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**PROSPECTS OF ICELANDIC PENSION FUNDS**

by

**Guðmundur Guðmundsson**

**January 2000**

**CENTRAL BANK OF ICELAND**

**Economics Department**

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# PROSPECTS OF ICELANDIC PENSION FUNDS

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## **Abstract**

The Icelandic pension system is so designed that the bulk of old age pensions, disability compensations and support for children when parents die will be provided by savings funds. Private sector funds collect fixed contributions but benefits depend upon the financial position of the respective fund. In the funds for public sector employees the benefits are predetermined and premiums of members fixed, but the contributions from the employer are adjusted to actuarial requirements of the funds. Benefits or premiums are sensitive to retirement age and long term development of interest rates and productivity growth. The total assets of the funds are now about 450 billion kr. or 71% of GDP and will eventually reach a size of the order of one and a half to twice the value of annual GDP.

Key words: Pension funds, real interest rates, productivity.

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\* Central Bank of Iceland. The views expressed in this paper are those of the author and do not necessarily have to reflect the views and policies of the Central Bank of Iceland.

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## **Introduction**

The Icelandic pension system is based on tax-financed benefits and contributions from funds, established by savings. The Social Security pays a fixed amount, about 9 per cent of average wages of employees, 40-60 years old, to Icelanders who have reached the age of 67 years. This amount is paid regardless of other pensions, but reduced if the recipient has substantial earned income. Those who have little other income receive supplementary benefits from this system.

By participation in the funds people save collectively in order to provide for themselves in old age. The premiums are determined as a proportion of the wages of each member. In addition to old age pensions they provide contributions to spouses and children of deceased members and support for members who become disabled. Membership of a pension fund has been mandatory for all Icelandic employees and self employed since 1974 and 1980 respectively. The funds are associated with the trade unions and contributions must be paid to the fund associated with respective union or trade. But the same fund may arrange pensions for more than one union and the present trend is of mergers of both unions and funds towards bigger units. Pension rights and other benefits accumulate with the premiums paid to the funds. However, liabilities towards individual members are not limited to their accumulated contributions. Payments to those who suffer disabilities at a young age or live to a very high age are supplemented by the contributions of short-lived members.

Icelandic pension funds now operate according to laws from 1997. They did not imply much change in the operation of most of the funds of employees of private enterprises, but there has been a substantial reorganisation of the pension system for public sector employees. The present laws on pension funds stipulate minimum benefits that the funds must provide and impose some restrictions on investment policies of the funds. Information about the finances and operation of Icelandic pension funds, based on their annual accounts, is published annually by Finance Inspectorate, previously the Bank Inspectorate (1998). Our calculations start in 1997 and we use these statistics for that year to calibrate our models. The main purpose of the present work is to examine the influence of real interest rates, productivity and population dynamics upon the operation of these funds and the economy of their members.

In the funds of employees of private companies, contributions have been fixed at 10 per cent of wages. Employers use similar funds, or in some cases individual pension accounts, combined with life insurance. The cost of this pension system is excep-

tionally low compared to other countries (Blöndal and Scarpetta 1997; Koch and Thimann 1999).

Funds for employees of the state and local governments constitute a different system. They provide fixed benefits. The premium of the employee is fixed, but the employer provides the necessary finance to pay the prescribed pensions and other benefits. These funds were initially intended to operate on a fund-saving basis. But premiums were not changed in spite of low interest rates and decreasing mortality so that they have essentially developed into a system where benefits are financed by current premiums and contributions from the employers. These funds were closed to new members in 1998 and a new system established. The benefits are on a similar level as in the earlier system and contributions of employees fixed, but the contributions of the employer are supposed to be adjusted so that full funding is achieved. All new public sector employees must join the new system, but members of the previous system could choose whether they remained there or joined the new. Herbertsson et al. (1999) examined the pension system of public sector employees.

Contributions to these pension funds are exempt from income tax, but pensions are taxed as other income. Neither capital gains tax nor property taxes are levied on pension funds.

The pensions can be supplemented by private pension savings where benefits are limited to the accrued contributions of respective member. To a certain extent contributions to these funds are exempt from income tax which is collected when the pensions are paid. Remaining assets are paid to inheritors when members of these funds die.

According to official statistics the average total income of pensioners in 1997 was a little over half of the income of those in full employment. A remarkable feature in the circumstances of Icelandic pensioners is that they earn considerable income. Almost half of the total income of Icelanders 76 years and older was from employment, on average about 25 per cent of the income of 40-60 years old people. Most pensioners own their dwellings and have low debts compared with younger people. A recent study indicated that the financial situation of a large majority of the pensioners was satisfactory. (Ólafsson et al. 1999).

The size of pensions in a system where fixed contributions are collected and saved

throughout the working life of the members is sensitive to interest rates, mortality and retirement age. Variations in income with time and age affect both the magnitude of the pension and the ratio between the incomes of pensioners and the working population. Similar considerations apply to the contributions needed to supply fixed benefits. We shall present examples of the magnitude of these effects.

Icelandic pension funds have already had a major impact on the credit market. Their assets at the end of 1998 were 407 billion kr., about 70 per cent of GDP in that year. They will continue to grow faster than the GDP for several decades. Assessment of future size of the funds will be presented.

### **Demography, interest rates and growth**

Assessment of the future development of the Icelandic pension system requires knowledge about the age-distribution of the present population, mortality, fertility and number of widows and widowers at different ages. This is all readily available in the publications of the Statistical Bureau of Iceland (1998). Information about wages and income distribution of public sector employees is from Talnakönnun and Bjarni Gudmundsson (1996). No statistics on disability were used except the amounts actually paid by the funds and the knowledge that it increases with age. This has been used to construct a model that fits the present observed disability compensations. But the assessment of disability compensations is highly uncertain and may change in the future. Apart from the actual physiological reasons for disability, judgement about what constitutes a disability may change and be affected by unemployment, compensations during unemployment and the possibility of taking early retirement. (Bratberg, 1999).

The funds have experienced variable real interest rates. In the high inflation in the seventies they were often negative. As a result of this the real value of bank deposits declined, assets of pension funds were low and domestic capital was scarce. This was reversed in 1979 by widespread indexation and more market-oriented interest rates. They have been higher than abroad since then. Regulation of interest rates was formally abolished during 1984-1987 but there is no longer any shortage of funds for lending.

The benefits that can be paid when premiums are a fixed proportion of wages, or

the premium needed to provide given benefits, are highly dependent upon interest rates. In Iceland prognoses for the future of the pension system have mainly been based on the assumption that the average real interest rate will converge to 3.5 per cent. Considering the observed variations of interest rates here and abroad in past decades this is obviously not a reliable assumption. We must expect that the actual interest rates obtained by the funds on their investments could differ considerably from this value over long periods of time.

Interest rates have been declining in Iceland during the last years. In 1997 the real interest rate on government bonds was about 5.3 per cent but is currently about 4.7. Average real interest rates on indexed bank loans have been about 8.9. We estimate the average interest rate on the assets of the funds as 6.5 per cent in 1997. In view of big and increasing supply of domestic credit, lower interest rates in other countries and free capital movements, interest rates might decrease rapidly in the next few years. In the following numerical examples we shall use two alternative patterns of future real interest rates. Both assume that the interest rate on new assets will fall rapidly towards a fixed value, either 3.5 or 2.5 per cent. Interest rates on the assets of the funds will be higher for a long time because much of them consist of fixed rate long term bonds.

With positive real interest rates premiums from young members are more valuable to the funds than from members who are approaching retirement. Variations of wages with age, and productivity growth affecting all wages, are therefore important factors in the financial position of pension funds. We use information from the Statistical Bureau of Iceland (1998) about the distribution of wages with age and sex. For 1998-1999 we use recent assessment of productivity growth, 2 per cent annually for 2000 and 2001 and a fixed value of 1 or 2 per cent after that.

### **Private sector funds**

We assume that the operation of the funds of employees in private enterprise follows rules issued by a group of funds (SAL-funds) in 1995 and pool them into a single fund in the following calculations. This hypothetical fund operates with fixed premiums of 10 per cent of wages. According to the law this can be increased if actuarial assessment indicates that a fund will not be able to provide the minimum benefits stipulated by the law, but at the moment the 10 per cent rule is dominating.



The normal retirement age is 67 years. The norm of the annual pension at this age is the sum of 1.4 per cent of annual wages over the whole working period, indexed by the consumer price index. If retirement is postponed the pensions are increased by 0.8 per cent for each month up to the age of 70 years. Early retirement is permitted from 65 years, but the pension is reduced by 0.8 per cent per month before 67 years age. These rules are designed so that early retirement or postponement of the retirement age has little effect upon the financial position of the fund.

The total premiums and main benefits of the private sector funds in 1997 were as follows:

|                               | <i>Million kr.</i> |
|-------------------------------|--------------------|
| .....                         |                    |
| Premiums .....                | 15,500             |
| Old age pensions .....        | 3,760              |
| Disability pensions .....     | 2,010              |
| Spouses of deceased members . | 880                |
| Children of deceased members  | 190                |

In a fund with a fixed premium the benefits must be adjusted according to the assets of the fund and expectations of future development of interest rates and wages. Initially the funds did not operate in that way, but paid fixed benefits based on an assumption of 3.5 per cent real interest rates although the actual rates were much lower. As the pensioners had only been members of the savings funds for a short time their accumulated pension rights were low so that this had less impact on the finances of the funds than it would have had in a mature fund. This practice was still in evidence in the SAL-rules from 1995, which stipulated that the old age pension was 1.4 per cent of the wages for which the premium was paid, indexed by the consumer price index.

The present law prescribes that the benefits follow actuarial assessment, which is revised annually. These are to be calculated with regard only to present members of the fund. This implies that benefits are adjusted so that the fund will be emptied when the last pensioner dies if no new members would be accepted, but those present remain and continue to pay their premiums until they reach retirement. We have estimated the benefits in this way for two different values of fixed future interest rates and productivity growth. The values in the table show the calculated benefits as a proportion of the benefits described in the SAL-rules. In the following calculations we have assumed

that the pensions start when the members reach 69 years age, but the finances of the funds is little affected by changes in this.

**Table 1**

Old age pension as a proportion of SAL-norm. No new members enter funds.

| <i>Interest rates</i> | <i>Productivity increase</i> |       |
|-----------------------|------------------------------|-------|
|                       | 1.0%                         | 2.0%  |
| 2.5%                  | 1.004                        | 0.964 |
| 3.5%                  | 1.186                        | 1.143 |

As 3.5 per cent is the present norm for future interest rates the funds have ample assets to provide for their present membership and in fact some of them have already increased the benefits above the SAL-norm.

In reality the funds will receive new members so that these calculations do not represent the correct future prospects of the funds and its members if the premises hold. Suppose that a fund is in a poor state and has lower assets than it would have had if it had operated under the conditions assumed in the future. The benefits are calculated in accordance with this without new members and the fund operates for another year. The prospects of the fund have now improved because of new members whose contributions are being invested under more favourable conditions and the benefits will be adjusted upwards. We have therefore also calculated the benefits, taking into account new members. The benefits are adjusted in such a manner that the fund grows in the distant future at the same rate as production.

**Table 2**

Old age pension as a proportion of SAL-norm. New members included.

| <i>Interest rates</i> | <i>Productivity increase</i> |       |
|-----------------------|------------------------------|-------|
|                       | 1.0%                         | 2.0%  |
| 2.5%                  | 0.866                        | 0.785 |
| 3.5%                  | 1.113                        | 1.046 |

The future benefits are slightly lower when new members are taken into account which implies that the funds have fully recovered from their impecunious state at the end of the seventies. However, the prospects are still good with 3.5 per cent interest rate.

There has been considerable reduction in mortality since the funds were established. Let us repeat the calculations in the table where new members are included, increasing the average age of those who reach 20 years age by 1 year. We achieve this by replacing the mortality of 20 years old by those of 19, 21 years by 20 etc. This leads to the following benefits:

**Table 3**

Old age pension as a proportion of SAL-norm. New members included.  
Mortality above 20 years shifted back one year.

| <i>Interest rates</i> | <i>Productivity increase</i> |       |
|-----------------------|------------------------------|-------|
|                       | 1.0%                         | 2.0%  |
| 2.5%                  | 0.827                        | 0.750 |
| 3.5%                  | 1.067                        | 1.003 |

We have assumed unchanged fertility. Since the funds are essentially designed so that each cohort will save for its pensions and other benefits, changes in fertility would have little effect upon these calculations.

Let us now look at the circumstances of the old age pensioners when they retire at 69 years age. We have calculated the ratio between their pension at that time and the average wages at 40-60 years age at the same time. With a premium that is a fixed proportion of wages this ratio is obviously sensitive to the difference between the rate of interest and productivity growth. We show the results when new members are taken into account:

**Table 4**

Old age pensions at 69 years age as a proportion of average wages at 40-60 years at that time.  
New members included.

| <i>Interest rates</i> | <i>Productivity increase</i> |       |
|-----------------------|------------------------------|-------|
|                       | 1.0%                         | 2.0%  |
| 2.5%                  | 0.483                        | 0.354 |
| 3.5%                  | 0.620                        | 0.472 |

## Public sector funds

The calculations above do not include the pension funds of employees of the state and municipal authorities. They are designed to provide fixed benefits and the contributions of the employer are adjusted accordingly.

The following calculations are only concerned with the new system, established for those who entered public sector service after 1996.

The income distribution of public sector employees differs considerably from the average over all employees. They enter public sector employment on average at 33 years age and their income does not decline in the final years before retirement. Their funds have paid relatively lower disability compensations than the private sector funds. This might at least be partly because public sector employees have had better possibilities of taking early retirement.

The normal retirement age in the new system is 65 years. The annual pension is 1.9 per cent of each annual wage, indexed by the consumer price index. Early retirement is permissible from 60 years, but the pension is reduced by 0.5 per cent for each month before 65 years. Postponement is also possible up to 70 years with an increased pension of 0.5 per cent per month after 65 years. In this system the benefits are fixed, but the premiums, as a percentage of the wages, needed to maintain the fund in equilibrium are presented below:

**Table 5**

Premiums as proportion of wages, needed to keep a fund for public sector workers in equilibrium.

| <i>Interest rates</i> | <i>Productivity increase</i> |       |
|-----------------------|------------------------------|-------|
|                       | 1.0%                         | 2.0%  |
| 2.5%                  | 0.204                        | 0.213 |
| 3.5%                  | 0.161                        | 0.169 |

## Effects of retirement age

Both the private sector funds and the new system for public sector employees allow early retirement and postponement of retirement with prescribed adjustments of benefits. According to the premises in the examples in the previous sections wages increase more than prices. Indexation of pensions by prices therefore implies that after retirement the pensions will become gradually smaller in comparison with the wages of the working population. Let us now look at the pension at 70 years age as a proportion of the average wages of those who are between 40 and 60 years old at that time. We present the pension for the normal retirement age in each system and also examples of postponement and early retirement. The example is calculated for 3.5 per cent interest rate and 1 per cent productivity growth.

**Table 6**

Pension at 70 years age as a proportion of average wages at 40-60 years age at that time for different age of retirement. Real rate of interest 3.5 per cent and annual productivity growth 1 per cent.

|                             | <i>Age of retirement</i> |           |           |           |
|-----------------------------|--------------------------|-----------|-----------|-----------|
|                             | <i>63</i>                | <i>65</i> | <i>67</i> | <i>70</i> |
| <i>Private sector funds</i> | .                        | 0.38      | 0.49      | 0.68      |
| <i>Public sector funds</i>  | 0.39                     | 0.48      | 0.59      | 0.75      |

The average age when employees join the public sector system is 33 years. This implies that they have usually also earned rights to pensions from the private sector funds. If we assume 8 years employment before joining the fund for public sector employers the additional pension would be about 6 per cent from 67 years age.

(The assessment of pensions from the private sector funds is based on averages for the whole population. In view of the statistics collected for the public sector funds it is clear that the membership of the private sector funds is a little younger than the average for the whole population and their prospects accordingly a little better).

The strong participation of people over seventy year's age in the labour market has obviously great effect on the average income of pensioners. But the requirements on the income that the pension funds must provide cannot be reduced in the same measure. The distribution of this income is presumably highly uneven. For individuals it

is hardly predictable to such extent that their participation in the pension system could be reduced accordingly. One might expect that the possibilities of employment for people over 70 years age would be sensitive to the state of the labour market, but in fact their earnings compared to others have been fairly stable since 1990 in spite of great changes in unemployment.

There has been considerable emphasis on the advantages of flexible retirement age in current debate on pensions. Our calculations indicate that with rules leaving the financial position of the pension fund unaffected by changes in the retirement age, the rewards of postponing retirement are very high and so is the cost of early retirement.

In the calculations above the pension of each fund member is proportional to the sum of the premiums which he has paid, indexed by the consumer price index. Each krona paid to the fund at the same time thus earns the same right to pension. But the premium from a 25 years old member will probably remain with the fund for over 40 years and with positive real interest rates contribute more to the capacity of the fund to pay pensions than the premium from a 60 years old member. In view of this it might seem fair that the younger members receive more pension rights for their premiums than the older. However, as membership of the system is mandatory this does not entail serious injustice. The younger members who earn lower pension rights than their premiums could support are entitled to remain with the funds and receive excessive rights for their contributions when they grow older.

At present some funds are planning to, or already have, introduced age-dependent pension rights accretion but others will retain the present system. We do not know which interest rates will prevail in the future so that the proper allocation of age-dependent pension rights is rather uncertain. The simultaneous operation of funds with different systems in this respect will distort the labour market. It will be advantageous for young people to work in occupations where acquired pension rights are age-dependent. Older people will try to leave such occupations and avoid changing from work where pension rights are independent of age.

An employee who changes from a fund with constant accretion of pension rights to one where it is age-dependent at the age of 40 years may acquire less than the statutory minimum rights although each fund provides adequate pension for those who remain there throughout their working life.

## **Individual pension savings**

There will be considerable pension savings outside the two mandatory systems. Some entrepreneurs arrange their whole pension with private pension savings accounts. But many others are also paying into such funds. At present 2 per cent of wages in addition to the mandatory premiums can be paid into private savings accounts with income tax delayed until the pension is received.

People can have various motivations for voluntary pension savings. According to the results presented in Tables 4 and 6 the pension provided by the regular funds will be low in comparison with wages if there is little difference between real interest rates and productivity growth or retirement starts early. The income of married women is less than half of the income of the husbands. The funds provide substantial income for widows and widowers with children, but little after the children have grown up. There are provisions to use part of the mandatory premiums to establish additional pension right for spouses, but in some cases additional savings for this purpose would be well motivated.

## **Size of pension funds**

In the funds of public sector employees benefits have been largely financed by current contributions. But this system was closed to new employees who join a new fully funded system. On average people start work later in these occupations, but the benefits are much larger so the funds will collect very large assets.

The total assets of the pension funds were estimated as 406 billion kr. at the end of 1998, about 69 per cent of GDP that year. But these assets will continue to grow relative to income and other assets in the economy for a long time. In 1998 the assets were distributed as follows:

|  | <i>per cent</i> |
|--|-----------------|
| Loans to government and local authorities  | 10              |
| Official investment funds (mainly housing) | 34              |
| Loans to members                           | 10              |
| Foreign investment (mainly stocks)         | 12              |
| Icelandic stocks                           | 7               |
| Other investments                          | 27              |

Most Icelanders own their flats and houses and the pension funds have been an important source of credit for this purpose. Previously much of their loans went directly to members of the funds. Now most of the financing of housing is channelled through official housing credit funds.

The expansion of the pension funds over the last 20 years has had a great effect on Icelandic capital markets. After a serious shortage of domestic capital there is now competition for good borrowers. A fund which operates according to the rules in our mandatory system grows until the oldest pensioners have been members of the system since they started work, i.e. after about 80 years if they start work at 20 years. The private sector funds have not yet reached this age and the savings fund of the public sector employees is new. The funds will therefore continue to expand in the next decades. This will inevitably lead to a change in the composition of their assets. There is little scope for expansion of loans for housing and some competition between lenders is emerging in this field. Neither the government nor local authorities plan greatly increased borrowing. The Icelandic stock market has expanded greatly in the last few years, but the pension funds have not had a dominating role in this.

The total assets of the private sector funds were 242 billions at the end of 1996, about 50 per cent of the GDP that year. Many of these funds were established in the early seventies so that this system will not reach equilibrium until after year 2040, but they will have reached 95 per cent of their final size (as proportion of GDP) about 2028. The new funds for public sector employees will continue to grow even longer. The assets of these funds in relation to the GDP when the funds have reached equilibrium are presented in Table 7.

|                       |                | <i>Productivity increase</i> |      |
|-----------------------|----------------|------------------------------|------|
|                       |                |                              |      |
| <i>Interest rates</i> | <i>Fund</i>    |                              |      |
|                       |                |                              |      |
| 2.5%                  | Private sector | 1.23                         | 1.02 |
| 2.5%                  | Public sector  | 0.60                         | 0.50 |
| 3.5%                  | Private sector | 1.24                         | 1.06 |
| 3.5%                  | Public sector  | 0.51                         | 0.48 |



The funds of the older system for public sector employees had assets about 76 billions at the end of 1997. They will gradually disappear, as no new members will join this system. The members could in fact choose whether to remain there or join the new system. Our calculations only included new public sector employees, but this does not affect the final size. We have no assessment of future pension savings in individual accounts. They will be smaller than the funds for public sector employees, but not negligible.

At the end of 1998 the total assets of the pension funds were 400 billion kr. According to these calculations the assets would now be of the order of 800-1200 billions if the funds had reached equilibrium.

Investment by the pension funds of a substantial proportion of the capital that they have still to find place for before they reach full size, say 200 billions, in present enterprises would imply an upheaval in the business environment. Expansion of the electricity production and associated energy-intensive industry could absorb capital on a scale that would actually matter to establish our planned pension system. However, this is essentially production of raw materials with highly fluctuating prices, which is not ideal for the purpose of pension funds. This leaves foreign investment which will presumably become a large component in the funds' investments.

## **Discussion**

The ratio between pensions and current wages depends mainly upon the difference between real interest rates and productivity growth. The history of Icelandic interest rates hardly provides much information about what to expect in the future, but Chadha and Dimsdale (1999) present a survey of historical real interest rates in the UK, USA, France and Germany. From 1980-1997 average long term real interest rates were 4.56%. The average value for 1897-1997 was 1.11%.

Annual productivity growth in industrial countries has been about 2 per cent in this century. It is obvious from the results in Table 4 that a premium of 10 per cent of wages is inadequate to provide a satisfactory old age pension if real interest rates are similar or lower than productivity growth. The constraint that the use of energy must be limited will probably reduce productivity growth in the next century. The large supply of capital for lending by the funds will push down domestic interest rates. Iceland

is not the only country with plans of expansion of savings for old age pensions. An independent currency pushes Icelandic interest rates upward.

Most of the present assets of the funds are in the form of indexed domestic bonds so that inflation has not been a major concern in their management. There has been a drive to reduce the application of indexation in Iceland and we expect that a large proportion of future expansion of the funds will be foreign investment. Empirical evidence supports the view that although there is strong relationship between inflation and interest rates, anticipated inflation has less than a unit effect on nominal interest rates. (King and Watson 1997; Koustas and Serletis 1999). The present situation of stability and low inflation in industrial countries is favourable to pension savings. There are little signs of imminent changes in these circumstances, but considering historical evidence we cannot expect them to last forever.

The Icelandic pension system is very cheap. It is designed to provide an exceptionally large proportion of pensions out of savings. There are two main conditions for achieving this. One is to maintain a high retirement age. The other is that most of the assets that will be added to the present funds must be combined with profitable real investment, in addition to the investment required to maintain normal productivity growth. This cannot be achieved without a big surplus on the current account balance, sustained over several decades. There is little sign of this at present.

It might be possible to establish the funds without achieving the goal of providing the designed cheap pension system. This would be manifested in increased lending to domestic borrowers and acquisition of Icelandic property. The pensions would be financed by the additional interest rates, paid by the state, households or local governments, and by rents and profits that would otherwise have accrued to households and firms.

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