An Roinn Caiteachais Phoiblí
agus Athchóirithe
Department of Public
Expenditure and Reform

Actuarial Review of Public Service Occupational Pensions in Ireland as required by EU Regulation 549 / 2013

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DISCLAIMER

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The material in this paper is based on membership data provided to the Department of Public Expenditure and Reform (the "Department") as at 31st December 2015. In preparing this material, the Department has relied upon data supplied to us by third parties. Whilst reasonable care has been taken to gauge the reliability of this data, the Department provides no guarantee as to the accuracy or completeness of this data, and the Department accepts no responsibility and will not be liable for any errors or misrepresentations in the data made by any third party.

The actuarial work involved in the preparation of this material complies with the guidelines set out by the Society of Actuaries in Ireland in Actuarial Standards of Practice PA-2, General Actuarial Practice ("ASP PA-2"). For the purposes of ASP PA-2, the "user" of this material is the Department and the Central Statistics Office (the "CSO").

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1. Executive Summary

1.1. Background

1.1.1. An actuarial review of the Accrued-to-Date liability (the "ADL") in respect of current and former public service employees' occupational pension schemes was carried out by the Department of Public Expenditure and Reform (the "Department").

1.1.2. The term "public service" pensions refers to a wide range of different pension arrangements covering the following various groups or sectors of public service employees:

- Civil Service
- Health
- Education
- Security, i.e. Defence Forces, Gardaí and Prison Officers
- Constitutional, Ministerial and Judicial Office holders
- Local Government
- Non-Commercial State Bodies

1.1.3. The ADL (see glossary in Appendix 3 for further detail of this and other terms used throughout this paper) represents the present value of all future expected superannuation benefit payments arising from accrued service to 31st December 2015, including contingent benefits payable to spouses and children of current and former public service employees.

1.1.4. The present ADL review was carried out on behalf of the Central Statistics Office (the "C.S.O.") who are required to compile a supplementary table showing the accrued liabilities of all funded and unfunded Irish pension schemes as part of the National Accounts, under EU Regulation 549 / 2013.

1.1.5. The supplementary table[1] on pension schemes was introduced as a requirement for all EU countries to allow for improved analysis and international comparability of existing pension systems within and between countries under the System of National Accounts (SNA, 2008) and European System of Accounts (ESA, 2010). The completed supplementary table is presented in Appendix 4.

1.2. Accrued-to-Date Liability Valuation

Methodology

1.2.1. The methodology used for the ADL valuation follows that described in the Technical Compilation Guide for Pension Data in the National Accounts produced by Eurostat and the European Central Bank.

1.2.2. The ADL represents the present value of retirement benefits to be paid in the future on the basis of accrued rights of current and former public service employees. The ADL valuation thereby makes no allowance for future service benefits to be accrued by current members or new entrants to the public service, and is known also as a "Closed Group Valuation".

1.2.3. The calculations of the ADL were performed by applying a commonly used method to liability valuation - the Projected Benefit Obligation or ("PBO") methodology. Accordingly, in order to determine the value of the liabilities, projections of the benefits payable in the future were first carried out. These projections were performed on an individual line by line basis which captured the idiosyncrasies in the rules and entitlements by sector (e.g. Civil Service, Health, and Education) and by cohort (i.e. pre 1995, post 1995, post 2004 and post 2013 entrants). The main benefit provisions are outlined in Appendix 3.

1.2.4. The ADL calculated under the PBO approach constitutes the State's obligations to make pension and other benefit payments to current and potential future beneficiaries on and from retirement date. The full range of liabilities valued include the main life pension and gratuity, a spouse's pension, a supplementary pension (where applicable) and death in service benefits including survivors' pensions and gratuities.

[1] *EU Regulation 549 / 2013 Country transmission of data to Eurostat for reference year 2015 is due by 31st December 2017.*

1.2.5. Projected benefit outflows were then capitalised by discounting the projected cash-flows at a suitable discount rate. A wide range of other critical assumptions were used in the calculation of the ADL figure.

Assumptions

1.2.6. The assumptions used in projecting the pension obligations are those prescribed by the Technical Compilation Guide for Pension Data in National Accounts produced by Eurostat and the European Central Bank; with the exception of the mortality assumptions. The mortality tables used reflect the mortality experience of pensioners of occupational pension schemes in Ireland.

1.2.7. The assumptions adopted broadly coincide with those produced by the European Commission for the purposes of the Ageing Report 2018 save for the exception with respect to mortality, as noted above.

1.2.8. A summary of all assumptions adopted for determining the ADL calculation of public service occupational pension obligations for EU reporting purposes is set out below.

Table 1.1: Assumptions for ADL purposes for EU Balance sheet as at 31st December 2015

Discount Rate	5.00% p.a.
Inflation	2.00% p.a.
Real Salary Increases[2]	Labour productivity per hour growth rate for Ireland which broadly translates to an overall rate of 1.45% p.a. in the long term
Mortality Post Retirement	58% ILT 15 (for males) 62% of ILT 15 (for females)
Mortality Post Retirement Improvement Factors	Yes

View of appropriateness of assumptions and methodology

1.2.9. The assumptions and methodology used in projecting the pension obligations are as guided by the Technical Compilation Guide for Pension Data in National Accounts produced by Eurostat and the European Central Bank. There was some discretion[3] as to the choice of mortality tables and those used reflect the mortality experience of pensioners of occupational pension schemes in Ireland. These mortality tables are in common usage for assessing liabilities of occupational pension schemes in Ireland and reflect a longer life expectancy than the population average.

1.2.10. ASP PA-2 (paragraph 2.8) requires the actuary to comment on the overall appropriateness of the methodology and assumptions where these are prescribed by another party. Overall, the assumptions and methodology are considered reasonable for the purposes of the EU Regulation 549 / 2013. However, a discount rate in the range 3.5% to 5.0% p.a. could be considered appropriate for the purposes of the ADL calculation. The discount rate is a material assumption as shown in the sensitivity analysis presented in Section 9.

Data

1.2.11. A large quantity of individual member data on active employees, deferred members and current pensioners in each sector was collated, cleansed and thoroughly analysed by the actuarial unit in the Department in order to carry out the present actuarial review.

1.2.12. The valuations for both the ADL and the cash-flow projection purposes reflect a line by line modelling of all benefits in scope on the per member data received; that is data records in respect of 228,563 active employees and 153,486 pensions in payment. Results obtained from the sample data were scaled downwards to reflect part-time work

[2] *Pension increases for pre 2013 entrants are assumed to be line with salary increases. Post 2013 entrants i.e. Single Scheme members' pension increases are in line with inflation i.e. 2% p.a. The labour productivity growth rates are taken from the projections run by the European Commission and sent to Member States to form the basis of the 2018 Ageing Report.*

[3] *5.3.1 of the Technical Compilation guide states that "if the mortality of pension scheme members is assumed to differ widely from the general population mortality, scheme-specific mortality data should be used if available. This might be the case for e.g. civil servants, who are generally assumed to have a higher life expectancy than the population average."*

patterns, and upwards to reflect incomplete data sets across each sector, where appropriate. Although complete deferred member data was received in respect of the civil service, data for deferred members was otherwise incomplete across a number of sectors. The deferred liability for a number of sectors was inferred from the proportion of deferred to active liability in the Civil Service and the results were sense-checked with relevant contacts in each sector.

1.2.13. Overall, the quality of data obtained varied considerably between sectors and between agencies. Data was not always complete and the main deficiencies were the failure to maintain full employment records in electronic format on former members, full service records as well as details of pensionable allowances. A significant amount of data consolidation, validation, checking and adjustments for gaps / apparent errors was required as part of this exercise.

1.2.14. The main uncertainty with respect to the data has been captured by a sensitivity test in Section 9.

High Level Results of ADL review

1.2.15. The value of the State's ADL in respect of public service retirement benefits for employees, pensioners and former members has been calculated to be **€114.5bn** as at 31st December 2015.

1.2.16. This €114.5bn figure represents the present value of all expected future superannuation payments to current and former staff and their spouses in respect of service to date, plus the liability for all future payments to current pensioners and to their spouses.

1.2.17. Table 1.2 below shows a breakdown of these results across sector.

Table 1.2: Accrued Pension Liability as at 31st December 2015

	Serving Staff	Pensioners	Deferred Members	Total Liability
	€ Bn	**€ Bn**	**€ Bn**	**€ Bn**
Civil Service	8.8	7.3	0.7	**16.8**
Health	12.2	11.9	0.9	**25.0**
Education	17.3	20.3	1.9	**39.5**
Defence Forces	3.4	4.5	0.0	**7.9**
Gardaí	4.1	5.6	0.0	**9.7**
State-Sponsored Bodies	3.4	2.7	0.2	**6.3**
Local Authorities	4.7	4.2	0.4	**9.3**
Total Public Service	**53.9**	**56.5**	**4.1**	**114.5**

1.2.18. The calculation of the €114.5bn ADL figure compares with the previous estimate of €98bn for 2012 which was arrived at by the previous actuary in the Department. Thus, over the three years from 2012 to 2015 the ADL has risen by €16.5bn or by 17%. The primary reasons for the rise in the value of the ADL were the additional accrual of benefits between 2012 and 2015, the unwinding of the discount rate as members age in the public service as well as the partial reversal of pay and pension FEMPI reductions.

1.2.19. In line with previous valuations, the new ADL estimate was calculated under the assumption that future pension increases will be in line with pay parity. For informational purposes, the valuation was also carried out assuming that pension increases will be in line with increases in the Consumer Price Index (CPI) in which case the ADL figure was estimated to be **€97.2bn** as at 31st December 2015.

1.3. **Conclusions and Recommendations:**

1.3.1. As expected, the ADL figure represents a significant liability for the State as it represents the total of all future retirement benefits to be paid to serving and former public servants in respect of service to date. The ADL is based on the rules of the many existing pension schemes within the public service. However, it should be considered in context in the sense that this liability will fall to be paid over approximately the next 70 years and not in any single year. By comparison, the total actual expenditure on public service pensions in 2015 was €3.3bn.

1.3.2. This review has not considered the sustainability of public service occupational pensions as this is not a requirement of the EU Regulation 549 / 2013.

1.3.3. While improvements have been made in the data since the last review, it is advisable that steps are taken at a sectoral level to continue to improve the quality of the data required for the valuation. Further progress could be made in storing the records in an electronic and ideally in a centralised format.

1.3.4. Given the uncertainty associated with the data a sensitivity analysis of the data is presented in Section 9.

1.3.5. An updated actuarial review of public service pension obligations is required to be completed no later than three years after this review, under EU regulation 549 / 2013.

2. Introduction and Background

2.1. Public service employees accrue Defined Benefit (DB) retirement benefits as part of their employment, with the majority of employees in final salary DB pension schemes where pension indexation (i.e. pension increases in retirement) has traditionally been based on pay parity.

2.2. From 1st January 2013, new entrants to the public service join the Single Public Service Pension Scheme (the "Single Scheme") which is a career average revalued earnings scheme with a retirement age in line with the State Pension Age (66 currently, rising to 68 in 2028). Single Scheme members' benefits are indexed in line with increases in the Consumer Price Index.

2.3. Benefits under most public service pension schemes are financed on a pay as you go basis with the annual cost of pensions in payment being met from current revenue. Approximately 155,000 pensioners are in receipt of a pension as at 31st December 2015 while approximately 298,000 serving staff are accruing retirement benefits.

2.4. A public service retirement benefit consists of two primary elements, namely:

- A lump sum at retirement ("gratuity"); and,
- A pension payable for life from retirement date.

2.5. Under EU 549 / 2013 regulation, the CSO will be required to compile a table showing the liabilities of Irish pension schemes as part of our National Accounts. This table will include estimates of the liabilities of all unfunded and funded pension schemes including the liability for public service schemes.

2.6. Transmission of the table to Eurostat is mandatory from 2017 in respect of valuation year 2015, and at three yearly intervals from that date.

2.7. The Department of Public Expenditure and Reform is conducting an actuarial review of the accrued-to-date liability (ADL) in respect of current and former public service employees.

2.8. The effective date of the previous actuarial review of public service occupational pensions was 31st December 2012.

2.9. The term "public service" pensions refers to a range of different pension arrangements covering the following various groups of public service employees:

- Civil Service
- Health
- Education
- Security, i.e. Defence Forces, Gardaí and Prison Officers
- Constitutional, Ministerial and Judicial Office holders
- Local Government
- Non-Commercial State Bodies

2.10. The calculations in this paper have been prepared based on methods and assumptions appropriate to the purposes set out above. My interpretation of what is required to estimate the ADL for EU reporting purposes relies heavily on the Technical Compilation Guide for Pension Data in National Accounts produced by Eurostat and the European Central Bank[4]. The guide contains detail on the methodology and assumptions to be used for the purposes of the ADL calculation.

2.11. Figures required for other purposes should be calculated based on the specific nature of those requirements.

2.12. Appendix 2 contains a glossary explaining some of the technical terms used in the paper.

2.13. Appendix 3 contains a summary of the main provisions of Irish public service pensions.

[4] *Eurostat, European Central Bank. (2011) Technical Compilation Guide for Pension Data in National Accounts. Eurostat Methodologies & Working papers*

3. Scope of this Paper

3.1. This paper has been prepared by the Actuary to the Department of Public Expenditure and Reform (the "Department") and peer reviewed by KPMG in Dublin. Appendix 1 contains a summary of KMPG's peer review of this paper.

3.2. The purpose of this actuarial review is to calculate the accrued-to-date liability (the "**ADL**") for the public service occupational pension obligation as required under EU Regulation 549 / 2013.

3.2.1. **EU Regulation 549 / 2013 Requirements**

- The System of National Accounts (2008 SNA) and European System of Accounts (ESA 2010) allows for a better analysis and international comparability of the pensions systems within and between countries, by introducing a supplementary table on pensions schemes.
- Under EU 549 / 2013 regulation, the CSO will be required to compile a table showing the liabilities of Irish pension schemes as part of our National Accounts. This table will include estimates of the liabilities of all unfunded and funded pension schemes including the liability for public service schemes. Transmission of the table to Eurostat is mandatory from 2017 in respect of valuation year 2015, and at three yearly intervals from that date.
- The table shows pension obligations of the various types of pension schemes using the ADL concept. These pension entitlements or obligations represent the present value of pensions to be paid in the future on the basis of accrued rights. Accrued pension rights are due to already paid contributions by current and former workers and remaining pension entitlements of existing pensioners. No rights accrued after the valuation year, by present or by future workers, are considered.
- The Department's interpretation of what is required to estimate the ADL for EU reporting purposes relies heavily on the Technical Compilation Guide for Pension Data in National Accounts produced by Eurostat and the European Central Bank[5].

3.3. **Scope of the ADL**

3.3.1. Accrued pension rights refer to the pension entitlements already earned by existing pensioners, serving staff and former staff. No rights accrued after the valuation year, by present or by future workers are considered. The ADL provides an estimate of the cost of a hypothetical termination of a pension scheme without reneging on accrued entitlements.

3.3.2. The ADL valuation requires the actuary / relevant technician to make various assumptions which enable an estimation of the amount of the benefits which will become payable in the future. These assumptions fall under two main headings, the "financial assumptions" and the "demographic assumptions" and are examined in more detail in later sections.

3.3.3. The supplementary table covers various types of pensions. The most significant category for the estimation of entitlements is pensions payable from retirement age. Generally, the largest amount of pension expenditure and entitlements is determined by this type of benefit. However, disability, early retirement, widows' pensions and orphans' pensions is also in scope of the "pension benefits" to be included in the new supplementary table of national accounts.

3.4. **Sustainability**

3.4.1. The sustainability of public service pensions was not considered in this review as this is not a requirement of EU Regulation 549 / 2013.

[5] *Eurostat, European Central Bank. (2011) Technical Compilation Guide for Pensions Data in National Accounts. Eurostat Methodologies & Working papers*

4. Recent developments in Public Service Pensions

4.1. In broad terms those who entered the public service before 6th April 1995 are provided with final salary defined benefit (DB) retirement benefits payable at their minimum retirement age of:

4.1.1. 1/80th of pensionable salary[6] at retirement for each year of reckonable service, to a maximum pension of 40/80ths of pensionable salary. 50% of this pension is payable to a surviving spouse or civil partner where the pensioner predeceases his or her spouse/civil partner, and

4.1.2. A gratuity of 3/80ths of pensionable salary at retirement for each year of reckonable service, to a maximum gratuity of 120/80ths of pensionable salary. In effect the gratuity is 3 times the annual pension.

4.2. **Public Service Pension Reform**

4.3.1. Significant public service pension reform measures have been implemented since 1995.

4.3.2. In general those measures collectively serve to:

- generate additional current revenues / savings;
- lock-in substantial long-term savings for the public finances;
- impose progressively-constructed moderation on net pension income of retirees and pension income expectations of serving staff; and
- modernise / streamline the pension provision system.

4.3.3. The principal reform measures over recent years are as follows:

1995

- In 1995, key changes affecting the pension terms of new joiners to public service employment were introduced.

Integration with State Pension entitlement

- The pension entitlement (but not the gratuity) of those who joined the public service after 6th April 1995 is integrated with their State Pension entitlement so that their total pension is made up partly by a public service pension and the balance by their State Pension.

- The integration is accomplished by providing a lower rate of pension accrual, 1/200th instead of 1/80th for each year of reckonable service, for that part of pensionable salary which falls below 3.333333 x the maximum annual rate of State Pension (Contributory) payable to a single person without dependents.

- This switch to integrated pensions in 1995 coincided with:

    - Such employees being required to pay PRSI at the higher Class A rate, instead of the lower 'modified' Class B, C or D rates of PRSI paid by those recruited before 6th April 1995.
    - The introduction of an explicit superannuation contribution for those sectors that had not previously paid such a contribution, e.g. Civil Service, and an increase in the contribution for those who had previously paid a reduced contribution, e.g. Gardaí.
    - A compensating increase in the pay scales for those sectors required to make a Superannuation contribution for the first time (Civil Service) or to pay an increased rate of contribution (Gardaí).

2004

- An increase of 5 years in the minimum pension age, to age 65 years, was implemented for new joiner staff.

2009

- A pension levy, or "Pension-related Deduction" (PRD) imposed on public servants under the financial emergency (FEMPI) legislation. It was estimated at that time as yielding on average 7% of salaries and saving some €950 million annually, and is now, following FEMPI 2015 "amelioration", estimated as yielding

[6] *Pensionable salary is normally the salary payable on the last day of reckonable service plus the average of the best three consecutive years' pensionable emoluments and allowances in the final ten years of service.*

some €700 million annually. While not a pension contribution as such, when this PRD is considered in conjunction with member pension contributions per se, it is seen that current public servants make a significant input to the cost of their occupational pensions.

- As part of the Public Service Stability Agreement (2018-2020), the PRD will be converted into the Additional Superannuation Contribution (ASC), commencing in 2019.

2010

- Public service pay cut (average reduction 7%) introduced – depresses pension and lump sum awards from March 2012 onwards.

2011

- Public service pensions in payment above €12,000 reduced via multi-band (progressively structured) "Public Service Pension Reduction" (PSPR) – average impact of 4% on pensions. [PSPR was subsequently made more severe for higher-paid pensioners under legislated changes in 2013 (FEMPI 2013), before being very significantly eased over the three-year period 2016-2018 under FEMPI 2015].

2013

- The "Single Public Service Pension Scheme" was launched for new-entrant employees across the entire public service. Post 1st January 2013, new entrants to the public service join the Single Public Service Pension Scheme (the "Single Scheme") which is a career average revalued earnings scheme with a retirement age in line with the State Pension Age (66 currently rising to 68 in 2028). Single Scheme members' benefits are indexed with increases in the Consumer Price Index.

2017

- The Government has indicated that the existing Pension Related Deduction (PRD) provided for under the Financial Emergency Measures in the Public Interest Act 2009 (as amended) will be converted into a permanent Additional Superannuation Contribution (ASC). This new contribution will be in addition to the existing superannuation contribution made by public servants currently and will apply to pensionable remuneration only from 1 January 2019.

- The present thresholds, bands and rates in respect of the Pension Related Deduction will be modified in conversion to the Additional Superannuation Contribution (ASC) to reflect the differentiated pension benefits accruing to public servants in accordance with the following tables:

Table 4.1: Public Servants who are Members of pre-2013 Pension Schemes with Standard Accrual Terms, 1st January 2019

Band	Rate
Up to €32,000	Exempt
€32,000 to €60,000	10%
€60,000 plus	10.5%

Table 4.2: Public Servants who are Members of pre-2013 Pension Schemes with Standard Accrual Terms, 1st January 2020

Band	Rate
Up to €34,500	Exempt
€34,500 to €60,000	10%
€60,000 plus	10.5%

Table 4.3: All Public Servants who are Members of the Single Public Service Pension Scheme, 1st January 2019

Band	Rate
Up to €32,000	Exempt
€32,000 to €60,000	6.66%
€60,000 plus	7%

Table 4.4: All Public Servants who are Member of the Single Public Service Pension Scheme, 1st January 2020

Band	Rate
Up to €34,500	Exempt
€34,500 to €60,000	3.33%
€60,000 plus	3.5%

Table 4.5: Public Servants who are Member of pre-2013 Pension Schemes with Fast Accrual Terms (Unchanged), 1st January 2019

Band	Rate
Up to €28,750	Exempt
€28,750 to €60,000	10%
€60,000 plus	10.5%

5. Data used in this Review

5.1. Data Overview

5.1.1. A large amount of information was required to calculate the value of public service pensions including individual member data on active employees, deferred members and current pensioners in each sector.

5.1.2. A data specification template was issued to all public service bodies, requesting the necessary data items for each active and former / retired employees as at 31st December 2015.

5.1.3. The quality and completeness of the membership data received was, on a whole, an improvement on that used in previous actuarial reviews. However, data was not received from all public service bodies and in some cases data received was incomplete or only sample data was available. This was largely due to the difficulties arising from data being held on many different systems in a non-centralised and non-standardised format.

5.1.4. The main gaps in the active employee data received were in respect of membership in the non-commercial state agencies (NCSAs), the local authorities, the voluntary hospitals and third level institutions. There were also gaps in the prior service records of many HSE employees explained further later in this section. Data on deferred members was quite limited overall. A near complete data set was received for pensions in payment across the public service.

5.1.5. Checks on the reasonableness and consistency of the data received were carried out, and some adjustments were required to almost all data files. The results derived from the sample data were scaled up where necessary, as outlined below.

5.1.6. The results of this review are critically dependent on the quality and correctness of the data used. The Department does not accept responsibility for any inaccuracies in the data supplied. However, following the performance of a variety of checks, adjustments and a thorough analysis of the data received, the resulting data was deemed appropriate for use in the 2015 actuarial valuation in respect of the public service.

5.2. Individual Member Data

Active Employees

5.2.1. Active member data was received for 228,563 individual employees from a large number of bodies across the public service. The results from the data received were scaled downwards to allow for part-time (PT) work patterns, with the application of sectoral PT scaling factors derived from the relative headcount number of employees and estimated full-time equivalent (FTE) numbers employed in each sector in Q4 2015 as per the Department's databank numbers supplemented by data from line Departments. An active employee data sample of 203,810 FTEs was thereby inferred from the headcount data received.

5.2.2. The sample of FTEs in the data received was then compared to the total FTE public service numbers employed in Q4 2015 published on the Department's databank, and the results for each sector were scaled up accordingly. See Table 5.1. below:

Table 5.1: Active Data

Sector	Data Headcount	Data FTE	Total FTE	Combined Scaling Factor*(%)
Civil Service	33,517	31,686	36,339	1.08
Defence	9,040	9,031	9,654	1.07
Education	76,646	65,459	96,433	1.26
Health	86,384	75,541	103,884	1.20
Justice	12,505	12,459	13,034	1.04
NCSAs	1,853	1,688	12,225	6.60
Local Authorities	8,618	7,946	26,630	3.09
	228,563	**203,810**	**298,199**	

**A combined scaling factor was used to adjust the results from the headcount data received. The scaling factor applied to each sector reflected part-time work patterns and the grossing up of the sample data as required.*

Pensions in Payment

5.2.3. Data records were received in respect of 153,486 pensions in payment from almost all relevant bodies across the public service.

5.2.4. The data received was compared to the estimated total number of pensions in payment in Q4 2015 published on the Department's databank and the results were scaled up accordingly where required. As can be seen complete datasets were received across nearly all sectors. See Table 5.2 below.

Table 5.2: Pensions in Payment Data

Sector	Data Count	Estimated Total	Scaling Factor (%)
Civil Service	21,767	21,767	1.00
Defence	12,128	12,128	1.00
Education	44,348	44,348	1.00
Health*	39,825	41,019	1.03
Justice	10,226	10,226	1.00
NCSAs	5,487	5,487	1.00
Local Authorities	19,705	19,705	1.00
	153,486	**154,680**	

**Some 1,194 pensioners in payment data records were not returned by the HSE North East.*

Deferred Employees

5.2.5. A complete data set was received in respect of deferred members of the civil service and a sample was received from the NCSA and Education sectors.

5.2.6. Data was not available for former public service employees who remain entitled to a deferred pension in the Health and the Local Authority sectors. The liability in respect of deferred members in these sectors was approximated by applying the proportion of deferred to active liability in the Civil Service across the Health and Local Authority sectors. It is not possible to verify the accuracy or otherwise of this approach. For example, it may be the case that a greater proportion of deferred members exist in the Health Sector than across the Civil Service as a whole given the typical nature of employments in the Health sector. Deferred liabilities are estimated at circa 3.5% of the ADL.

5.2.7. Data was not requested from Gardaí nor the Defence sector as no significant deferred pensioners' liability exists in relation to the Gardaí and the Defence Forces due to the lower minimum retirement age in these sectors.

5.3. **Data Checks**

5.3.1. All public service bodies were asked to provide the required data in a standard template with any comments and/or existing reservations surrounding the data output attached.

5.3.2. Once the data was submitted to the Department, a number of checks were performed on the data which included the following:

- Checks on the critical data items e.g. average age, salaries, and pension amounts, and also members' length of service in the context of their specified type of pension scheme, to ensure these were reasonable.

- A comparison of the total amount of pensions, pay, employees and pensions in payment against the figures published on DPER's databank

5.3.3. Any critical data items which were not properly completed or which contained unexpected entries were queried with the relevant bodies. In some cases, a revised data set was received. In other cases, where errors existed in the data or where data was not available adjustments and estimations were made as set out below.

5.4. **Data Quality**

5.4.1. The quality of the data received varied considerably between sectors and between public service bodies within a sector. The main issues surrounding the data were as follows:

Active Employee Data

- Files contained several blank or invalid fields for critical data items including date of birth, date of entry to pension scheme, type of pension scheme, annual pensionable salary, marital status and gender.
- Several data sets contained blank fields for the full-time equivalent (FTE) multiplier corresponding to employees' work patterns, and where the FTE multiplier was provided, details on the start and end date of the part-time employment pattern were for the most part omitted.
- A lack of data on pensionable allowances, and on added years either purchased by or awarded to employees.
- A lack of clarity surrounding the status of currently serving employees. For example, in some instances, the data input in the salary field was very low and it was often unclear whether this meant that the employee was working on a part-time basis or was no longer employed.
- Start date of employment in the public service was not always available. In many instances, start date reflected the date an employee commenced in a particular sector or body and thus transfer of service across the public service was not captured.

Pensions in Payment Data

- Files contained several blank or invalid fields for critical data items including date of birth, date of retirement, pension commencement date, type of pension scheme and annual pension value.
- Data on contingent dependents' pensions was not captured.

Deferred Employee Data

- A general lack of data and existing information on former public service employees with deferred pensions.

5.4.2. A high level summary of the data received from each sector is set out below:

Civil Service

Data provided for the Civil Service was generally comprehensive and of a reasonable quality. Some adjustments were required in the case of incomplete and invalid data fields for active member and pensioner data albeit these were not very significant. For deferred members, the data was not available in the format requested, with the relevant data having to be extracted from a larger file of all non-serving employees in the Civil Service. It was also necessary to estimate type of pension scheme from date of entry for all deferred members.

Defence

The data on actives and pensions in payment in the defence sector was of high quality. In addition to the requested data items, individual accrued benefits were provided for active members where atypical pension terms applied. Deferred pensioner data was not received but this is not expected to be significant as there are few with deferred pensions within the Defence forces.

Education

The education sector is very fragmented and thus data was received across numerous different files. Data provided for active employees in the primary and secondary cohort was of a high quality. Active data was not received from certain universities and Institutes of Technology, and some adjustments were required in the case of incomplete and invalid data fields for active employees in third level institutions and also for pensions in payment albeit they were not

very significant. Data for deferred members was however only provided in respect of primary and secondary schools and some adjustments were required to the data set received.

Health

The health sector, similar to the Education sector, is quite fragmented with many different data files of varying quality received by the Department. One large data set of reasonable quality was provided in respect of active employees in the Health Service Executive (HSE). For this cohort, type of pension scheme was estimated from start date for all HSE employees and critically, start date of employment reflected the start date an active employee commenced in the HSE body with whom he/she is currently employed and not in the public service. Thus service may be significantly understated due to the lack of collation of individuals' historical data on service, added years, in respect of previous employments in hospitals across more than one region of the HSE. A commentary on the potential impact of such additional service on the liabilities is provided in the data sensitivity analysis in section 9.

Data was received from only one voluntary hospital for active employees. Pensions in payment data was generally of very high quality with only minor adjustments required in the case of incomplete and invalid data fields. Deferred pensioner data was not available for the Health sector.

Justice

Data for active members was received across many different files with an arduous process of extraction and collation of the relevant data being required. The data was of a reasonable quality overall although there were some inconsistencies in data items pertaining to the same employee across data sets. Pensions in payment data was of good quality with only a few adjustments required in the case of incomplete and invalid data fields. Deferred pensioner data was not provided but this is not expected to be significant as there are few deferred Gardaí due to the lower retirement age associated with these members.

Non-Commercial State Agencies (NCSAs)

Data provided by the Non-Commercial State Agencies (NCSAs) in respect of active and former employees was of a high quality. However, the sample size for active and deferred members was small and thus may not be entirely representative of the population in this sector. Some adjustments were required in the case of incomplete and invalid data fields for the pensioner data however these were not significant.

Local Authorities

The data on actives and pensions in payment was of good quality. Adjustments were necessary where incomplete and invalid data items were returned to the Department. Overall these were not very significant. Deferred pensioner data was not available for the Local Authority sector.

5.5. **Data Adjustments**

5.5.1. Several necessary adjustments were made to the data received including the following:

- Where the date of birth or start date fields were blank or invalid, the date was set as the average date among those in the same pension scheme in the relevant sector.
- Data on type of pension scheme was used to estimate employees' normal retirement age and PRSI class in the case of blank entries.
- If type of pension scheme was not provided, the employee was placed in a scheme based on date of entry.
- For type of pension scheme among pensioners, those with blank entries were assumed to have a member's pension, those classified as having a member's or survivor's pension with age less than 22 years at date of valuation were assumed to instead have a children's pension, and those with a children's pension with age greater than or equal to 22 at date of valuation were assumed to have a 'survivor's' pension.
- Where the salary or annual pension field was blank or zero the average salary or pension value in the relevant sector was used, respectively.

- In the case of a blank or invalid entry in the gender field, the employee was given the most common gender in the data file.

- Data on employees with a date of entry post valuation date, and on pensioners with a date of retirement post valuation date, was excluded from analyses.

5.6. Data Summaries

5.6.1. The data provided by public service bodies, following implementation of the adjustments made to improve the quality of the data and/or to estimate missing data is summarised below.

Table 5.3: Summary Data for Active Employees across Pension Schemes of the Public Service

	FTE	Gender Breakdown	Average Age (Years)	Average Service (Years)	Average Basic Pens. Salary (€)
Pre 1995	66,590	34% Male 66% Female	53.3	30.0	54,559
Post 1995	97,994	30% Male 70% Female	45.9	16.0	46,550
Post 2004	96,806	28% Male 72% Female	39.0	8.1	44,330
Single Scheme	36,809	33% Male 67% Female	34.2	1.1	35,337
Total	**298,199**	**31% Male 69% Female**	**43.8**	**14.7**	**46,234**

Table 5.4: Summary Data for Active Employees across Sector

	FTE	Gender Breakdown	Average Age (Years)	Average Service (Years)
Civil Service	36,339	38% Male 62% Female	47.6	20.6
Defence	9,654	94% Male 6% Female	36.2	15.8
Education	96,433	21% Male 79% Female	41.8	13.0
Health	103,884	19% Male 81% Female	45.3	13.1
Justice	13,034	74% Male 26% Female	39.5	17.4
NCSAs	12,225	56% Male 44% Female	46.3	18.0
Local Authorities	26,630	66% Male 34% Female	46.9	17.4
Total	**298,199**	**31% Male 69% Female**	**43.8**	**14.7**

Table 5.5: Summary Data for Pensions in Payment across Sectors of the Public Service

	Count	Gender Breakdown	Average Age (Years)	Average Year of Retirement	Average Pension Amount (€)
Civil Service	21,767	54% Male 46% Female	70.3	2005	18,821
Defence	12,128	86% Male 14% Female	61.0	2003	18,069
Education	44,348	38% Male 62% Female	68.7	2007	24,725
Health	41,019	23% Male 77% Female	68.1	2008	16,483
Justice	10,226	80% Male 20% Female	67.4	2003	28,694
NCSAs	5,487	60% Male 40% Female	70.0	2002	22,958
Local Authorities	19,705	68% Male 32% Female	70.7	2006	12,909
Total	**154,680**	**48% Male 52% Males**	**68.4**	**2006**	**19,908**

Table 5.6: Number of Current and Former Employees across Age Bands

	<35	35-45	45-55	55-65	65-75	75-85	85-95	>95
Current Employees	24.8%	29.6%	28.6%	17.0%	0.0%	0.0%	0.0%	0.0%
Deferreds	9.9%	31.8%	31.8%	23.9%	2.6%	0.0%	0.0%	0.0%
Pensioners	1.0%	0.8%	7.3%	35.3%	35.5%	15.2%	4.5%	0.3%
Total Membership	**16.2%**	**20.7%**	**22.1%**	**23.3%**	**11.4%**	**4.8%**	**1.4%**	**0.1%**

6. Methodology for Accrued-to-Date Liability (ADL) valuation

6.1. The methodology used for the calculation of the ADL follows those prescribed in the Technical Compilation Guide for Pension Data in National Accounts produced by Eurostat and the European Central Bank.

6.2. To maintain consistency across locations, it is recommended that the Projected Benefit Obligation or ("PBO") approach is applied when estimating retirement benefit obligations of defined benefit schemes for government employees. This is one of the most commonly used actuarial valuation techniques for pension valuation purposes and one which is recommended for the purposes of the present ADL calculation in any event.

6.3. Under the PBO approach, it is assumed that pension and gratuity benefits are uprated in line with wage growth, or consumer price inflation where appropriate, and that pensions in payment are indexed in accordance with the relevant indexation rules. For the calculation of the ADL in respect of Irish public service occupational pensions accrued benefits are uprated in line with wage growth pre-retirement and pensions are also uprated in line with wage growth post retirement (save for post 2013 entrants whose benefits are uprated in line with CPI), reflecting the historic discretionary practice of parity pay linkage.

6.4. Accrued-to-date liabilities (ADL) are entitlements or obligations representing the present value of retirement benefits to be paid in the future on the basis of accrued rights. Accrued pension rights arise as a result of pension rights already earned by current and former employees and remaining pension entitlements of existing pensioners. Consideration is not given to rights accrued by present or future employees after the relevant valuation year.

6.5. The ADL is also known as the 'closed group valuation' approach.

6.6. For the estimation of pension liabilities, the EU technical guide notes that it is important to distinguish between pension entitlements accrued by current retirees, and pension entitlements accrued by active members. The former group has its working and contribution period behind it, and is therefore already entitled to full pension benefits. For the estimation of ADL liabilities, it is important to take into account that current active members have not yet accrued all of their future (expected) full pension benefits upon retirement.

6.7. Current pensioners or retirees are entitled to pension benefits on the basis of past accrued pension rights. As outlined above, this group is entitled to full pension benefits. In other words, the benefits they receive in the base year are fully accrued. It is important to note that current pensioners are entitled to pension benefits not just for one year but, in fact, to all future pension payments, usually until they pass away. Most employees are also members of a separate Spouse / Civil Partners and Children's pension scheme which provides a pension of the order of 50% of the employee's retirement pension, plus associated children's pensions.

6.8. The estimation of retirement benefit entitlements for active members closely follows the approach for current pensioners.

6.8.1. However the fact that current employees are not yet entitled to the full pension they would receive after a complete career needs to be taken into account. Therefore their future prospective pension and gratuity payments need to be estimated.

6.8.2. The accrued proportion of the full prospective pension and gratuity under the PBO approach depends on how much of a career has been completed to the balance sheet date. The calculation of the accrued pension = approximated future total prospective pension x T / N where T = Contribution period of the participant until the balance sheet date and N = total expected contribution periods of the participant until retirement.

6.8.3. The projection of the future career starts after the year for which the latest data on past earnings is available i.e. from 2016 onwards.

6.8.4. The pension benefit at the future point of retirement has been calculated for all active employees for whom detailed data have been obtained.

6.9. In order to determine the value of the liabilities, projection of the benefits payable in the future was first carried out. The projections were performed on an individual line by basis which captured the idiosyncrasies in the rules and entitlements by sector (e.g. Civil Service, Health, and Education) and by cohort (pre-1995, post-95, post 2004 entrants and post 2013 entrants).

6.10. The ADL calculated under the PBO approach constitutes the state's obligations to make pension and other benefit payments to current and potential future beneficiaries on and from the valuation date. The full range of liabilities valued included the main life pension and gratuity, a spouse's pension, a supplementary pension (where applicable) and death in service benefits including survivors' pensions and gratuities.

6.11. Projected benefit outflows were then capitalised by discounting the projected cash-flows at a suitable discount rate. A wide range of other assumptions were used in the calculation of the ADL estimate, as discussed in Section 7.

7. Assumptions

7.1. Overview of Assumptions

7.1.1. A number of critical financial and demographic assumptions were required in order to calculate an estimate of the value of retirement benefits to be payable in the future.

7.1.2. The macroeconomic assumptions are those produced by the European Commission for Ireland and intended to be used in the 2018 Ageing Report.

7.1.3. The assumptions used in projecting the pension obligations over a future term are as guided by the Technical Compilation Guide for Pension Data in National Accounts produced by Eurostat and the European Central Bank; with the exception of the mortality assumptions over which there is an element of discretion. The mortality tables used reflect the mortality experience of pensioners of occupational pension schemes in Ireland.

7.1.4. The assumptions should be considered in totality and any one element should not be considered in isolation.

7.1.5. A summary of the primary assumptions adopted for determining the ADL calculation of public service occupational pension obligations for EU reporting purposes is set out below.

Table 7.1: Assumptions for ADL purposes for EU Balance sheet as at 31st December 2015

Discount Rate	5.00% p.a.
Inflation	2.00% p.a.
Real Salary increases[7]	Labour productivity per hour growth rate for Ireland which translates to an overall nominal rate of 1.45% p.a. in the long term
Mortality Post Retirement	58% ILT 15 (for males) 62% of ILT 15 (for females)
Mortality Post Retirement Improvement Factors	with an increase to the annuity value of: ▪ 0.36% p.a. (single males) ▪ 0.30% p.a. (single females) ▪ 0.30% p.a. (married members) for each year between 2014 and the member's year of retirement.

7.2. Financial Assumptions

7.2.1. Discount rate

- A discount rate is used to determine the present value of accrued retirement benefits. Specifically, the real discount rate [i.e. the nominal discount rate less the impact of expected inflation] is critical to the calculation of the value of retirement benefits.

- For government-managed pension schemes, central government debt securities are generally considered as a suitable basis for the discount rate.

- The choice of the discount rate should be based on the following criteria:

    i. In order to obtain a suitable proxy for a risk-free interest rate, it is advisable to base it not on central government debt securities of one single country but on a basket of e.g. European central government debt securities.

[7] *Pension increases for pre 2013 entrants are assumed to be line with salary increases. Post 2013 entrants i.e. Single Scheme members' pension increases are in line with inflation i.e. 2% p.a. The labour productivity growth rates are taken from the projections run by the European Commission and sent to Member States to form the basis of the 2018 Ageing Report.*

ii. The maturity of these debt securities should be similar to that of pension entitlements, i.e. at least 10 years, but preferably longer.

iii. In order to ensure comparability across countries, the same discount rate should be applied to all EU countries and all government-managed pension schemes (including social security pension schemes) at whatever level of government.

iv. A stable discount rate should be applied to avoid the noise resulting from frequent changes.

Discount rate: In line with the above criteria, it is recommended by Eurostat to set the discount rate at 3% per annum in real terms and 5% per annum in nominal terms.

- Where assumptions and methodology are prescribed by another party, ASP PA-2 (paragraph 2.8) requires the actuary to comment on whether, as a Fellow of the Society of Actuaries in Ireland, the willingness to support the prescribed assumptions and methodology. With respect to the discount rate assumption, it is believed that a discount rate in the range 3.5% to 5.0% could be appropriate for the purposes of the calculation of the ADL reflecting current economic conditions. Further detail as to how this range was derived is provided at the end of this Section.

7.2.2. **Inflation**

- For calculating pension entitlements, future cash flows can be projected in nominal or in real terms. If nominal values are projected, both the discount rate and wage growth rate should include future inflation expectations. If the projection is based on real values, inflation expectations are not explicitly considered.

- Generally, for calculating present values, both approaches (nominal and real values) should lead to similar results.

An inflation rate of 2% per annum should be applied. This is in line with the European Central Bank's inflation rate target of just under 2% per annum over the medium term.

7.2.3. **Wage Growth**

- Generally, it is assumed that, over the long term, wages follow labour productivity growth per capita in the economy. In order to reflect heterogeneous growth paths across the EU, it is recommended in the EU technical guide that the wage growth assumptions produced by the European Commission for use in the 2018 Ageing Report — reflecting productivity growth per capita — should if possible be used for the estimation of pension entitlements.

- The labour productivity per hour growth rate for Ireland was taken from the projections run by the European Commission and sent to Member States to form the basis of the 2018 Ageing Report.

Table 7.2: Average wage growth rates per 2018 Ageing Report

	2016	2025	2035	2045	2055	2065
Real	1.80%	1.51%	1.44%	1.54%	1.54%	1.54%
Nominal	3.84%	3.54%	3.47%	3.57%	3.57%	3.57%

- The nominal rates reflect a constant 2% per annum inflation assumption throughout plus the "real" labour productivity growth rates.

7.2.4. **State Pension (Contributory) increases**

- State Pension (Contributory) increases are related to price inflation and Government policy. The State Pension (Contributory) is assumed to increase at the same rate as salary increases i.e. circa 3.45% p.a. nominal in the long term. This is in line with the base case assumption adopted in the most recent Actuarial Review of the Social Insurance Fund 2015. The State pension has broadly been increased such as to represent 33%-34% of average earnings at a given time.

- Allowance has been made for the Supplementary Pension in this review.

- No allowance for the cost of the State Pension (Contributory) has been made in this review as it is assumed that this has been provided for via the Social Insurance Fund / PRSI system and thus costed elsewhere.

7.2.5. Post-retirement pension increases

- Pension increases are a discretionary benefit and require Ministerial consent. Pensions for pre-2013 cohorts have increased at full parity. For the most part, general increases for staff are passed on to pensioners on the same basis. While discretionary, it is assumed that future pension payments will be indexed in line with general salary increases for the main valuation results presented in this review.

- Post-2013 cohorts, i.e. Single Scheme members' benefits are indexed in line with increases in the Consumer Price Index (CPI).

7.2.6. Promotional salary scale

- It is understood that the salary increase assumption adopted which is line with labour productivity growth rates per capita incorporates both general and promotional salary increases.

7.2.7. Expenses

- The cost of administration was not factored into the cost of providing the benefits.

7.3. Demographic Assumptions

7.3.1. Life expectancy / mortality rates

- The assumed life expectancy in retirement is the most critical demographic assumption.

- A standard mortality table recommended by the Society of Actuaries in Ireland was used in the present analysis.

- This mortality table reflected a mortality investigation carried out by the Society of Actuaries in Ireland over 2013 which considered mortality data from large private sector and public sector pension schemes in Ireland.

- The base table used for the post-retirement mortality assumptions reflected this new study with the revised rate of mortality improvement factors reflecting an updated analysis performed by the CSO in 2013 which showed that the rate of mortality improvement had slowed down as compared with previous estimates.

- Mortality is based on 58% of ILT15 for males and 62% of ILT15 for females, with a compounded annual increase from 2014 to the annuity value of:

  i. 0.36% (males with no spouse's pension)
  ii. 0.30% (females with no spouse's pension)
  iii. 0.30% (males with a spouse's pension)
  iv. 0.25% (females with a spouse's pension)

- This mortality basis incorporates an explicit allowance for continuing improvements in mortality rates into the future. That is to say it is expected that members retiring in future years will benefit from progressively improved life expectancies compared to their counterparts retiring this year. This mortality assumption (both the base table and the mortality improvement rates into the future) is in line with that included in the Pensions Authority prescribed guidance in relation to section 34 of the Pensions Act i.e. it is the mortality table used for the purpose of calculation of transfer values.

- The mortality table does not lend itself to direct calculation of life expectancies and thus for the purpose of illustrating life expectancies in this paper reference is made to an underlying table (88% ILT 15(M) / 91% ILT 15(F) with allowance for future improvements in line with CSO projections).

- These improvements in mortality rates can best be illustrated by considering the life expectancies after retirement of average active members. These members have a current average age of 53 and a member of that average age will therefore retire in 2029. At the previous valuation the average age of the active members was 50 and a member of that age would also have been expected to retire in 2029. At that time, under the current projection of mortality, it was anticipated that a new retiree would then enjoy a longer life expectancy as set out in the following table.

Table 7.3: Life Expectancies with allowance for future mortality improvements

Gender	Life expectancy in 2029 2015 Assumption	Life expectancy in 2029 2012 Assumption
Male	22.6 years	23.4 years
Female	24.9 years	25.7 years

As mortality changes have proven particularly difficult to predict, it is intended to keep these assumptions under review at future valuations.

7.3.2. **Pre-retirement mortality**

- Mortality pre-retirement is assumed to be in line with 62% of PNML00 for male lives and 70% of PNFL00 for female lives.

7.3.3. **Assumed retirement ages**

Table 7.4: Table of Normal Retirement Ages assumed in ADL

	Pre 1995	Post 1995	Post 2004	Post 2013
Civil Service	63	63	65	66-68
Defence	50	50	50	50
Education	63	63	65	66-68
Health	63	63	65	66-68
Justice	55	55	55	55
NCSAs	63	63	65	66-68
Local Authorities	63	63	65	66-68

7.3.4. **Proportion married**

- 90% of members are assumed to be married at retirement.

7.3.5. **Death in service benefits / ill-health benefits**

- Death in service benefits have been valued. An ill-health loading of 5% has been applied to the ADL.

7.3.6. **Staff turnover**

- No allowance has been made for staff turnover albeit this is not expected to have a significant impact on the results. Pension increases in deferment are a discretionary benefit requiring Ministerial consent. Deferred members benefits have traditionally been increased in line with wage growth.

7.3.7. **Age difference**

- Males are assumed to be three years older than females.

7.3.8. **Early retirement allowance**

- No allowance has been made for early retirement. This is not expected to have a significant impact on the results given that (broadly) cost neutral early retirement is permitted in the public service schemes.

7.4. **Sensitivity to Assumptions**

7.4.1. The financial assumptions are generally considered to have a more significant effect on the valuation results than the demographic assumptions. Of these assumptions, those made in relation to the discount rate and inflationary type increases (such as in respect of salary and pensions in payment increases) are the most significant financially. Section 9 of this paper sets out sensitivity analysis of the results.

7.5. **Overall appropriateness of assumptions**

7.5.1. As mentioned earlier in this section, the assumptions used in projecting the pension obligations are as guided by the Technical Compilation Guide for Pension Data in National Accounts produced by Eurostat and the European Central Bank. There was some discretion[8] as to the choice of mortality tables and those used reflect the mortality experience of pensioners of occupational pension schemes in Ireland. These mortality tables are in common usage for assessing liabilities of occupational pension schemes in Ireland and reflect a lower life expectancy than the population average.

7.5.2. ASP PA-2 (paragraph 2.8) requires commentary on the overall appropriateness of the methodology and assumptions where these are prescribed by another party. Overall the assumptions and methodology are considered to be reasonable. A discount rate in the range 3.5% to 5.0% could be considered appropriate for the purposes of the ADL calculation reflecting the approach described below. The discount rate is a material assumption as shown in Section 9 – sensitivity analysis.

7.6. **Appropriateness of Discount Rate**

7.6.1. The value of liabilities at a future date will depend on the prevailing yields on long dated bonds at the effective date of that valuation. In accordance with related professional guidance issued by the Society of Actuaries in Ireland, Actuarial Standard of Practice Pen-4, it may be appropriate for an actuary to assume that different yields will apply in future, provided that the alternative rate(s) can be justified either by examination of the relevant yield curves or by reference to historic norms.

7.6.2. For the purposes of deriving a potential range of suitable discount rates, it was assumed at one end of the range that no yield reversion will take place over time and that expected long term yields on Eurozone Government AAA bonds remain at 1.56% p.a. At the other end of the range a yield revision of 0.75% was allowed for such that the overall yield on bonds would be 2.31%.

7.6.3. The discount rate is a critical assumption for funding purposes and interlinked with investment strategy. The baseline is a 100% bond / LDI investment strategy (the 'least risk' portfolio) which gives a discount rate in the range of 1.56% p.a. – 2.31% p.a.

7.6.4. Trustees in funded schemes are often amenable to holding a sizeable proportion of return seeking /growth assets particularly for schemes with long maturity and strong employer covenants. The reasons cited for holding return seeking / growth assets include the long term nature of the promise and confidence in the employer covenant. Many actuaries use a dual discount rate model which reflects a pre-retirement discount rate that reflects initial investment strategy (with a significant allocation to return seeking assets) and a lower post retirement discount rate reflecting anticipated increase in risk reducing / matching assets as schemes mature / members retire.

7.6.5. In relation to the setting of the equity risk premium ("ERP"), the Finance and Investment Committee of the Society of Actuaries have provided the following guidance:

"The actuary may decide to use an ERP to allow for the additional expected return from taking on the relatively higher risk of the equity market. To help inform the setting of the equity ERP, the Society has prepared a database of historical economic data. However, it is not clear yet which specific parts of it have the most value and credibility and, therefore, how the database should be used for the purpose of determining a reasonable ERP assumption. Using different historical data—either different stock markets

[8] 5.3.1 of the technical compilation guide states that "if the mortality of pension scheme members is assumed to differ widely from the general population mortality, scheme-specific mortality data should be used if available. This might be the case for e.g. civil servants, who are generally assumed to have a higher life expectancy than the population average."

or different periods—produces significantly different estimates for the ERP, and there appears to be no fundamental reason to choose a particular market or period over any other. Using different assumptions or analysis would also lead to different ERPs. This means there is considerable uncertainty about what an appropriate ERP is. Because of this, we think it sensible to recommend a range for the ERP rather than a central estimate."

7.6.6. In keeping with the above, an ERP in the range of 3.0% p.a. - 4.0% p.a. could be considered reasonable.

7.6.7. Using a long term investment strategy of 67% equities and 33% long dated euro area government bonds assuming no yield revision coupled with a 3% ERP an assumed investment return of 4.56% p.a. on equities and 1.56% p.a. on bonds would be derived resulting in a long term discount rate of 3.6% p.a..

7.6.8. Alternatively assuming 0.75% yield revision coupled with a 4% ERP an assumed investment return of 6.31% p.a. on equities and 2.31% p.a. on bonds would be derived resulting in a long term discount rate of 5.0% p.a.

7.6.9. Overall, plausible discount rates in the range 3.5% - 5.0% would be calculated based on economic conditions prevailing at balance sheet date.

7.6.10. A higher discount rate pre-retirement and a lower discount rate post-retirement could alternatively have been used here; however, a single discount rate is commented on for simplicity.

8. Accrued to Date Liability Valuation Results

8.1. The Accrued to Date Liability ("**ADL**") represents the present value of all expected future superannuation payments to current retirees and their spouses, plus the liability for all future payments to current and preserved pensioners and to their spouses. The payments arising from these liabilities will be spread over the next 75 years or more. The figure uses the salary points of employees at the valuation date and allows for projected increases to salaries between the balance sheet date and the year of assumed retirement.

8.2. The value of the State's ADL in respect of public service retirement benefits for staff, pensioners and former members has been calculated to be **€114.5bn** as at 31st December 2015.

8.3. Table 8.1 below shows a breakdown of these results by sector.

Table 8.1: ADL by sector as at 31st December 2015

	Serving Staff	Pensioners	Deferred Members	Total Liability
	€ Bn	**€ Bn**	**€ Bn**	**€ Bn**
Civil Service	8.8	7.3	0.7	**16.8**
Health	12.2	11.9	0.9	**25.0**
Education	17.3	20.3	1.9	**39.5**
Defence Forces	3.4	4.5	0.0	**7.9**
Gardaí	4.1	5.6	0.0	**9.7**
State-Sponsored Bodies	3.4	2.7	0.2	**6.3**
Local Authorities	4.7	4.2	0.4	**9.3**
Total Public Service	**53.9**	**56.5**	**4.1**	**114.5**

Notes:

- The ADL makes no allowance for the cost of paying the State Pension (Contributory) to public service employees (where eligible).
- The ADL assumes that pensions in payment are indexed in line with pay-parity. Similarly future pensions in payment of those not yet retired are assumed to be indexed in line with pay-parity save for those members of the Single Scheme whose pensions are projected to increase in line with CPI reflecting the terms of that scheme. This approach to indexing pensions in line with pay-parity is consistent with previous reviews.
- The ADL makes no allowance for the commercial semi-state sector.

8.4. This compares with the previous estimate of €98bn which was calculated by the Department of Public Expenditure and Reform in 2012. Therefore, over the three years from 2012 to 2015 the ADL has risen by €17bn or by 17%.

8.5. The primary reasons for the rise in the value of the ADL are the additional accrual of benefits between 2012 and 2015, the unwinding of the discount rate as members age in the public service as well as the partial reversal of pay and pension FEMPI reductions.

8.6. Table 8.2 below shows an estimated breakdown of the ADL according to scheme.

Table 8.2: ADL by Scheme as at 31st December 2015

	Pre 2004 Joiners	Post 2004 Joiners	Single Scheme	Total Public Service
	€ Bn	**€ Bn**	**€ Bn**	**€ Bn**
Serving Staff	47.7	5.9	0.2	**53.8**
Pensioners	55.6	1.0	0.0	**56.6**
Deferred Members	3.6	0.5	0.0	**4.1**
Total Public Service	**106.9**	**7.4**	**0.2**	**114.5**

8.7. In the long term, the introduction of the Single Public Service Pension Scheme (the "Single Scheme") on 1st January 2013 is also of relevance when considering future pension costs. While the Single Scheme does not have any material effect on the ADL figure (c €0.2bn), it is expected to reduce spending on retirement benefits by in excess of 35% over the long

term. This expected cost saving can be attributed to the later retirement age, career average benefit accrual and post-retirement indexation to CPI.

8.8. The pension increase assumption adopted for the purpose of the ADL valuation can have a large effect on the final figure. Historically, public service pension increases have been on the basis of pay parity, i.e. in line with the pay of the grade from which the public servant retired. Section 47 of the Public Service Pensions (Single Scheme and Other Provisions) Act 2012 permits the government to pay all public service pension increases in line with increases in the Consumer Price Index.

8.9. In light of the above, an alternative ADL figure was also estimated; this was calculated assuming pension increases are in line with CPI in all cases and the figure arrived at was €97bn, i.e. a reduction of over €18bn.

Table 8.3: ADL by Sector as at 31st December 2015 [Pension in Payment increases in line with increases in CPI]

	Serving Staff	Pensioners	Deferred Members	Total Liability
	€ Bn	**€ Bn**	**€ Bn**	**€ Bn**
Civil Service	7.5	6.2	0.5	**14.2**
Health	10.5	10.2	0.6	**21.3**
Education	14.8	17.5	1.5	**33.8**
Defence Forces	2.8	3.7	0.0	**6.5**
Gardaí	3.4	4.7	0.0	**8.1**
State-Sponsored Bodies	2.9	2.4	0.2	**5.5**
Local Authorities	4.1	3.6	0.1	**7.8**
Total Public Service	**46.0**	**48.3**	**2.9**	**97.2**

8.10. However, the Public Service Stability Agreement 2018 – 2020 (PSSA) includes the following:

- *"The Government, in acknowledgement of the increase in pension contributions required of public servants in respect of the Additional Superannuation Contribution (ASC), have committed not to extend the application of Section 40 of the Public Service Pensions (Single Scheme and Other Provisions) Act 2012 for pre-existing public service pensions for the duration of this Agreement."*

- The PSSA applies for the period 1 January 2018 to 31 December 2020 and thus the basis on which pensions are increased could only potentially change with effect from 1 January 2021 onward.

9. Sensitivity Analysis

9.1. Sensitivity of valuation results to assumptions

9.1.1. A number of critical assumptions were made in respect of the calculations presented in this paper and these are outlined in section 7. Any variation in these assumptions can have a significant impact on the valuation results. Certain parameters were stressed as part of a sensitivity analysis to allow an understanding of the main areas of inherent subjectivity and judgement in the calculations as a result of the uncertainty surrounding the assumptions underpinning long-run projections.

9.1.2. The sensitivities of accrued-to-date liabilities are shown with the intention of illustrating a range of reasonable outcomes that may have been determined at the present valuation. They are not intended to illustrate a possible range of variation in assumptions that might be considered at future valuations and in light of future experience.

9.1.3. Sensitivity analysis was carried out in relation to specified changes in the discount rate, normal retirement age, life expectancy, general salary inflation and hence post retirement indexation, as set out below.

9.2. Discount Rate Sensitivity

9.2.1. Table 9.1 illustrates the impact on the value of the ADL results by testing its sensitivity to a change of +/- 1% p.a**.** in the discount rate. For the purpose of this sensitivity test, all other parameters were assumed to remain unchanged.

Table 9.1: Accrued Pension Liability as at 31st December 2015

Discount Rate	**4.0% p.a.**	**ADL Results**	**6.0% p.a.**
	€ Bn	€ Bn	€ Bn
Civil Service	19.9	16.8	14.3
Health	29.8	25.0	21.3
Education	47.4	39.5	33.8
Defence Forces	9.4	7.9	6.6
Gardaí	11.5	9.7	8.1
State-Sponsored Bodies	7.5	6.3	5.5
Local Authorities	11.0	9.3	7.9
Total Public Service	**136.5**	**114.5**	**97.5**

9.3. Mortality Sensitivity

9.3.1. Table 9.2 below illustrates the impact on the value of the ADL results by sensitivity testing the mortality assumptions such that the resulting life expectancies change by +/- 1 year. For the purpose of this sensitivity test, all other parameters were assumed to remain unchanged.

Table 9.2: Accrued Pension Liability as at 31st December 2015

Mortality – Life Expectancy	**Life Expectancy decreases by 1 year**	**ADL Results**	**Life Expectancy increases by 1 year**
	€ Bn	€ Bn	€ Bn
Civil Service	16.1	16.8	17.4
Health	24.0	25.0	26.0
Education	38.0	39.5	41.1
Defence Forces	7.6	7.9	8.2
Gardaí	9.3	9.7	10.1
State-Sponsored Bodies	6.1	6.3	6.6
Local Authorities	8.9	9.3	9.7
Total Public Service	**109.9**	**114.5**	**119.1**

9.4. **Pensionable Remuneration Sensitivity**

9.4.1. Table 9.3 below illustrates how a change in the salary inflation assumption of +/- 1% p.a. would likely impact on the value of the ADL results**.** The results presented also reflect the impact of pension in payment indexation changes corresponding to the changes made to salary inflation. For the purpose of this sensitivity test, all other parameters were assumed to remain unchanged.

Table 9.3: Accrued Pension Liability as at 31st December 2015

Salary & Pension Increases	-1% p.a.	ADL Results	+1% p.a.
	€ Bn	€ Bn	€ Bn
Civil Service	14.3	16.8	19.8
Health	21.3	25.0	29.7
Education	33.8	39.5	47.3
Defence Forces	6.7	7.9	9.4
Gardaí	8.3	9.7	11.5
State-Sponsored Bodies	5.5	6.3	7.5
Local Authorities	7.9	9.3	11.0
Total Public Service	**97.8**	**114.5**	**136.3**

9.5. **Normal Retirement Age Sensitivity**

9.5.1. The sensitivity of the ADL value to a change in the assumed retirement age of all active employees was also analysed.

9.5.2. Specifically, the retirement age was changed such that all employees were assumed to retire at their minimum NRA. Thus those members who joined before 1st April 2004 in Health, the Civil Service, Local Authorities, NCSAs and third level institutions were assumed to retire at age 60, those in the primary and secondary school sector were assumed to retire at age 55. No change was made in relation to the security services.

9.5.3. Results of this analysis revealed an increase of €8 billion.

9.6. **Sensitivity of valuation results to data input**

9.6.1. The quality and completeness of the data used were analysed in Section 5 of this paper. The data was deemed appropriate for the present purpose and thus there is reasonably high confidence in the figure calculated for the value of accrued liabilities of €114.5 billion.

9.6.2. However, given that transfer of service was for the most part not captured in the Health sector, the results of the accrued liability in respect of active employees in this sector were sensitivity tested by assuming the maximum potential underestimation of service in all cases. All employees with a date of entry post their 25th birthday were given a revised date of entry of their 25th birthday, resulting in a calculated additional liability of approximately €5 billion.

9.6.3. In light of the incompleteness of data samples and the adjustments made to the data in its entirety, it is expected that the actual value falls within a range of -5% and +10% of the derived ADL figure of €114.5 billion, thus within the range of €109 billion to €126 billion.

10. Conclusions and Recommendations

10.1. The results of the actuarial review show a significant increase in the ADL since 2012.

10.2. As expected the ADL figure represents a significant liability for the State as it represents the total of all future retirement benefits to be paid to serving and former public servants in respect of service to date. The ADL is based on the rules of the many existing pension schemes within the public service. However, it should be considered in context in the sense that this liability will fall to be paid over approximately the next 70 years and not in any single year. By comparison, the total actual expenditure on public service pensions in 2015 was around €3.3bn.

10.3. This review has not considered the sustainability of public service pensions.

10.4. While improvements have been made in the data since the last review, it is advisable that steps are taken at a sectoral level to continue to improve the quality of the data required for the valuation. Further progress could be made in storing the records in an electronic and ideally in a centralised format.

10.5. A data sensitivity analysis was presented in this review in light of the uncertainty associated with the data.

10.6. An updated actuarial review of public service pension obligations is required to be completed no later than three years after this review, under EU regulation.

11. Appendix 1 - Summary of Peer Review Findings

The peer review exercise was undertaken by Joanne Roche FSAI and Brian Morrissey FSAI, KPMG.

The **Stage 1 review** undertaken in late October and early November 2017 comprised the following activities:

- Discussions with the Actuary on approach to data, methodologies, and assumptions reflecting the Technical Compilation Guide for Pension Data in National Accounts produced by Eurostat and the European Central Bank;
- A review of the proposed approach to data (including allowances for gaps, grossing up), methodology, and assumptions as described in the initial draft of the paper;

The **Stage 2 review over** a 2 - 3 week period in November reflected:

- A review of the models which included;
    - discussions with the Actuary around the appropriateness of inputs used reflecting the various idiosyncrasies in benefit structure across sectors and cohorts;
    - independent checking of the ADL calculations performed for each vocational sector and each cohort in order to ensure the models used are robust and that all of the calculations are materially accurate.
- Review of a number of drafts of the paper;
- Discussions with the Actuary in relation to aspects of the review including the reasonableness of the results;
- Discussion around the approach to illustrating data sensitivities particularly in the Health sector.

On the basis of the approach set out above, the peer reviewers have concluded that in their opinion:

- The paper of 30 November 2017 is comprehensive and provides sufficient detail to allow an informed reader to:
    - readily review and understand the results emerging;
    - understand the work performed to generate these results including methodologies and assumptions employed, key data inputs used and the main judgments made;
- The extent to which the Actuary has employed judgement in selecting a number of the key assumptions is addressed in Section 7 of the paper and further illustrated as part of the sensitivities shown in Section 9. The sensitivities illustrated (discount rate, life expectancies, salary and pension increase, normal retirement age, illustration of sensitivity to key data) are sufficiently broad to capture the main areas of inherent subjectivity and judgement in the calculations;
- The methodology that has been used is appropriate. Specifically the actuarial review is based on a commonly accepted actuarial methodology known as the “Projected Benefit Obligation” method which is appropriate for valuation purposes and the methodology recommended for use in the Technical Compilation Guide for Pension Data in National Accounts produced by Eurostat and the European Central Bank[9].
- The actuarial basis and assumptions used are in line with the recommendations made in the Technical Compilation Guide for Pension Data in National Accounts produced by Eurostat and the European Central Bank save for the mortality assumption over which the actuary has some discretion;

[9] *Eurostat, European Central Bank. (2011) Technical Compilation Guide for Pensions Data in National Accounts. Eurostat Methodologies & Working papers*

- The post retirement mortality tables used are in line with those included in the Pensions Authority prescribed guidance in relation to section 34 of the Pensions Act i.e. it is the mortality table used for the purpose of the calculation of transfer values. These tables are in common usage by occupational pension schemes in Ireland for funding and assessment of accrued liability purposes and in our view reasonable for the purposes of this review;
- The assumptions guided are reasonable and in line with a reasonable range that the actuary would otherwise have recommended in any event save for the observation in relation to the discount rate;
- The actuary's assessment that in the absence of guidance an alternative discount rate in the range 3.5% to 5.0% would have been recommended seems reasonable. Noted that the discount rate is a material assumption with a 1% reduction in discount rate adding circa 19% to the ADL.
- No issues arose from independent checking of the calculations. We noted that the modelling was performed to a high standard reflecting granular modelling of all retirement benefits and thorough consideration of data quality issues arising with reasonable adjustments made to allow for gaps;
- Substantive comments made by us relating to the technical content of the earlier drafts were reflected in the final paper of 30 November 2017.

Suggestions for future assessments of the ADL

1. Collation and centralisation of data

We fully agree with the actuary's recommendation in the paper around further steps being taken at a sectoral level to continue to improve the quality of the data required for the valuation. Further progress could be made in storing the records in an electronic and ideally in a centralised format.

We note that pensionable service captured for active employees in the health sector in particular may be significantly understated due to the absence of a centralised system for collation of individuals' historical data on service, added years, etc. in respect of employments in hospitals across more than one region. This arises because the collation exercise on individual member data is not usually performed until the point of retirement. At that stage paper files need to be examined to allow retirement calculations be performed and associated benefits paid.

2 Assessment of experience around ages at which individuals normally retire

We recommend further analysis on the appropriateness of the assumed "normal" retirement ages from various sectors / cohorts based on actual experience observed over the period to the next ADL assessment.

3 Full analysis of movement in ADL between periods

Given that this is the first formal assessment of ADL intended to form part of the National accounts, we would anticipate that future assessments of the ADL will include attribution analysis of key drivers in the movements in the figures between periods.

Reliances and Limitations

The full peer review letter is delivered subject to the agreed written terms of KPMG's engagement. Any party who chooses to rely on our letter (or any part of it) will do so at its own risk. To the fullest extent permitted by law, KPMG will accept no responsibility or liability in respect of our letter to any other party.

Judgements as to the conclusions drawn in the peer review summary findings and paper should be made only after studying both the findings and the paper in their entirety. We assume that users of the peer review summary findings and paper will seek explanation and / or amplification of any parts which are not clear.

12. Appendix 2 - Glossary

12.1. **Accrual (rate)**
The rate at which pension benefit is built up as pensionable service is completed in a defined benefit scheme. Often expressed as a fraction of pensionable salary e.g. 1/80th towards pension and 3/80t^{hs} towards gratuity for each year of service.

12.2. **Accrued to date liability (ADL)**
The ADL valuation is also known as a 'Closed Group Valuation' as there is no allowance for future service benefits to be accrued in respect of current members or new entrants to the public service. Accrued pension rights refer to pension rights already earned by current employees and remaining pension entitlements of existing pensioners. No rights accrued after the current year — by present or by future workers — are considered.

12.3. **Active member**
A member of a pension scheme who is in "reckonable service", i.e. currently in the employment to which the scheme relates, and who is included in the scheme for a pension benefit.

12.4. **Actuarial assumptions**
In a defined benefit scheme the set of assumptions made by the actuary as to rates of investment return, inflation, increase in earnings, mortality, etc. which form the basis of an actuarial valuation or other actuarial calculation.

12.5. **Actuarial value**
Actuarial value is a mathematical calculation, often of the financial condition of a pension plan. It includes the computation of the present monetary value of benefits payable to present members, and the present monetary value of future employer and employee contributions, factoring in mortality among active and retired members and also the rates of disability, retirement, withdrawal from service, salary and interest. It is the value of cash, investments, and other property belonging to a pension plan, as used by the actuary for the purpose of an actuarial valuation. The actuarial value of assets may represent an average value over time, and normally differs from the amount reported in the financial statements, which is a measurement as of the date of the statement of net assets.

12.6. **Actuary**
The individual appointed by the trustees of an occupational pension scheme to carry out valuations and advise on funding matters.

12.7. **Added years**
A provision of some defined benefit schemes for building extra pensionable service in return for additional contributions.

12.8. **"Career average scheme" (also known as average earnings scheme)**
A defined benefit scheme where pensionable salary is defined by the average of your earnings throughout your career rather than the final year's earnings.

12.9. **Closed scheme**
A pension scheme that does not accept new members.

12.10. **Co-ordination**
A term used in the public sector to indicate that the benefits payable under the social welfare system are taken into account in the occupational pension scheme. Co-ordination is generally required as a matter of policy where social welfare retirement benefits are payable. However, the calculation of the gratuity payable on retirement or death is not normally affected by co-ordination. See also "integration".

12.11. **Defined benefit scheme (also known as "final salary scheme")**
Defined benefit schemes provide members with retirement and death benefits based on formulae set out in the rules of the scheme. Benefits are often based on a member's salary close to retirement and on his or her pensionable service. For this reason these schemes are sometimes known as "final salary" schemes.

12.12. **Early retirement**
The retirement of a member, with immediate retirement benefit, before normal pensionable age. The benefit may be reduced because of early payment. See also "ill-health early retirement".

12.13. **Escalation**
A system whereby pensions in payment and/or preserved benefits are increased regularly at a fixed or variable percentage rate. The percentage increase applied may be limited to the increase in a specified index. Escalation may be promised and paid for in advance of, or may be granted on a discretionary basis after the pension has commenced.

12.14. **Funding method**
The approach used by an actuary in an actuarial valuation. A variety of methods can be used, but whatever method is employed should be adequately described in the valuation report.

12.15. **Gratuity**
A tax free lump sum payment, payable at pension age or on death, which may be subject to abatement.

12.16. **Indexation**
A system whereby pensions in payment and/or preserved benefits are increased automatically at regular intervals by reference to a specified index of prices or earnings.

12.17. **Integration**
The system of designing scheme benefits to take into account all or part of the benefits payable by the State under the social welfare arrangements. Known in public service schemes as "co-ordination".

12.18. **Liabilities**
The obligations of a scheme to pay amounts of money either immediately or in the future. Liabilities whose payment is dependent on unpredictable future events (such as the death of a member) are called “contingent liabilities”.

12.19. **Minimum retirement age**
The earliest age at which the pension scheme allows a member to retire with an immediate pension other than on the grounds of incapacity or ill-health.

12.20. **Net pensionable salary**
Pensionable salary [also referred to as pensionable remuneration], less twice the annual rate of the maximum contributory old age pension payable under the social welfare system to a person with no dependants, calculated on the last day of service. See also "co-ordination".

12.21. **Notional service**
Members of civil or public service pension schemes who are likely to have less than 40 years' service by their minimum retirement age, can top up their benefits through notional service purchase (NSP). This means buying back missing years of service by lump sum or a regular payment which would be a percentage of their salary.

12.22. **Occupational pension scheme**
A pension scheme set up by an employer to provide retirement and/or other benefits for employees. It is sometimes called a "company pension scheme".

12.23. **Offset**
An amount of salary which is disregarded under the rules of a scheme, to take account of a social welfare pension. Can also be applied to a deduction from the member's pension to take account of a social welfare pension. See also "integration".

12.24. **Pay parity**
A term used to describe the system of increasing pensions in payment and deferred pensions in line with the pay for the post held by the scheme member before retirement or leaving service, as appropriate.

12.25. **Pay-as-you-go**
Often abbreviated to PAYG, this is the method of financing pension promises out of the current income of the employer, there being no advance funding of the pension liabilities. It is used for social welfare schemes and for many (though not all) public service occupational schemes.

12.26. **Pension plan**
Another term for pension scheme.

12.27. **Pension scheme**
An arrangement, other than accident insurance, to provide pension and/or other benefits for members on leaving service or retirement and for the member's dependants in the event of death.

12.28. **Pensionable salary / pensionable remuneration**
The earnings on which benefits and/or contributions are calculated. In the public service, pensionable remuneration at retirement is normally the salary payable on the last day of reckonable service plus the average of the best three consecutive years' pensionable emoluments and allowances in the final ten years of service. In the private sector pensionable salary at retirement is normally the three year average of basic salary in the lead up to retirement. Note the above two definitions of pensionable remuneration / pensionable salary are before allowance for integration with the State Pension (Contributory).

12.29. **Projected Benefit Obligation ("PBO")**
A projected benefit obligation (PBO) is an actuarial liability equal to the present value of liabilities earned and the present value of liability from future compensation increases. It measures the hypothetical amount of money an entity must pay to satisfy all defined benefit pension entitlements that have been earned by employees up to that date, adjusted for expected future salary increases. The magnitude of the obligation is determined through a net present value calculation.

12.30. **PRSI**
A shortened name for Pay Related Social Insurance, whereby workers earning an income pay contributions to the Social Insurance Fund. In return, they are covered for certain benefits, such as a State pension.

12.31. **Public sector pension scheme**
An occupational pension scheme for employees of central or local government, statutory and other semi-state bodies. Many of these schemes are not funded and pension benefits are paid as they fall due by the State from current spending.

12.32. **Scheme**
Scheme means an occupational pension scheme.

12.33. **Spouses' & children's pension scheme**
A scheme usually separate from the main superannuation scheme in a public service body, designed to supplement the superannuation scheme and to provide only pensions payable to spouses and children of deceased members. The pensions are payable on death before, or after, retirement. Such schemes are almost always contributory. When these schemes were first introduced, entry was voluntary but became compulsory for subsequent entrants to service.

12.34. **State pension age**
The age from which pensions are normally payable by the social welfare scheme, currently, 66 (old age pension) for both men and women. This is increasing to age 67 from 2021 and age 68 from 2028.

13. Appendix 3 – Main Benefit Provisions

13.1 **Public service pension benefits**

- The term "public service pensions" refers to a range of different pension arrangements covering the following various groups of public service employees:
  - Civil Service
  - Education
  - Health
  - Security, i.e. Gardaí, Defence Forces and Prison Officers
  - Constitutional, Ministerial and Judicial office holders
  - Local Government
  - Non-commercial State sponsored bodies.

13.2 **Coverage**

- There is generally 100% pension coverage of employees and part time/fixed term contract employees whose normal hours of work constitute at least 20% cent of the normal hours of work of a comparable full time employee.

13.3 **Retirement benefits**

- In broad terms those who entered the public service before 6th April 1995 are provided with final salary DB retirement benefits payable at their minimum retirement age of:
  - 1/80th of pensionable salary[10] at retirement for each year of reckonable service, to a maximum pension of 40/80ths of pensionable salary. 50% of this pension is payable to a surviving spouse or civil partner where the pensioner predeceases his or her spouse/civil partner, and
  - A gratuity of 3/80ths of pensionable salary at retirement for each year of reckonable service, to a maximum gratuity of 120/80ths of pensionable salary. In effect the gratuity is 3 times the annual pension.

13.4 **Integration with State Pension entitlement**

- The pension entitlement (but not the gratuity) of those who joined the public service *after* 6th April 1995 is integrated with their State Pension entitlement so that their total pension is made up partly by a public service pension and the balance by their State Pension.
- The integration is accomplished by providing a lower rate of pension accrual, 1/200th instead of 1/80th for each year of reckonable service, for that part of pensionable salary which falls below 3.333333 x the maximum annual rate of State Pension (Contributory) payable to a single person without dependents.

This switch to integrated pensions in 1995 coincided with:

- Such employees being required to pay PRSI at the higher Class A rate, instead of the lower 'modified' Class B, C or D rates of PRSI paid by those recruited before 6th April 1995.
- The introduction of an explicit Superannuation contribution for those sectors that had not previously paid such a contribution, e.g. civil service, and the increase in the contribution for those who had previously paid a reduced contribution, e.g. Gardaí.
- A compensating increase in the pay scales for those sectors required to make a Superannuation contribution for the first time (Civil Service) or to pay an increased rate of contribution (Gardaí).

13.5 **Example – Civil Servant**

- Take an example of a civil service employee on a grade salary of, say, €50,000 p.a. (pre 6th April 1995 entrant level). The table below compares their salary and superannuation contribution and benefit entitlements, assuming 40 years' reckonable service at minimum retirement age and the current rate of State Pension (Contributory):

[10] *Pensionable salary is normally the salary payable on the last day of reckonable service plus the average of the best three consecutive years' pensionable emoluments and allowances in the final ten years of service.*

Salary scale point	€50,000	€50,000 x 20/19 = €52,631
Superannuation contribution	Implicit contributions as lower salary 1.5% x (€50,000 – 2 x €12,434) = = 0.8% of salary	3.5% x (€52,631 – 2 x €12,434) + 3.0% x €52,631 = 4.8% of salary
PRSI employee rate	0.9%	4.0%
Gratuity	120/80 x €50,000 = €75,000 (150%)	120/80 x €52,631 = €78,947 (150%)
Public Service Pension	40/80 x €50,000 = €25,000 p.a.	40/200 x (3.333333 x €12,434) + 40/80 x (€52,631 – 3.333333 x €12,434) = €13,881
State Pension	Nil	€12,434
Total pension	€25,000 (50%)	€26,316 (50%)

- The post 6th April 1995 civil servant's retirement benefits are circa 5% higher in monetary terms than those of the corresponding pre 6th April 1995 employee, as a result of the 5% increase in salary scale provided to post 6th April 1995 new entrants.

- The integration of public service pension entitlements for employees recruited after 6th April 1995 means that the State's pension liability for these employees is split between:

  - The payment of public service pension funded by the Exchequer, and
  - The State Pension paid from the Social Insurance Fund (SIF) and funded by employer and employee PRSI contributions and, if PRSI contribution income is insufficient to meet SIF outgoings, an Exchequer subvention to the SIF.

13.6 **Added years / fast accrual**

- Some professional and technical grades have traditionally been entitled to "added" or "notional years" service of up to 10 years, for reckonable service purposes. This was reduced to a maximum of 5 years added service for new entrants post 1st April 2005 and to 0 years for new entrants from 1st January 2013.

- Some sectors and grades are entitled to 'fast accrual', i.e. they can achieve the maximum pension and gratuity entitlement with less than 40 years actual service[1].

- There is a separate Purchase of Notional Service (PNS) scheme whereby public service employees can, in return for an additional contribution (which is eligible for income tax relief within statutory limits), buy missing years of service required to bring them to their maximum reckonable service by their minimum retirement age. Public service employees can also contribute AVCs in addition to or in conjunction with PNS.

13.7 **Minimum retirement age**

- Public service superannuation benefits are payable without actuarial reduction when an employee reaches their *minimum* retirement age, which varies between certain sectors and by date of entry into service.

  - Employees recruited before 1st April 2004 generally have a minimum retirement age of 60 and a maximum of 65;
  - Employees recruited after 1st April 2004 and before 31st December 2012 generally have a minimum retirement age of 65 but no maximum.
  - Employees recruited after 1st January 2013 have a retirement age in line with the State Pension qualifying age [i.e. age 66, increasing with the State Pension (Contributory) age to 67 in 2021 and to age 68 in 2028. Security: Current earlier minimum retirement ages for the security sector continue to apply].

- Staff may retire at an earlier age but with an actuarial reduction applied to their pension and gratuity to allow for earlier payment.

- However security and education sectors have earlier minimum retirement ages in certain cases:

Sector	Minimum Years' Service Required to earn Maximum Retirement Benefits		Minimum Age for Payment of Pension		
	Pre-2004	Post-2004	Pre-2004	Post-2004[1]	Single Scheme
Gardaí	30	30	50	55	55
Permanent Defence Force	31	31	-[2]	50	50
Fire Fighters	30	30	55	55	55
Prison Officers	30	30	50	55	55
Teachers	40	40	55	65	66,67,68 [as applicable]

1. Pension terms amended by the Public Service Superannuation (Miscellaneous Provisions) Act 2004.
2. Previous to 1 April 2004, retirement ages were linked to service and rank.

- For example, a member of the Gardaí recruited before 1st April 2004 can retire on full pension and gratuity from age 50 onwards (with no actuarial reduction), if they have 30 years reckonable service completed at that time;

- However a teacher recruited after 1st April 2004 can only retire on full pension and gratuity from age 65 onwards (with no actuarial reduction), if they have completed 40 years reckonable service.

13.8 **The Single Public Service Pension Scheme (the "Single Scheme")**

- The Public Service Pensions (Single Scheme and Other Provisions) Act 2012 provided for a new single public service pension scheme for all new public service employees recruited on or after 1 January 2013. The Act does not fundamentally impact on existing public service pension arrangements for current employees and pensioners except potentially in relation to the operation of pension increases.

- The main changes in the new single scheme compared to current post April 2004 entrants are:

  - Retirement benefits based on career average pensionable salary, adjusted by CPI increases, rather than final salary.
  - A later minimum pension age, linked to the State Pension age (currently 66, increasing to 68 by 2028).
  - Less favourable fast accrual for security sectors, i.e. longer term to accrue maximum retirement benefits as compared to 30 years currently; however these grades retain their right to retire without actuarial reduction to their benefits from 55 (50 for PDF).
  - Higher superannuation contributions for security and other specialist sectors who benefit from fast accrual, and
  - Consumer Price Index linking for pensions in payment, rather than current pay parity increases.

	Pre 6th April 1995 entrant	6th April 1995 – 31st March 2004 entrant	Current post 1st April 2004 entrant	Single Public Service Pension Scheme entrant
Minimum retirement age *(when benefits can be taken without actuarial reduction)*	*Standard* : 60 *Security* : 50 *Teachers* : 55	*Standard* : 60 *Security* : 50 *Teachers* : 55	*Standard* : 65 *Security* : 55 (50 for Permanent Defence Force)	*Standard*: 66, increasing with the State Pension (Contributory) age to 67 in 2021 and to age 68 in 2028. *Security*: Current earlier minimum retirement ages for the security sector continue to apply.
Employee contribution	*Civil Servants* : Implicit :1.5% pensionable salary *Gardaí*: 1.75% of pensionable salary *Teachers*: 5% of pensionable salary. + Spouses/Civil Partners and Children's Scheme : 1.5% of salary + Pension Related Deduction / Additional Superannuation Contribution + PRSI Class B/D: 0.9% + 3.1% on excess over €75,000.	3.5% of net pensionable salary[11] + 3.0% of gross salary. + Spouses/Civil Partners and Children's Scheme : 1.5% of salary + Pension Related Deduction / Additional Superannuation Contribution + PRSI Class A : 4.0%	3.5% of net pensionable salary + 3.0% of gross salary. + Spouses/Civil Partners and Children's Scheme : 1.5% of salary + Pension Related Deduction / Additional Superannuation Contribution + PRSI Class A : 4.0%	*Standard*: 3.5% of net pensionable salary + 3.0% of gross salary. *Security*: 4.2% of net pensionable salary + 3.3% of gross salary. President, Ministers, members of the Oireachtas, the judiciary: 13% of pensionable salary. + Pension Related Deduction / Additional Superannuation Contribution + PRSI Class A : 4.0%

[11] *i.e. Pensionable salary less twice the maximum annual rate of State Pension (Contributory) payable to a person with no child or adult dependents*

Employee retirement benefits	Final salary pension *Standard*: 1/80th x pensionable salary for each year of reckonable service Max 40 years reckonable service *Gratuity* : 3/80th x pensionable salary for each year of reckonable service : max 120/80ths *Gardaí*: Double reckonable service for each year of reckonable service over 20 years; e.g. 30 years actual = 40 years reckonable.	Final integrated salary pension *Standard* : Pensionable salary up to 3.33 x State Pension : 1/200th for each year of reckonable service Pensionable salary in excess of 3.33 x State Pension: 1/80th for each year of reckonable service Max 40 years reckonable service *Gratuity* : 3/80th x pensionable salary for each year of reckonable service: max 120/80ths *Gardaí*: Double reckonable service for each year of reckonable service over 20 years; e.g. 30 years actual = 40 years reckonable.	Final integrated salary pension *Standard* : Pensionable salary up to 3.33 x State Pension : 1/200th for each year of reckonable service Pensionable salary in excess of 3.33 x State Pension: 1/80th for each year of reckonable service Max 40 years reckonable service *Gratuity* : 3/80th x pensionable salary for each year of reckonable service : max 120/80ths *Gardaí*: Double reckonable service for each year of reckonable service over 20 years; e.g. 30 years actual = 40 years reckonable.	Career average integrated salary pension: adjusted by CPI, upward only. *Standard*: Career average pensionable salary up to 3.74 x State Pension : 0.58% (1/172th) for each year of reckonable service Career average pensionable salary in excess of 3.74 x State Pension : 1/80th for each year of reckonable service *Gratuity*: 3/80th x career average Pensionable salary for each year of reckonable service. *Gardaí* : Career average pensionable salary up to 3.74 x State Pension : 0.58% for each year of reckonable service Career average pensionable salary in excess of 3.74 x *State Pension:* 1.43% (1/70th) for each year of reckonable service *Gratuity*: 4.29% (3/70th) career average pensionable salary for
Pensions in payment	Pay parity Under Single Pension Scheme Act, CPI linking 'may' be applied by Minister to existing pensions of pre- operative date retirees, instead of pay parity.	Pay parity Under Single Pension Scheme Act, CPI linking 'may' be applied by Minister to existing pensions of pre-operative date retirees, instead of pay parity.	Pay parity Under Single Pension Scheme Act, CPI linking 'may' be applied by Minister to existing pensions of pre- operative date retirees, instead of pay parity.	CPI linking; upward only for new entrants' post-operative date.

14. Appendix 4 - ADL Supplementary Table

See below the Supplementary Table 29 – Column G - completed as at 31 December 2015. The table below has been prepared on the basis of pay parity pension increases in retirement.

			Discount rate 4%	Discount rate 5%	Discount rate 6%
		Column number		G	
		Opening balance sheet (€ Bn)			
	1	**Pension entitlements**	**131.0**	**109.8**	**93.4**
		Changes in pension entitlements due to transactions			
Σ 2.1 to 2.5	2	Increase in pension entitlements due to superannuation contributions	8.8	8.0	7.4
	2.1	Employer actual superannuation contributions	0.0	0.0	0.0
	2.2	Employer imputed superannuation contributions	1.9	0.8	0.1
	2.3	Actual employee contributions	1.7	1.7	1.7
	2.4	Household social contribution supplements[5)]	5.2	5.5	5.6
	2.5	Less: Pension scheme service charges	0.0	0.0	0.0
	3	Other (actuarial) change of pension entitlements in social security pension schemes			
	4	Reduction in pension entitlements due to payment of pension benefits	3.3	3.3	3.3
2 + 3 – 4	5	Changes in pension entitlements due to social contributions and pension benefits	5.5	4.7	4.1
	6	Transfers of pension entitlements between schemes	0.0	0.0	0.0
	7	Change in entitlements due to negotiated changes in scheme structure	0.0	0.0	0.0
	8	Changes in entitlements due to revaluations[6)]	0.0	0.0	0.0
	9	Changes in entitlements due to other changes in volume[6)]	0.0	0.0	0.0
		Closing balance sheet			
1+ Σ 5 to 9	10	**Pension entitlements**	**136.5**	**114.5**	**97.5**

Notes

An explanation of rows and columns of the Supplementary table follows:

The rows in the supplementary table contain a reconciliation between the opening value of pension obligations (entitlements) at the beginning of a period (31st December 2014) and the closing value at the end of a period (31st December 2015).

Row 1 illustrates the opening stock of pension obligations (entitlements), which is identical with the closing stock the previous year (had it been calculated). In this case it equals to the 31st December 2014 position reflecting the ADL calculation in respect public service occupational pension and associated contingent benefits. The opening ADL is €109.8bn.

Row 2 shows the changes to pension entitlements due to contributions. It is formula based and is equal to Row 2.1 – 2.5 (inclusive).

Row 2.1 The public service occupational pension schemes are pay as you go and are as such unfunded.

Row 2.2 This row reflects a residual / balancing figure which includes "experience effects" found in the occupational pension scheme in which the observed outcome of pension modelling assumptions (real wage growth rate, discount rate, etc.) differs from the levels assumed in the previous estimation.

Row 2.3 This figure represents the superannuation contributions and Pension Related Deduction (PRD) paid by public service employees over the year. This figure has been taken from the Government's accounts.

Row 2.4 This is equivalent to the unwinding of the discount rate, meaning that its value is equal to the discount rate times the pension entitlements at the beginning of the accounting period. In this case it is 5% x €109.8bn = €5.5bn

Row 2.5 It's a zero value for column G as no fixed portion of contributions are set aside for covering the costs.

Row 3 Not applicable

Row 4 comprises the pension benefits that are paid during the period of time.

Row 5 shows the changes to pension entitlements due to contributions and benefits. It is formula based and is equal to Row 2 + Row 3 – Row 4.

Row 6 Transferring pension entitlements: Nil

Row 7 Pension reforms occurring between opening and closing dates: Nil.

Row 8 Revaluations are due to changes to the key model assumptions in the actuarial calculations and are covered in **row 8**. These assumptions are the discount rate, the wage rate and, if used in the model, the inflation rate. In all three cases the change in assumption was nil between 31st December 2014 and 31st December 2015 as the same assumptions were adopted at year beginning and at year end.

Row 9 When the demographic assumptions used in the actuarial calculations are changed, they are recorded as other changes to the volume of assets (**row 9**). Any other changes to assumptions which are not revaluations are covered in row 9. This includes presumptions on future retirement behaviour. Besides changes to the underlying assumptions, the general framework of the actuarial model applied may also change from one year to the next to improve the accuracy of the results. Row 9 records these changes to the estimation approach which are not due to altered assumptions but result from a change in the model framework.

In this case row 9 is nil as no change in demographic assumptions about retirement behaviour have been made. In future years where the model is refined this row may be non-zero.

Row 10 illustrates the closing stock of pension obligations (entitlements), which is identical with the opening stock the next year. In this case it equals to the 31st December 2015 position reflecting the ADL calculation in respect of public service occupational pension obligations is €114.5 bn.

See below the Supplementary Table 29 – Column G - completed as at 31st December 2015. The table below has been prepared on the basis of pension increases in line with increases in the Consumer Price Index going forward.

			Discount rate 4%	Discount rate 5%	Discount rate 6%
		Column number		G	
		Opening balance sheet (€ Bn)			
	1	**Pension entitlements**	**110.3**	**93.6**	**80.6**
		Changes in pension entitlements due to transactions			
Σ 2.1 to 2.5	2	Increase in pension entitlements due to superannuation contributions	7.5	7.2	6.8
	2.1	Employer actual superannuation contributions	0.0	0.0	0.0
	2.2	Employer imputed superannuation contributions	1.4	0.8	0.3
	2.3	Actual employee contributions	1.7	1.7	1.7
	2.4	Household social contribution supplements[5)]	4.4	4.7	4.8
	2.5	Less: Pension scheme service charges	0.0	0.0	0.0
	3	Other (actuarial) change of pension entitlements in social security pension schemes			
	4	Reduction in pension entitlements due to payment of pension benefits	3.3	3.3	3.3
2 + 3 – 4	5	Changes in pension entitlements due to social contributions and pension benefits	4.2	3.9	3.5
	6	Transfers of pension entitlements between schemes	0.0	0.0	0.0
	7	Change in entitlements due to negotiated changes in scheme structure	0.0	0.0	0.0
	8	Changes in entitlements due to revaluations[6)]	0.0	0.0	0.0
	9	Changes in entitlements due to other changes in volume[6)]	0.0	0.0	0.0
		Closing balance sheet			
1+ Σ 5 to 9	10	**Pension entitlements**	**114.5**	**97.5**	**84.1**