



29 June 2006

Mr Brendan Kennedy
Actuarial Adviser
The Pensions Board
28-30 Lower Mount Street
Dublin 2

Dear Brendan

The purpose of this letter is to summarise our work in carrying out a quantitative evaluation of the various systems of pension provision which you have asked us to investigate. In particular, it sets out the scope of our work and summarises the methodology and assumptions we have used to produce our results.

Terms of engagement & scope of our work

As agreed in our exchange of emails (mine dated 28 April, yours dated 2 May), Life Strategies Ltd undertook to carry out the following assignment for the Pensions Board:

1. To produce comparative projections for a number of alternative systems of pensions provision, with those projections to include:
 - Total contributions payable each year (2006-2056), split between mandatory and voluntary contributions and between employer, employee and Exchequer contributions (where relevant)
 - Total net Exchequer costs each year, with the following components of the overall total net Exchequer cost to be separately identified:
 - The cost of Pillar 1 pensions;
 - The cost of public service pensions;
 - PRSI receipts;
 - The net transfers to/from the National Pensions Reserve Fund (NPRF);
 - The net cost of voluntary Pillar 2 provision (i.e. the cost of tax relief on voluntary contributions and tax foregone on investment income/gains, less tax collected from pensions in payment arising from voluntary provision);
 - The cost of tax relief on mandatory pension contributions (where relevant);
 - The cost of Exchequer contributions to mandatory pensions (where relevant);
 - The tax 'foregone' on investment income/gains on the accumulated assets of mandatory arrangements;
 - The tax collected from pensions in payment arising from mandatory provision.
 - Total benefit payments (split between Pillar 1 benefit payments, benefit payments from voluntary Pillar 2 arrangements and benefit payments from mandatory systems).
 - Total Pillar 2 accrued funds (split between accrued funds from voluntary Pillar 2 arrangements and accrued funds from mandatory systems).

2. To provide you with the detailed output for each system (as specified above) in Excel spreadsheet format.
3. To produce a short note summarising the systems, the scenarios, the assumptions and the results. (It was agreed that we were not required to produce a full report to the same level of detail as the report we provided to you last year, in the context of the National Pensions Review, in assessing alternative systems of pension provision¹).

It was agreed that we would investigate a number of alternative pension systems of your choosing. You would provide us with the outline specification of each system. It was also agreed that we would provide you with projections for each system under a number of alternative scenarios.

It was subsequently agreed that five alternative systems (plus the current system) would be investigated and that each system would be investigated under five alternative scenarios. In total, therefore, we would provide you with 30 sets of projections.

The final set of alternative systems chosen by the Pensions Board for investigation was as follows:

- A. Increasing the State Pension to 50% of gross average industrial earnings (GAIE).
- B. Introducing a supplementary scheme with a 15% contribution rate (split evenly between employers, employees and the Exchequer).
- C. Introducing a supplementary scheme with a 15% contribution rate (10% from employees; 5% from Exchequer; zero from employers).
- D. Introducing a supplementary scheme with a 9% contribution rate (split evenly between employers, employees and the Exchequer).
- E. Increasing the State Pension to 40% of GAIE and introducing a supplementary scheme with a 15% contribution rate (split evenly between employers, employees and the Exchequer).

The scenarios to be investigated were:

- The central scenario which we used in our NPR report.
- A higher immigration scenario.
- A zero net migration scenario.
- The central scenario but with 0.5% p.a. higher investment returns.
- The central scenario but with 0.5% p.a. lower investment returns.

More detail on the systems and the scenarios is provided in the Appendix to this letter.

Methodology and assumptions

The methodology and assumptions that we have used are summarised in the Appendix to this letter.

¹ The report in question was entitled "Alternative systems of pension provision: An assessment for the Pensions Board" and was published as Appendix 6 to your National Pensions Review report. It is referred to as "our NPR report" throughout the remainder of this letter and the Appendix.

Results provided

As agreed, we have provided you with the various outputs from our projections as specified above. These were provided in an Excel spreadsheet which was sent to you by e-mail on 16 June. The spreadsheet provides yearly projections, covering the period 2006-2056, for each of the systems under each of the scenarios.

I trust that this provides you with the information you require. Please do not hesitate to contact me if you should need any further information.

Yours sincerely

Michael Culligan
Director

1. Introduction

In this Appendix we provide a high-level summary of the methodology and assumptions employed in our projections of the current Irish pension system and the five alternative systems chosen by the Pensions Board for investigation.

2. Outline of methodology

In broad terms, our approach to carrying out the financial projections of the various pension systems was as follows:

- We first produced demographic & economic projections which formed the basis for our projections of the economy, population and labour force.
- Having gathered the relevant data, we analysed and modelled the features of the pension systems in order to project the required items (contributions, assets, benefits, tax reliefs etc.)
- In doing we looked at the four components of each of the systems – Pillar 1, public service Pillar 2, private sector Pillar 2 and the National Pensions Reserve Fund. For Pillar 1 and public service Pillar 2, we relied heavily on work undertaken by the Department of Social and Family Affairs and the Department of Finance respectively. The key was to ensure harmonisation and consistency between the approaches taken in respect of each component.

3. Assumptions employed in projecting the current system

3.1 Introduction

Clearly, when projecting the future development of any pensions system over a 50 year period, a great many assumptions are required. Chapters 5, 6 and 7 of our NPR report provide a full description of the assumptions we used in our earlier work in assessing the current Irish pension system. We adopted the same assumptions for the purposes of carrying out projections of the current system under this assignment.

The assumptions may be categorised under the following main headings:

- Demographic assumptions
- Economic assumptions
- Labour force & earnings assumptions
- Pension system assumptions

The following sections deal with each of these in turn.

Any changes which we made to those assumptions, and any additional assumptions which we introduced, to reflect the impact of the proposed alternative systems are summarised in section 4 below.

3.2 Demographic assumptions

We generated population projections for the period to 2056 using our own demographic model.

We took the population as measured by the census of 2002 as our starting point (broken down by age and sex). By imposing age and gender-specific assumptions for fertility, mortality and migration on the 2002 baseline, we generated projections for the future population.

Clearly, the choice of assumptions is crucial in determining the path of projected population developments. In order to minimise any controversy surrounding our choice of assumptions, and also in an effort to bring consistency with the work of others, we opted to use assumptions that had already been used by the CSO in producing population projections. Our central population projection, therefore, mirrors one of the CSO's population projections (specifically their M2F2 variant).

In addition to producing population projections on the central set of assumptions for fertility, mortality and migration, we were also required to produce two further sets of population projections. The first of these assumed a relatively high level of net inwards migration (net inflows of 50,000 people p.a. from 2003-2010, falling to 25,000 p.a. in 2020 and remaining at this level thereafter); the second assumed zero net migration. In both cases the fertility and mortality assumptions were unchanged from the central values.

3.3 Economic assumptions

In assessing alternative pension systems it is necessary to be able to express aggregate pension assets, benefits, contributions etc., as percentages of GNP. For this reason, we needed to generate a long-run GNP series (out to 2056). The methodology and assumptions which were used in projecting future GNP are set out in detail in Chapter 5 of our NPR report. In summary, however, the growth in GNP was projected as a function of growth in employment and productivity.

Assumptions for earnings and price inflation were also derived, consistent with the GNP projections. We also made certain assumptions for future investment returns on pension fund assets. Once again, the details are set out in Chapter 5 of our NPR report.

3.4 Labour force & earnings assumptions

In order to project the size of the labour force we made assumptions about the level of labour force participation by gender and age which we then applied to the projected population numbers. In summary, we held the male age-specific participation rates constant at their current levels, whilst for women we assumed a degree of increase in the participation rates in the 35-54 age range. The full details are provided in Chapter 5 of our NPR report.

We also needed to segment the labour force into earnings bands at each age. We did this on the basis of PRSI data for 2003 which was supplied by the Department of Social and Family Affairs (DSFA). We then assumed that, for each age, the proportion of the labour force in each of the earnings bands would remain constant over time. We further assumed that total labour force earnings would inflate in the future at a rate consistent with our economic assumptions.

Further detail on our labour force & earnings assumptions is provided in Chapter 5 of our NPR report.

3.5 Pension system assumptions

The detailed assumptions which we used in assessing the current system are set out in Chapter 7 of our NPR report. The following paragraphs provide a high-level summary of some of the more important assumptions.

Retirement age

We assumed a retirement age of 65 (other than in the case of the State Pension (Contributory) where we assumed 66).

Pillar 1

Current data from the DSFA provided us with information on the proportion of the over-65 population in receipt of various benefits. By making assumptions on how these proportions will move over time, we calculated the number of recipients under the various payment categories out to 2056, using our population projections. The relevant assumptions, which were supplied by the DSFA, are detailed in Table 5.1 in our NPR report.

With regard to payment rates, we assumed that the amount of the State Pension (Contributory) increases to 34% of the previous year's gross average industrial earnings with immediate effect. We then assume that it is indexed from that base in line with earnings inflation and that the same absolute increases (i.e. in monetary amounts) are applied to other payments.

Section 7.3 of our NPR report provides more detail on the Pillar 1 projections.

PRSI receipts

Under our assumptions (about the growth in the labour force, earnings and GNP), PRSI receipts are projected to represent a broadly constant proportion of GNP over time (approximately 4.3% of GNP). We were instructed to count 85% of total PRSI receipts as being 'pension-related' (i.e. 3.7% of GNP). Please see section 7.4 of our NPR report for more detail on this point.

Public service Pillar 2

The Department of Finance provided us with projections of the gross benefit outgo in relation to public service pensions out to 2056. These projections were essentially an updating of the work undertaken by the Commission on Public Service Pensions in 2000 and in most cases the assumptions follow those used by the Commission, with some updating in certain areas.

The projections are on the basis that public service employment numbers remain constant at approximately 280,000 (as measured on a full-time equivalent basis). Section 7.5 of our NPR report provides a detailed description of the approach taken.

Private sector Pillar 2

We gathered data on the current private-sector Pillar 2 system (i.e. membership, contributions, assets, pensioners etc.) from various sources and made assumptions about how each of these items would evolve in the future.

With regard to membership, we assumed that private sector Pillar 2 coverage rates remain constant at their current levels. New entrants to defined benefit schemes are assumed to dry up over the next 20 years (with occupational defined contribution and personal arrangements making up the difference).

Please refer to section 7.7 in our NPR report for more details on our approach to projecting the private sector Pillar 2 system.

National Pensions Reserve Fund

We projected the future size of the NPRF, allowing for contributions of 1% of our projected GNP figures and assuming a real investment return of 4.6% p.a. (see section 6.8.3 of our NPR report for details on the derivation of this rate). Drawdowns were assumed to commence in 2025 (at a low level) with subsequent annual drawdowns increasing in line with the growth in the over-65 population. More detail on our methodology and assumptions for the NPRF projections may be found in section 7.6 of our NPR report.

4. Assumption changes for each of the alternative systems

4.1 Introduction

In our opinion (which we had previously discussed and agreed with the Pensions Board in the context of our NPR report), introducing any alternative pension system would be likely to have an impact on existing pension arrangements and would therefore necessitate a revision of the assumptions relevant to those arrangements.

In addition, some of the alternative systems have features which are not present in the current system and for which additional assumptions are therefore required.

Therefore, in order to model the future evolution of the various alternative pension systems, we had to alter some assumptions and to introduce some new ones.

The potential impact of introducing mandatory pension systems on economic variables such as employment levels, earnings and GNP also needed to be reflected. The Pensions Board commissioned the Economic and Social Research Institute (ESRI) to quantify the macro-economic impacts on the Irish economy of the introduction of the various types of alternative pension systems under examination. The medium-term impacts on employment, earnings and GNP were determined by the ESRI and, based on these, the Pensions Board provided us with the economic adjustments to be incorporated in our financial projections of those alternative systems.

In summary, the assumption changes and the economic adjustments varied from system to system, reflecting the design of the system in question. The following paragraphs summarise the main assumption changes and additional assumptions which were required for each of the alternative systems which we were asked to investigate. The necessary adjustments to the economic variables, as advised by the Pensions Board, are also summarised.

4.2 System A

System A entails a gradual increase over 10 years in the level of the Pillar 1 pension from 34% to 50% of the previous year's gross average industrial earnings. The cost of the increase in this pension is assumed to be met by separately identifiable contributions to be paid by employers and employees. The contribution rate in respect of the additional pension is set at a rate which is calculated to be cost-neutral in the long-term. Other than this, the current system continues unchanged.

This system is very similar to one of systems we examined in our NPR report (termed "Alternative System 5" in that report). The only difference of any significance between the two systems is that System A assumes a gradual stepping up of the Pillar 1 pension over 10 years, whereas Alternative System 5 envisaged an immediate increase to the 50% level.

The methodology and assumptions used to assess System A are, therefore, very similar to those set out in Chapter 13 of our NPR report. They are the same as those used in assessing the current system, with the following exceptions:

- Coverage rates: We assumed that there would be no future new entrants to existing voluntary schemes, except in the highest income band (as everyone will be getting increased Pillar 1 benefits).
- Employee contributions: For defined contribution arrangements, we assumed that voluntary contributions would reduce by the amount of the mandatory contributions. For defined benefit schemes, contributions would reduce to reflect the impact of integration with a higher Pillar 1 benefit.
- Employer contributions: We assumed that employer contributions to defined contribution arrangements would continue at a lower rate, such that the total employer contribution (to existing arrangements and new mandatory arrangements) would be unchanged. For defined benefit schemes, employer contributions would reduce to reflect the impact of integration with a higher Pillar 1 benefit.
- Additional Pillar 1 contribution: We calculated that an additional contribution of 9.2% (payable on all earnings) would be required to fund the increase in the Pillar 1 benefit. This additional contribution was assumed to attract tax & PRSI relief at the contributor's marginal rate.
- Transition costs: In projecting the net Exchequer cost of this system, we assumed that the increase in Pillar 1 benefit would be immediately payable to all existing pensioners as well as to all future retirees. The additional contribution levied in respect of this additional benefit (which has been calculated on the basis of a new entrant funding rate), whilst sufficient to fund the increase in the long term, would not, however, address the additional transitional costs which would result from granting the increase to those already retired (and to a lesser extent to those already in the workforce).
- Tax revenues from increased Pillar 1 pensions: We assumed that the additional Pillar 1 pension (i.e. the extra amount resulting from the increase from 34% to 50%) would give rise to additional income tax revenue at an average tax rate of 20%.
- Public servants: We assumed that the additional Pillar 1 pension would only be payable to those who were integrated with the social insurance system.

In terms of adjusting for the potential economic impact of introducing this system, we were advised by the Pensions Board to make the following adjustments:

- To adjust the projected year 10 GNP figure by multiplying it by 0.99
- To adjust the projected year 10 earnings by multiplying by 0.95
- To adjust the projected year 10 number of employed persons by multiplying by 0.97

For years 1 to 9, we were instructed to apply adjustment factors to be calculated by interpolating between a starting value of 1 and the relevant year 10 factor.

The following adjustments were to be made to the projected year 50 figures:

- Adjust projected year 50 GNP by multiplying by 0.98
- Adjust projected year 50 earnings by multiplying by 0.90
- Adjust projected year 50 employment by multiplying by 0.94

For years 11 to 50, we were instructed to apply adjustment factors to be calculated by interpolating between the relevant year 10 and year 50 factors.

4.3 System B

This system involves the introduction of a mandatory supplementary defined contribution scheme, with contributions from employers, employees and the Exchequer. All workers (including the self-employed) other than those in the public service are covered by the scheme. Each party pays 5% of relevant earnings (15% in total). Relevant earnings are defined as earnings above twice the State Pension (Contributory) up to a maximum of six times the State Pension (Contributory). The mandatory employee contributions do not qualify for tax relief. Additional contributions may be paid into voluntary arrangements if desired. Additional voluntary employer and employee contributions qualify for tax relief as at present. Finally, there is no change to the Pillar 1 pension.

This system is somewhat similar to one of systems we examined in our NPR report (termed "Alternative System 2" in that report). The main difference between the two systems relates to the form of Exchequer support for the mandatory system (the 5% Exchequer contribution did not exist in Alternative System 2; mandatory contributions were assumed to qualify for higher rate tax relief instead). The other difference is that System B is assumed to be introduced over a 10 year period (with a total contribution rate of 1.5% in year 1, 3.0% in year 2 etc.), whereas Alternative System 2 envisaged the immediate introduction of mandatory contributions at the full rate.

The methodology and assumptions used to assess System B are, therefore, very similar to those set out in Chapter 10 of our NPR report. They are the same as those used in assessing the current system, with the following exceptions:

- Coverage rates: We assumed that there would be no future new entrants to existing voluntary schemes, except in the highest income band (as everyone, other than the lowest earners, will be joining the new mandatory arrangements).
- Employee contributions: We assumed that voluntary contributions would reduce by the amount of the mandatory contributions.
- Employer contributions: We assumed that employer contributions would continue at a lower rate, such that the total employer contribution (to existing arrangements and new mandatory arrangements) would be unchanged.
- Tax relief on contributions: Mandatory employer contributions are assumed to qualify for tax relief; mandatory employee contributions do not. Additional voluntary contributions qualify for tax relief as at present.
- Expenses: We assumed a reduction in yield of 0.5% p.a. on mandatory assets (compared to 1.5% p.a. on the assets of voluntary Pillar 2 arrangements).

In terms of adjusting for the potential economic impact of introducing this system, we were advised by the Pensions Board to make the following adjustments:

- To adjust the projected year 10 GNP figure by multiplying it by 0.997
- To adjust the projected year 10 earnings by multiplying by 0.977
- To adjust the projected year 10 number of employed persons by multiplying by 0.988

For years 1 to 9, we were instructed to apply adjustment factors to be calculated by interpolating between a starting value of 1 and the relevant year 10 factor.

For years 11 to 50, we were instructed to use the year 10 adjustment factors throughout.

4.4 System C

This system is very similar to System B except that the split of the 15% mandatory contribution is different – rather than employers and employees paying 5% each, employees pay 10% and employers pay nil. Accordingly, the adjustments to our methodology and assumptions were as for System B above. We were also advised to make the same economic adjustments as for System B.

4.5 System D

This system is also very similar to System B except that the total mandatory contribution is lower (9% in total rather than 15%). The split of the total contribution is the same, however, with an equal three-way division between employers, employees and the Exchequer. Accordingly, the adjustments to our methodology and assumptions were as for System B above.

In terms of adjusting for the potential economic impact of introducing this system, we were advised by the Pensions Board to make the following adjustments:

- To adjust the projected year 10 GNP figure by multiplying it by 0.998
- To adjust the projected year 10 earnings by multiplying by 0.986
- To adjust the projected year 10 number of employed persons by multiplying by 0.993

For years 1 to 9, we were instructed to apply adjustment factors to be calculated by interpolating between a starting value of 1 and the relevant year 10 factor.

For years 11 to 50, we were instructed to use the year 10 adjustment factors throughout.

4.6 System E

System E may be viewed as a hybrid of Systems A and B – it involves the introduction of a mandatory supplementary defined contribution scheme as well as an increase in the level of the Pillar 1 pension. There are some differences, however: under this system the Pillar 1 pension is assumed to increase to 40% of GAIE (rather than 50% in System A). The relevant earnings for the purposes of mandatory contributions are also different – the lower earnings limit for contribution purposes is set at the employee PRSI threshold (approximately €15,000) rather than twice the State Pension (approximately €20,000).

Other than those differences, System E is effectively a combination of Systems A and B and our methodology and assumptions reflect this (see the commentary on Systems A and B above for details).

In terms of adjusting for the potential economic impact of introducing this system, we were advised by the Pensions Board to make the same economic adjustments as for System A.