economic Institute of the University of Iceland, Report No. R99:01*.
- Herbertsson, Tryggvi Thor, J. Michael Orszag and Peter R. Orszag (2000), *Retirement in the Nordic Countries: Prospects and Proposals for Reform*, TemaNord 2000:548, Nordic Council of Ministers.
- James, E. (1995), "Averting the Old-Age Crisis", *Finance & Development / June 1995*.
- James, E. and R. Palacios (1995), "Costs of Administering Public and Private Pension Plans", *Finance & Development / June 1995*.
- Jónsson, Bjarni Bragi (1979), "Interest Rate Policy and Financial Saving with Inflation" (in Icelandic), *Fjármálatíðindi*, No 2, 1979.
- Jónsson, Bjarni Bragi (1999), "Financial Indexation and Interest Rate Policy in Iceland", *Central Bank of Iceland Working Papers No. 5*, Central Bank of Iceland, Economics Department, <http://www.sedlabanki.is>.
- Kohl, R. and P. O'Brien (1998), "The Macroeconomics of Ageing, Pensions and Savings: A Survey", *OECD Economics Department Working Papers No. 200*.
- Kristinsson, Yngvi Örn (1991) "Pension Funds 1980-1989" (in Icelandic), *Fjármálatíðindi*, No. 1, 1991.
- Mackenzie, G. A. (1995), "Reforming Latin America's Old-Age Pension Systems", *Finance & Development / June 1995*.
- Miles, D. (2000), "Funded and Unfunded Pensions: Risk, Return and Welfare", *CEPR Discussion Paper No. 2369*.
- OECD (1993), "Iceland", *OECD Economic Surveys*.
- OECD (1999), "Iceland", *OECD Economic Surveys*.
- Orszag, Peter R. and Joseph E. Stiglitz (1999), *Rethinking Pension Reform: Ten Myths About Social Security Systems*, paper submitted at the conference of the World Bank, "New Ideas About Old Age Security", September 14-15, 1999.
- Reisen, Helmut (1997), "Liberalising Foreign Investments by Pension Funds: Positive and Normative Aspects", *OECD Technical Paper No. 120*.
- Schwarz, A. M. (1995), "Pension Schemes: Trade-Offs Between Redistribution and Saving", *Finance & Development / June 1995*.
- Sigurdsson, Sveinn (1972), "Pension Funds 1961-1970" (in Icelandic), *Fjármálatíðindi*, No. 1, 1972.
- Sinn, Hans-Werner (2000), "Why a Funded Pension System is Useful and Why it is not Useful", *Working Paper 7592*, National Bureau of Economic Research.
- Stefánsson, Ásmundur (1994), "The Purpose of Pension Funds. The Pension Issue", (in Icelandic) a minority statement with the Report of the Pension Commission of the the Icelandic Chamber of Commerce, "Mandatory Pension Saving, the Old Pension System and New Thinking on Financial Markets", *Mimeo*.
- Williamson J. and H. Reisen (1994), "Pension Funds, Capital Controls and Macroeconomic Stability", *OECD Working Paper, No. 47*.
- World Bank (1994), "Averting the Old Age Crisis", *World Bank Policy Research Report*, Oxford University Press.

Appendix: Key figures for pension funds 1961-1999

Table A. 1 Pension fund assets 1961-1999

	<i>In billions of króna at end of year</i>	<i>In billions of króna at average prices of the year</i>	<i>At 1990 prices</i>	<i>Annual real in- crease in per cent)</i>	<i>As a percent- age of GDP</i>	<i>As a percentage of the dome- stic liabilities of the finan- cial system</i>	<i>As a percen- tage of the credit system</i>	<i>As a percen- tage of the domestic capital stock</i>
1961	6	5	5,150		5.5	8.0		1.5
1962	7	7	5,782	12.3	5.7	7.9		1.7
1963	9	8	6,123	5.9	5.7	8.6		1.8
1964	11	11	6,807	11.2	5.9	9.0		2.0
1965	14	13	7,779	14.3	6.0	9.1		2.0
1966	17	17	8,933	14.8	6.3	9.5		2.1
1967	21	19	9,723	8.8	7.2	10.5		2.2
1968	24	22	9,674	-0.5	7.8	11.3		2.1
1969	29	28	10,210	5.5	7.8	11.3		2.0
1970	36	35	11,157	9.3	7.7	11.4		2.1
1971	47	46	14,208	27.4	8.1	11.9		2.4
1972	64	62	16,983	19.5	8.6	12.9		2.6
1973	88	78	17,466	2.8	7.8	13.4		2.4
1974	130	108	17,065	-2.3	7.4	13.9		2.1
1975	193	171	18,122	6.2	8.2	16.2		2.2
1976	291	258	20,423	12.7	8.8	18.0		2.5
1977	446	384	23,034	12.8	9.0	18.9		2.7
1978	713	624	26,653	15.7	9.5	19.0		2.9
1979	1,138	926	26,462	-0.7	9.5	20.0		2.9
1980	2,014	1,703	29,308	10.8	10.5	21.5	13.1	3.3
1981	3,711	3,169	38,275	30.6	12.5	24.1	15.7	3.9
1982	6,976	5,629	43,960	14.9	14.2	27.0	14.7	4.3
1983	13,288	11,184	49,023	11.5	16.4	27.7	15.3	4.8
1984	18,214	16,667	54,600	11.4	18.7	29.3	15.0	5.7
1985	27,946	24,901	62,455	14.4	20.6	30.6	16.9	6.3
1986	37,445	35,648	74,174	18.8	22.1	31.3	18.9	7.2
1987	53,209	48,345	83,562	12.7	23.1	31.3	20.5	8.0
1988	74,660	70,546	99,127	18.6	27.5	33.3	21.4	9.6
1989	105,199	96,167	112,902	13.9	31.2	35.3	22.6	10.3
1990	145,000	141,975	145,000	28.4	38.5	41.0	27.6	12.7
1991	164,700	160,165	153,699	6.0	40.1	39.2	27.2	13.1
1992	186,700	185,549	170,089	10.7	46.3	40.9	27.7	14.6
1993	208,800	206,219	184,380	8.4	50.0	41.8	27.9	15.5
1994	234,103	233,418	203,361	10.3	53.2	42.9	29.8	16.9
1995	262,617	260,064	224,478	10.4	57.6	44.5	31.6	18.2
1996	306,506	305,299	256,853	14.4	63.1	46.6	34.0	20.3
1997	352,690	348,629	289,074	12.5	66.4	47.2	35.8	21.9
1998	407,403	404,096	329,582	14.0	70.0	47.3	35.3	23.7
1999	517,599	501,978	395,811	20.1	80.4	50.8	38.2	28.1

Table A. 2 Disposable funds, contributions and pension payments 1961-1999

	<i>Dis- posable funds in m.kr</i>	<i>Contri- butions in m.kr.</i>	<i>Pension payments in m.kr.</i>	<i>Disposable funds as a percent- age of GDP</i>	<i>Contri- butions as a per- centage of GDP</i>	<i>Pension payments as a per- centage of GDP</i>	<i>Pension burden (percent- age)</i>
1961	1.3	1.0	0.3	1.3	1.0	0.3	30.0
1962	1.5	1.3	0.4	1.3	1.1	0.3	29.5
1963	1.9	1.5	0.5	1.3	1.0	0.3	31.8
1964	2.6	2.1	0.7	1.4	1.2	0.4	31.5
1965	3.2	2.6	0.8	1.4	1.2	0.4	31.3
1966	3.8	3.3	1.1	1.4	1.2	0.4	32.7
1967	4.2	3.5	1.2	1.6	1.3	0.5	34.8
1968	5.0	4.0	1.4	1.7	1.4	0.5	36.3
1969	5.9	4.5	1.8	1.7	1.3	0.5	40.5
1970	8.7	6.9	2.2	1.9	1.5	0.5	32.0
1971	18.4	10.1	3.3	3.2	1.8	0.6	32.2
1972	18.9	17.7	4.5	2.6	2.5	0.6	25.6
1973	28.3	26.9	6.7	2.8	2.7	0.7	24.8
1974	42.6	39.9	10.2	2.9	2.7	0.7	25.6
1975	62.2	54.5	13.5	3.0	2.6	0.6	24.8
1976	85.5	75.7	21.0	2.9	2.6	0.7	27.8
1977	127	112	35	3.0	2.6	0.8	31.3
1978	217	188	61	3.3	2.9	0.9	32.4
1979	350	290	103	3.6	3.0	1.1	35.5
1980	577	459	171	3.6	2.8	1.1	37.3
1981	960	798	307	3.8	3.2	1.2	38.5
1982	1,428	1,223	509	3.6	3.1	1.3	41.6
1983	2,418	2,022	868	3.5	3.0	1.3	42.9
1984	3,115	2,529	1,153	3.5	2.8	1.3	45.6
1985	4,760	3,701	1,626	3.9	3.1	1.3	43.9
1986	6,905	5,316	2,302	4.3	3.3	1.4	43.3
1987	9,801	7,397	3,394	4.7	3.5	1.6	45.9
1988	14,649	10,007	4,520	5.7	3.9	1.8	45.2
1989	19,414	11,842	5,120	6.3	3.8	1.7	43.2
1990	23,025	13,410	5,833	6.2	3.6	1.6	43.5
1991	29,543	15,478	6,394	7.4	3.9	1.6	41.3
1992	33,473	16,637	7,194	8.4	4.2	1.8	43.2
1993	39,457	17,219	7,813	9.6	4.2	1.9	45.4
1994	43,605	16,701	8,640	9.9	3.8	2.0	51.7
1995	46,549	17,575	9,451	10.3	3.9	2.1	53.8
1996	62,182	19,782	10,663	12.8	4.1	2.2	53.9
1997	81,393	25,639	12,386	15.5	4.9	2.4	48.3
1998	129,599	30,613	14,104	22.4	5.3	2.4	46.1
1999	130,263	44,335	16,714	20.9	7.1	2.7	37.7

Notes on definitions and sources

1. The series on pension fund assets is from three sources. Sigurdsson (1972) provides data for the period 1961-1970, Jónsson (1979) and various Annual Reports of the Central Bank of Iceland have data for the period 1970-1981 and Kristinsson (1991) and Annual Reports of the Central Bank of Iceland from 1981. The definitions are not exactly the same so the series are spliced at the connection points in order to have a continuous series with correct percentage changes between years.
2. Pension fund assets at average prices of the year and at 1990 prices are calculated using the CPI.
3. Pension fund assets as a percentage of GDP refer to assets at average year prices.
4. Disposable funds in Table A.2. are from Sigurdsson (1972) and Annual Reports of the Central Bank of Iceland.
5. Pension burden (A.2.) is the percentage ratio of pension payments and contributions.