



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

# **Actuarial Review of Public Service Occupational Pensions in Ireland**

**As required by Regulation (EU) No 549 / 2013**

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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 31<sup>st</sup> December 2018. 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

## Background

- 1.1. An actuarial review of the Accrued-to-Date liability (the “ADL”) in respect of public service occupational pension schemes has been carried out by the Department of Public Expenditure and Reform (the “Department”) as at 31<sup>st</sup> December 2018.
- 1.2. The ADL provides a point in time estimate of the State’s public sector pension obligations, representing the present value of all future expected superannuation benefit payments arising from accrued service to year-end 2018, including contingent benefits payable to qualifying dependants of current and former public service employees.
- 1.3. The scope of the review encompasses public service pension schemes i.e. pension arrangements of the following sectors of the public service:
  - Civil Service (incl. Prison Officers)
  - Education
  - Health
  - Security (Defence Forces, Gardaí)
  - Constitutional, Ministerial and Judicial Office Holders
  - Local Government
  - Non-Commercial State Bodies
- 1.4. The ADL review was carried out on behalf of the Central Statistics Office (the “C.S.O.”) which is required to compile a supplementary table, ESA Table 29, showing the accrued liabilities of all funded and unfunded Irish pension schemes<sup>1</sup> as part of the National Accounts, under Regulation (EU) No 549 / 2013.
- 1.5. The supplementary table on pension schemes facilitates improved analysis and international comparability of existing pension systems within and between EU countries under the System of National Accounts (SNA, 2008) and European System of Accounts (ESA, 2010). The completed supplementary table is presented in Appendix D.

## Methodology

- 1.6. The methodology underlying this valuation follows that specified in the Technical Compilation Guide (2020) for Pension Data in the National Accounts<sup>2</sup> produced by Eurostat and the European Central Bank.
- 1.7. 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 at year-end 2018. 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 thus is known also as a ‘closed group’ valuation.
- 1.8. The calculations of the ADL were performed by applying a commonly used method to liability valuation - the Projected Benefit Obligation (“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 captures the varied 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 set out in Section 3 and Appendix B.
- 1.9. The ADL calculated under the PBO approach constitutes the State’s obligations to make pension and other benefit payments to current beneficiaries and their dependants 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.
- 1.10. A capitalised value of the projected benefit outflows was then determined by discounting the projected cash-flows at an appropriate discount rate.

## Assumptions

- 1.11. A wide range of critical assumptions underlie the calculation of the ADL figure.
- 1.12. The assumptions used in projecting the benefit obligations are those prescribed by the Technical Compilation Guide (2020) 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.

<sup>1</sup> Includes all Irish public and private sector pension schemes

<sup>2</sup> <https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/KS-GQ-20-008>

- 1.13. The assumptions adopted broadly coincide with those produced by the European Commission for the purposes of the Ageing Report 2021 with the exception of the mortality assumptions, as noted above.
- 1.14. 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. The assumptions underlying the previous actuarial review are included for comparison purposes.

**Table 1.1. Assumptions for ADL purposes for EU Balance sheet as at 31<sup>st</sup> December 2018**

	Current Valuation	Previous Valuation
Discount Rate	4.00% p.a.	5.00% p.a.
Inflation	2.00% p.a.	2.00% p.a.
Real Salary Increases <sup>3</sup>	Labour productivity per hour growth rate for Ireland which broadly translates to an overall rate of 1.48% p.a. in the long term	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	88% ILT 15 (for males) 91% ILT 15 (for females)	Proxy to 88% ILT 15 (for males) Proxy to 91% ILT 15 (for females)
Mortality Improvement Factors	Yes	Yes

- 1.15. Most notable is the change in the discount rate used to estimate the accrued pension obligations in present day value terms. The fall in the discount rate reflects a decline in real interest rates to historically low levels, as reflected in market expectations of persistently low interest rates over future years.

#### Data

- 1.16. A large quantity of individual member data relating to active employees, deferred members and current pensioners in each sector was collated, cleansed and thoroughly analysed in order to carry out the present actuarial review.
- 1.17. The ADL valuation, carried out on ProVal pension software, reflects a line by line modelling of all benefits in scope on the per member data received; that is data records in respect of approximately 313,691 active employees and 173,405 pensions in payment. This represents an 87% and 94% sample size for actives and pensioners, respectively. Results obtained from the sample data were scaled upwards to reflect incomplete data sets across each sector, where appropriate.
- 1.18. Overall, the membership data received was considered to be of a higher quality than that used in previous actuarial reviews. However, the quality of the data received varied considerably between sectors and between public service bodies within each sector. 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 different systems in a non-centralised and non-standardised format. A significant amount of data consolidation, validation, checking and adjustments for gaps / apparent errors was undertaken as part of this exercise.

#### Results

- 1.19. The value of the State's ADL in respect of public service occupational pension schemes was estimated to be **€149.6bn**, or 46.2% of GDP<sup>4</sup>, as at 31<sup>st</sup> December 2018. This ADL figure of €149.6bn represents the present value of all accrued retirement entitlements in respect of current and former employees in the public service, calculated in accordance with the revised assumptions prescribed by Eurostat for year-end 2018 valuations.
- 1.20. The State's ADL calculated using the assumptions prescribed at the previous valuation is €124.9bn. This ADL figure is comparable with the previous estimate of €114.5bn calculated by the Department as at 31<sup>st</sup> December 2015.
- 1.21. In line with previous valuations, the new ADL estimate of €149.6bn was calculated under the assumption that future pension increases would be in line with pay-parity<sup>5</sup>, or salary inflation. As the post-retirement indexation policy is at the discretion of the Minister of Public Expenditure and Reform, the valuation was also carried out assuming that pension increases would be in line with increases in the Consumer Price Index ("CPI") in which case the ADL figure was estimated to be **€126.6bn**, or 39.1% of GDP<sup>6</sup>, as at 31<sup>st</sup> December 2018. This represents a €23bn, or a 15%, decrease in the ADL as a result of a different post-retirement indexation policy being assumed.

<sup>3</sup> Pension increases for pre 2013 entrants are discretionary and are assumed to be in 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 2021 Ageing Report.

<sup>4</sup> Or, 75.9% of Modified GNI in the year 2018

<sup>5</sup> Pay parity refers to when pensions are increased in line with, and on the same date as, pay awards granted to serving employees.

<sup>6</sup> Or, 64.3% of Modified GNI in the year 2018

- 1.22. Table 1.2 below shows a breakdown of the results between active employees, pensions in payment and deferred members, on various assumption sets.

**Table 1.2. ADL results across various scenarios**

	Previous valuation	Current valuation		
	€ bn*	Previous valuation assumptions € bn*	Revised valuation assumptions € bn*	Consumer Price Inflation pension increase € bn
Active Employees	53.9	59.5	74.8	63.5
Pensions in Payment	56.5	60.6	68.7	57.8
Deferred Members	<u>4.1</u>	<u>4.8</u>	<u>6.1</u>	<u>5.3</u>
<b>Total</b>	<b>114.5</b>	<b>124.9</b>	<b>149.6</b>	<b>126.6</b>

**Notes:**

1. The ADL makes no allowance for the cost of paying the State Pension (Contributory) to eligible public service employees.
2. \*The ADL figures set out above assume that current and future pensions in payment would be increased in line with salary increases with the exception of those in the Single Scheme whose pensions are indexed in line with CPI reflecting the terms of that scheme.
3. There are a small number of funded public service schemes that have been excluded from this analysis as the asset base is expected to result in an immaterial addition or reduction to the ADL.
4. The ADL makes no allowance for the commercial semi-state sector.

- 1.23. The updated ADL estimate of €149.6bn represents a significant increase on the previous valuation's figure of €114.5bn. Approximately, €24.7bn or 70% of the increase in the reported obligation can be attributed to the change in assumptions, in particular to the 1% decrease in the annual discount rate underlying the calculations.

- 1.24. The other material drivers of the increase in the ADL are the additional accrual of benefits, the unwinding of the discount rate as members' age in the public service, the partial reversal of pay and pension financial emergency measures in the public interest ("FEMPI") reductions as well as a revision to Health sector data over the inter-valuation period.

**Conclusions and next steps**

- 1.25. 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 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 2018 was €3.6bn.

- 1.26. This review has not considered the long term sustainability of public service pension schemes. However, it is worth noting that a number of reforms to public service pension have been implemented in recent times. For example, the integration of public service pensions with the State Pension (Contributory) for employees who joined the public service post 6<sup>th</sup> April 1995, the subsequent increase in the minimum retirement age for new entrants from 2004, as well as the Single Public Service Pension Scheme introduced from 2013 which will, in time, reduce liabilities by around 35% from what would otherwise have been the case. Additionally, a Pension Related Deduction (PRD) was introduced in 2009 and subsequently converted to the Additional Superannuation Contribution (ASC) in 2019, and the maximum retirement age was also increased to 70 for employees who joined service before 1<sup>st</sup> April 2004.

- 1.27. 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. The storage of the records in an electronic and ideally centralised format could be further progressed.

- 1.28. Given the uncertainty associated with the data, and the dependency of the results on the assumptions used, a sensitivity analysis is included in Section 6 of this report.

- 1.29. An updated actuarial review of public service pension obligations is required to be completed no later than three years after this review, under Regulation (EU) No 549 / 2013.

## 2. Introduction

### Background

- 2.1. An actuarial review of the accrued-to-date liability (the “ADL”) in respect of public service occupational pension schemes was carried out by the Department of Public Expenditure and Reform as at 31<sup>st</sup> December 2018.
- 2.2. The ADL represents the present value of all expected future superannuation benefit payments arising from accrued service to year-end 2018, including contingent benefits payable to qualifying dependants of current and former employees in the public service.
- 2.3. The previous actuarial review estimated the State’s obligations in respect of public service pension schemes to be €114.5bn at an effective date of 31<sup>st</sup> December 2015.
- 2.4. Public service pension schemes are defined benefit (DB) in nature, with those employed before 2013 accruing benefits in final salary schemes where pension indexation has traditionally been applied on a pay-parity basis. All new entrants to the public service from 1<sup>st</sup> January 2013 are members of the Single Public Service Pension Scheme (the “Single Scheme”) which is a career average revalued earnings scheme with benefits indexed in line with increases in the Consumer Price Index.
- 2.5. In all pension schemes, a public service retirement benefit consists of two primary elements, namely; a lump sum at retirement (“gratuity”) and, a pension payable for life from date of retirement. Further detail on public service benefit structures is set out in section 3 and Appendix B of this report.
- 2.6. Benefits under most public service occupational pension schemes are statutorily provided. Most schemes are financed on a pay-as-you-go basis, with the annual cost of pensions being met from current revenue in year of payment. Approximately 173,000 public service pensions were in payment as at year-end 2018 while retirement benefits had accrued for over 330,000 serving employees. Payments in respect of public sector pensions amounted to approximately €3.6bn, while member contributions and PRD amounted to €1.4bn over the year 2018.

### Purpose of review

- 2.7. The primary purpose of this actuarial review is to project the overall occupational pension scheme liability of the State in respect of the public service as at 31<sup>st</sup> December 2018, as required under Regulation (EU) No 549 / 2013.
- 2.8. A new reporting framework on pension entitlements was established by the System of National Accounts (2008 SNA) and European System of Accounts (ESA 2010), requiring obligatory completion of a supplementary table on pension schemes to allow for improved analysis and international comparability of pensions systems within and between countries in the EU. Transmission of the table to Eurostat has been mandatory from 2017 in respect of valuation year 2015, and at three yearly intervals from that date.
- 2.9. Accordingly, the Central Statistics Office (the “CSO”) is required to compile a table showing the liabilities of Irish pension schemes as part of the National Accounts under Regulation (EU) No 549 / 2013. This table includes estimates of the liabilities of all unfunded and funded pension schemes including the liability for public service schemes.
- 2.10. The supplementary table requires estimates of pension entitlements or gross liabilities to be carried out on the “accrued to date” basis, in line with other information in the national accounts. These pension entitlements or obligations represent the present value of pension payments to be paid in the future on the basis of accrued rights or entitlements. This method excludes any possible entitlements gained during working life thereon, and any new entrants to the system.
- 2.11. The Department’s understanding of the requirements underpinning the estimation of the ADL for the purpose of EU reporting is based largely on information set out in the Technical Compilation Guide for Pension Data in National Accounts produced by Eurostat and the European Central Bank<sup>7</sup>. This guide contains detail on the methodology and assumptions to be used for the purpose of the ADL calculation. Figures required for other purposes should be calculated based on the specific nature of those requirements.

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<sup>7</sup> Technical Compilation Guide for Pension Data in National Accounts (2020). Eurostat, European Central Bank.

## Scope of review

- 2.12. The present actuarial review provides estimates of the State's obligations on the 'accrued to date' or 'closed system' basis, as stated above. The ADL allows for accrued pension rights only, referring only to the pension entitlements already earned by current and former employees. The ADL represents the cost of a hypothetical termination of pension schemes where the present value of all accrued entitlements are paid, thereby providing a point in time estimate of the accumulation of entitlements at year-end 2018.
- 2.13. It is important to note that, while the ADL approach provides a snapshot of Irish pension obligations, it is not an indicator of the fiscal sustainability of the pension system. An analysis of the sustainability of public service pensions would require an "open system" approach taking into account pension entitlements that would be built up in the future as well as those accrued to date. It would also take account of member contributions and the ASC. This is not a requirement under Regulation (EU) No 549 / 2013.
- 2.14. The scope of this review encompasses public service pension schemes i.e. the pension arrangements of those in all sectors of the public service, as set out below.
- Civil Service (incl. Prison Officers)
  - Education
  - Health
  - Security (Defence Forces, Gardai)
  - Constitutional, Ministerial and Judicial Office Holders
  - Local Government
  - Non-Commercial State Bodies
- 2.15. The ADL represents all expected future superannuation benefit payments arising from service to 31<sup>st</sup> December 2018, with the full range of the liabilities valued including 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.
- 2.16. Appendix A contains a glossary of the technical terms used in this paper.

### 3. Public service pension benefits & recent reforms

#### Public service pension benefits overview

- 3.1. In broad terms those who entered the public service before 6<sup>th</sup> April 1995 are provided with final salary defined benefit (DB) retirement benefits payable at their minimum retirement age of:
- 1/80<sup>th</sup> of pensionable salary<sup>8</sup> at retirement for each year of reckonable service, to a maximum pension of 40/80<sup>ths</sup> 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 3/80<sup>ths</sup> of pensionable salary at retirement for each year of reckonable service, to a maximum gratuity of 120/80<sup>ths</sup> of pensionable salary. In effect the gratuity is 3 times the annual pension.
- 3.2. Different terms apply to post 1995 and post 2013 entrants, as detailed below.
- 3.3. The main benefit provisions for each of the main categories are shown in the table below. Members of the security forces and prison officers are entitled to a modified version of the benefit structures below. In particular, these members are entitled to 'fast accrual', i.e. they accrue their pension entitlements over a shorter period, and they can retire earlier than other public service employees. Further detail on the main benefit provisions, and also on member contributions, in the public service is included in Appendix B.

**Table 3.1 – High level overview of public service superannuation benefits**

	Pre 1995	Post 1995	Post 2004	Single Scheme
Basis of provision	Final Salary	Final Salary	Final Salary	Career average
Integrated with State Pension (Contributory)	No	Yes	Yes	Yes
Pension accrual rate	1/80	1/200 <sup>th</sup> up to 3.333 x State Pension (Contributory); 1/80 <sup>th</sup> thereafter	1/200 <sup>th</sup> up to 3.333 x State Pension (Contributory); 1/80 <sup>th</sup> thereafter	0.58 up to 3.74 x State Pension (Contributory); 1/80 <sup>th</sup> thereafter
Retirement lump sum accrual rate	3/80	3/80	3/80	3/80
Dependant benefits	50% contingent pension	50% contingent pension <sup>9</sup>	50% contingent pension <sup>9</sup>	50% contingent pension
Pension increases	Discretionary	Discretionary	Discretionary	Consumer Price Inflation

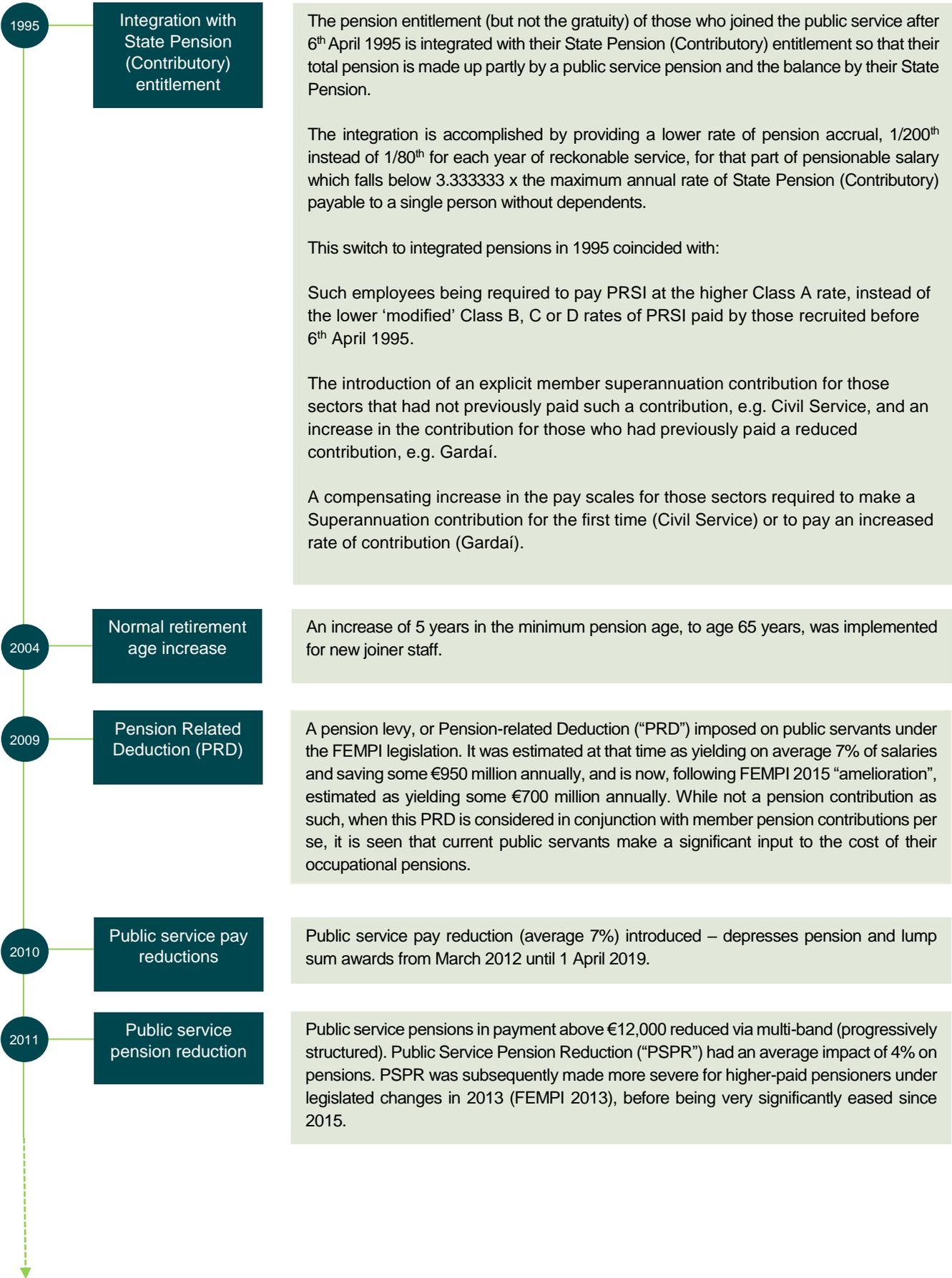
#### Public service pension reform

- 3.4. The principal reform measures to public service pensions implemented since 1995 are detailed below.
- 3.5. In general those measures collectively serve to:
- Integrate public service pensions with the social welfare system;
  - 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.
- 3.6. The reforms below indicate a general direction of travel whereby public service employees were either required to contribute more to fund their retirement benefits, or the retirement benefits payable from the occupational pension scheme were reduced. In recognition of these reforms, the OECD (2014) places Ireland in a group of countries more advanced in tackling pension sustainability.

<sup>8</sup> Pensionable salary is normally the salary payable on the last day of reckonable service plus pensionable emoluments and allowances, subject to 3-year averaging.

<sup>9</sup> The pension is re-calculated to allow for a single deduction in respect of the State Pension (Contributory).

3.7. However, the OECD also suggests that more can be done, in particular to reduce Government liabilities in respect of public servants' pensions and to ensure more equity between different cohorts of the Irish population.



2013

### Single Public Service Pension Scheme

The Single Public Service Pension Scheme (the “Single Scheme”) was launched for new-entrant employees across the entire public service. Post 1<sup>st</sup> January 2013, new entrants to the public service join the Single Scheme which is a career average revalued earnings scheme with a retirement age in line with the State Pension Age. Single Scheme members’ benefits are indexed with increases in the Consumer Price Index. The Single Scheme is projected to generate savings of more than 35% versus the pre-Single Scheme pension benefits.

2017

### Additional Superannuation Contribution (“ASC”)

The PRD provided for under the Financial Emergency Measures in the Public Interest Act 2009 (as amended) was converted into a permanent Additional Superannuation Contribution (“ASC”). This contribution is in addition to the existing superannuation contribution made by public service employees from 1 January 2019. Different ASC rates apply depending on whether a member is a Pre 2013 joiner, a Single Scheme member or a Fast Accrual member. ASC is applied progressively with those on higher salaries paying more. Broadly, the average public service employee would pay approximately 4% of pensionable remuneration in ASC. Appendix B sets out the ASC rates.

2019

### Increase in maximum retirement age

The Public Service Superannuation (Age of Retirement) Act 2018 provided for an increase in the compulsory retirement age to age 70 for the majority of public service employees recruited before 1<sup>st</sup> April 2004.

## 4. Data

### Overview of data

- 4.1. This actuarial review of public service pensions required a large amount of data including individual member data on active employees, deferred members and current pensioners in each sector.
- 4.2. The Data Sharing and Governance Act, part 5, provides the legal basis for the request of data to be provided to the Minister, and requirements of the EU General Data Protection Regulation (“GDPR”) were complied with at all stages while carrying out this review.
- 4.3. A data specification template was issued to all public service bodies, requesting the necessary data items for each active and former / retired employee as at 31<sup>st</sup> December 2018. This data was uploaded to a dedicated website operated by the Office of the Government Chief Information Officer (“OGCIO”) to facilitate the secure transmission of the requested data. The data items included in the data requests for the purpose of the valuation are set out in Appendix C.
- 4.4. The quality and completeness of the membership data received represented, on the whole, a significant 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.
- 4.5. The active employee sample data provided coverage of approximately 87% of the total active membership in the public service. The main gaps in the active data received was in respect of employees in the non-commercial state agencies (“NCSAs”), the local authorities, the voluntary hospitals and third level institutions. The pension in payment sample data covered approximately 94% of the total number of pensions in payment, with the main gap in the data in respect of the NCSAs. Data on deferred members, while significantly more complete compared with previous reviews, was limited overall.
- 4.6. 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.
- 4.7. 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 2018 actuarial valuation in respect of the public service.

### Individual member data

#### Active Employees

- 4.8. Active employee data in respect of 313,691 individual employees from a large number of bodies across the public service was used for analysis. This figure allows for the exclusion of a number of active records which were deemed inadequate for valuation purposes based on the checks applied to the data set.
- 4.9. The number of individual records in each sector was compared with the corresponding total headcount data as reported to the Department, supplemented with data from line departments where appropriate. A scaling factor was determined for each sector accordingly. Implicitly this uprating approach assumes that missing or excluded records have the same average profile (i.e. age, salary and service) as included records. The total full-time equivalent (“FTE”) numbers employed in each sector in Q4 2018 as per the Department’s databank were then scaled downward to infer an FTE active employee sample of 287,661 from the headcount data received. See table 4.1. overleaf.
- 4.10. The sample of active data received from public service bodies represents 87% of the total active membership in the public service at year end 2018. This represents a significant improvement on the 68% data sample received for the last valuation carried out as at year end 2015.

**Table 4.1: Active Employee Data**

Sector	Headcount Data	FTE Data	Total FTE	Sample as % of Population
Civil Service	40,396	39,080	39,923	98%
Education	105,680	98,068	106,948	92%
Health	108,383	94,103	117,857	80%
Defence	8,962	8,860	9,403	94%
Justice	13,713	13,659	14,395	95%
NCSAs	9,871	9,239	13,707	67%
Local Authorities	26,686	24,652	28,343	87%
<b>Total</b>	<b>313,691</b>	<b>287,661</b>	<b>330,576</b>	<b>87%</b>

**Pensions in Payment**

- 4.11. Individual data records in respect of 163,223 pensions in payment from relevant bodies across the public service were analysed. This figure similarly reflects the data set following the exclusion of a number of records which were deemed inadequate for the valuation based on the checks applied. The sample data was compared to the estimated total number of pensions in payment in Q4 2018 on the Department's data bank and the numbers were scaled up accordingly.
- 4.12. The pension in payment sample data set represents 94% of the total number of pensions in payment in the public service at year end 2018. This compares with a 99% data sample received for the last actuarial review. It should however be noted that the total number of individual pension records analysed increased by approximately 6% for the present valuation.

**Table 4.2: Pension in Payment Data**

Sector	Data Count	Total Count	Sample as % of Population
Civil Service	24,803	25,190	98%
Education	47,861	48,105	99%
Health	44,183	48,350	91%
Defence	12,198	12,483	98%
Justice	10,414	10,601	98%
NCSAs	5,577	7,958	70%
Local Authorities	18,187	20,718	88%
<b>Total</b>	<b>163,223</b>	<b>173,405</b>	<b>94%</b>

**Deferred Employees**

- 4.13. The availability and reporting of data in respect of deferred employees is significantly more limited than is the case for active employees and pensions in payment across the public sector. In particular, the headcount or total FTE number of individuals with entitlement to deferred benefits is not readily available in relation to most sectors.
- 4.14. A sample of data was received from all sectors with the exception of Justice, and total headcount was known only for the Civil Service and Defence. As a result, the liability in respect of deferred members in Health, the Local Authorities and the NCSAs was approximated by applying the proportion of deferred to active liability in the Civil Service to these sectors. Similarly, the liability in respect of deferred members in Justice was approximated by applying the proportion of deferred to active liability in Defence to this particular sector. The Education data from the 2015 valuation indicated that there was a higher number of deferred members in Education relative to other sectors and as a result, the proportion of deferred to active liability in this sector was maintained for the current valuation.
- 4.15. 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 atypical nature of employments in the Health sector.

### **Validation of data**

- 4.16. All public service bodies were requested to upload the required data in a standard template to a Data Gathering and Validation Tool (“DGV” system); a web application operated by the data analytics team in the OGCIO and which carried out basic validations on the uploaded data.
- 4.17. The data sets were required to meet a certain standard before being accepted by the DGV system in order to ensure the quality of the data would be sufficient for the valuation. For example, dates of birth were required to be within a specific reasonable range and in date format, and numerical data items were not accepted if they were negative in value.
- 4.18. Once the data was submitted to the DGV system, a number of further checks were performed on the data through a pension management web application. These checks included the following:
- Checks on critical data items e.g. average ages, salaries, and pension amounts as well as individual members’ length of service and date of entry in the context of their specified pension scheme, to ensure the reasonability of the data;
  - A comparison of the total pension and pay expenditure, and the number of active employees and pensions in payment, with the figures published on the department’s databank.
- 4.19. Any critical data items which were not properly completed or which contained unexpected entries were queried with the relevant public sector 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 in paragraph 4.28.
- 4.20. The checks carried out on the data do not represent a full independent audit of the data. Since it was not possible to undertake independent checks for all categories of members and a full reconciliation has not been completed against all prior datasets there is the potential for currently unidentified problems with the data to emerge in future. The actuarial unit has thereby relied on the general completeness and accuracy of the data supplied.

### **Quality of data**

- 4.21. Overall, the data was considered to be of a higher quality than that received for previous actuarial valuations of public service pension obligations. However, the quality of the data received varied considerably between sectors and between public service bodies within a sector. The most notable issues surrounding the data were as follows:

#### **Active Employee Data**

- 4.22. Data sets contained blank or invalid fields for critical data items including date of birth, date of entry to pension scheme, type of pension scheme, length of service, annual pensionable pay, FTE multiplier and gender.
- 4.23. A lack of clarity around how part-time work patterns were reflected in certain data items. For example, while FTE pensionable pay was requested, the data input to the pensionable pay field was sometimes considerably lower than would be expected if this was the case.
- 4.24. Data on pensionable allowances, and on notional added years of service either purchased by or awarded to employees, was scarce. There was also a lack of clarity around whether any transfer of service across the public sector was captured in the length of service data item.

#### **Pensions in Payment Data**

- 4.25. Data sets contained several blank or invalid fields for critical data items including date of birth, pension commencement date, type of beneficiary, annual pension value and gender.

#### **Deferred Employee Data**

- 4.26. A general lack of data and existing information on former public service employees with entitlement to deferred pensions was evident.
- 4.27. It is strongly encouraged that administrators are engaged with to ensure the data deficiencies evidenced in this valuation may be addressed before the 2021 valuation.

## Adjustments to data

- 4.28. The data provided was not fully accurate and complete for all members and approximations have been made to enable valuation calculations to be undertaken. Adjustments made to the data include those set out below.

**Table 4.3: Adjustments to Data Items**

Data Item	Relevant Cohort	Adjustment
Date of birth	Actives, pensions	Invalid or blank entries approximated as average date of birth of those in the corresponding pension scheme and sector
Gender	Actives, deferreds, pensions	Blank entries changed to most common gender in the relevant sector
Date of entry	Actives	Invalid or blank entries calculated from corresponding entries for length of service
Length of service	Actives	Invalid or blank entries calculated from corresponding entries for date of entry
Pension scheme	Actives	Blank entries changed to the pension scheme corresponding to date of entry
Pensionable remuneration	Actives, deferreds	Blank or invalid entries changed to average pensionable remuneration in the relevant sector
Pension value	Pensions	Blank or invalid entries changed to average pension value in the relevant sector
Type of pension	Pensions	Blank entries were changed to a member pension. Entries classified as a member pension and with age less than 22 were changed to a child pension.

## Data summaries

- 4.29. A high level comparison between the active and pensioner public service data used in the current valuation (year-end 2018) and the previous valuation (year-end 2015) is presented below. All summaries in this section allow for the application of scaling factors and adjustments to the data, as appropriate.

**Table 4.4: Active Employee Data in 2018 versus 2015**

Active Employees	Current Valuation	Previous Valuation
Total FTE	330,576	298,199
Average Pensionable Remuneration (€)	50,172	46,234
Average Age (Years)	44.0	43.8
Average Service (Years)	12.9	14.7
Gender Breakdown	33% Male 67% Female	31% Male 69% Female

- 4.30. In accordance with the data shown in Table 4.4, the FTE number of active employees in the public service has increased by approximately 11% over the three year inter-valuation period. The average pensionable remuneration has increased by approximately 9%, the average age has increased marginally by about 0.5% or 0.2 years, and the average number of years' service has decreased by approximately 12% or 1.8 years. There has been a 2% increase in the proportion of the public service that are male; however females still make up a significant majority of the public service at 67%.

**Table 4.5: Pension in Payment Data in 2018 versus 2015**

Pensions in Payment	Current Valuation	Previous Valuation
Total Count	173,405	154,680
Average Pension Value (€)	20,310	19,908
Average Age (Years)	69.2	68.4
Gender Breakdown	46% Male 54% Female	48% Male 52% Females

4.31. In accordance with the data shown in Table 4.5, the number of pensions in payment in the public service has increased by approximately 12% over the three year inter-valuation period. The average pension value has increased by approximately 2% and the average age of those with pensions has increased by approximately 1% or 0.8 years over the period. The gender breakdown of pensions in payment has changed slightly with an additional 2% of pensions being paid to females at year end 2018 vis-à-vis year end 2015.

4.32. The public service data used in the present actuarial review is summarised in detail below.

#### Active employee data

4.33. A summary of FTE numbers, gender breakdown, and average ages, years of service and pensionable salary, across the four main pension schemes in the public sector is set out in table 4.6 below.

**Table 4.6: Active Employee Data across Pension Schemes in the Public Service**

	FTE	Gender Breakdown	Average Age (Years)	Average Service (Years)	Average Pensionable Salary (€)
<b>Pre 1995</b>	47,634	36% Male 64% Female	54.7	28.9	61,088
<b>Post 1995</b>	89,605	35% Male 65% Female	48.4	19.1	54,764
<b>Post 2004</b>	91,432	28% Male 72% Female	42.6	10.5	52,254
<b>Single Scheme</b>	101,905	34% Male 66% Female	36.3	2.4	39,292
<b>Total</b>	<b>330,576</b>	<b>33% Male 67% Female</b>	<b>44.0</b>	<b>12.9</b>	<b>50,172</b>

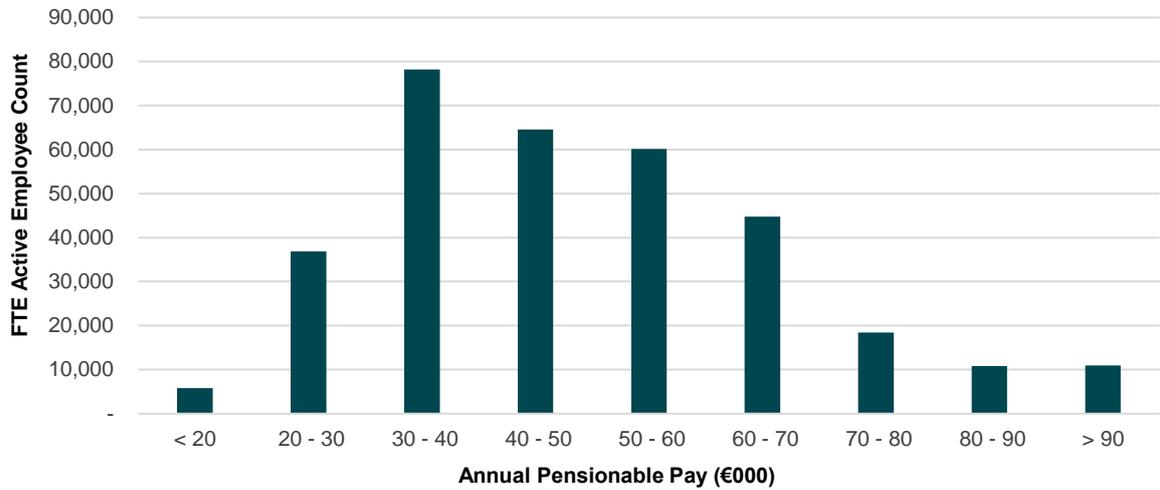
4.34. A summary of FTE numbers, gender breakdown, and average ages and years of service and pensionable salary, across all sectors in the public service is set out in table 4.7 below.

**Table 4.7: Active Employee Data across Sector in the Public Service**

	FTE	Gender Breakdown	Scheme	Average Age (Years)	Average Service (Years)
<b>Civil Service</b>	39,922	42% Male 58% Female	<b>Pre-2013</b>	49.7	21.0
			<b>Single Scheme</b>	38.2	2.1
<b>Education</b>	106,948	24% Male 76% Female	<b>Pre-2013</b>	45.4	16.0
			<b>Single Scheme</b>	36.0	2.9
<b>Health</b>	117,857	21% Male 79% Female	<b>Pre-2013</b>	48.2	16.7
			<b>Single Scheme</b>	36.6	2.3
<b>Defence</b>	9,403	93% Male 7% Female	<b>Pre-2013</b>	39.7	19.4
			<b>Single Scheme</b>	24.1	2.3
<b>Justice</b>	14,395	75% Male 25% Female	<b>Pre-2013</b>	41.8	17.7
			<b>Single Scheme</b>	28.5	1.5
<b>NCSAs</b>	13,707	47% Male 53% Female	<b>Pre-2013</b>	51.3	19.9
			<b>Single Scheme</b>	39.0	1.8
<b>Local Authorities</b>	28,342	62% Male 38% Female	<b>Pre-2013</b>	50.5	20.5
			<b>Single Scheme</b>	39.8	1.8
<b>Total</b>	<b>330,576</b>	<b>33% Male 67% Female</b>	<b>Pre-2013 Single Scheme</b>	<b>47.4 36.3</b>	<b>17.7 2.4</b>

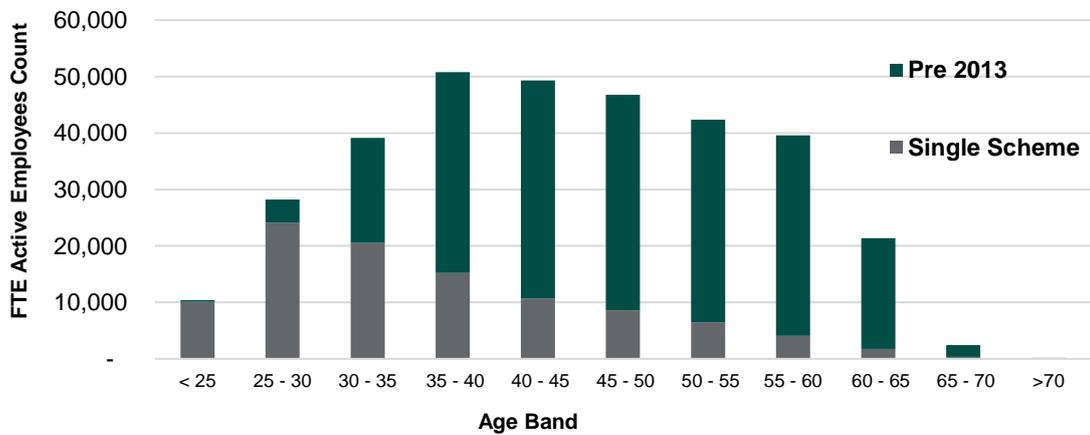
4.35. A breakdown of the FTE number of active employees across annual pensionable pay band as at year-end 2018 is presented in Chart 4.1. below.

**Chart 4.1. Number of Members by Salary Band**



4.36. A breakdown of the number of active employees across age band, and across the pre-2013 pension schemes vs the Single Scheme at year-end 2018 is summarised in Chart 4.2 below.

**Chart 4.2. Number of Members by Age Band**



### Pension in Payment Data

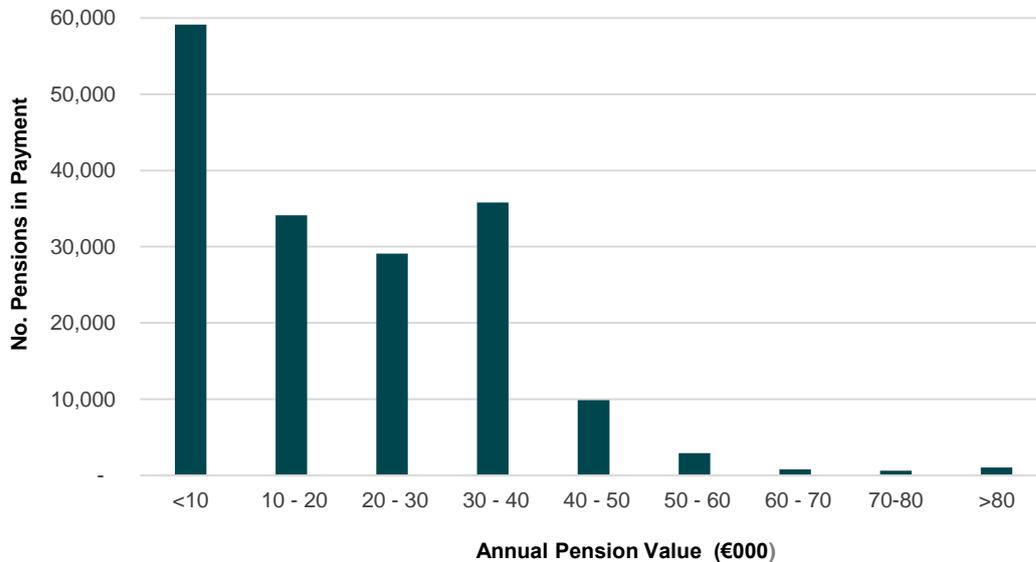
4.37. A summary of pension numbers, gender breakdown, and average ages and pension value, across all sectors in the public service is set out in table 4.8 below.

**Table 4.8. Pension in Payment Data across Sectors in the Public Service**

	Count	Gender Breakdown	Average Age (Years)	Average Pension Value (€)
Civil Service	25,190	51% Male 49% Female	69.8	18,136
Education	48,105	37% Male 63% Female	69.6	26,852
Health	48,350	22% Male 78% Female	69.0	16,054
Defence	12,483	90% Male 10% Female	63.0	18,551
Justice	10,601	79% Male 21% Female	68.5	30,027
NCSAs	7,958	59% Male 41% Female	71.7	21,465
Local Authorities	20,718	66% Male 34% Female	71.4	13,335
<b>Total</b>	<b>173,405</b>	<b>46% Male 54% Female</b>	<b>69.2</b>	<b>20,310</b>

4.38. A breakdown of the number of pensions in payment across pension value band as at year-end 2018 is presented in Chart 4.3. below.

**Chart 4.3. Number of Pensions in Payment by Pension Value**



### Active, Deferred & Pension in Payment Data

4.39. A breakdown of the % of active employees, deferred members and pensions in payment across age band is summarised in Table 4.9 below.

**Table 4.9: % of Current and Former Employees across Age Bands**

	<25	25-35	35-45	45-55	55-65	65-75	75-85	85-95	>95
<b>Current Employees</b>	3.2%	20.4%	30.3%	27.0%	18.4%	0.7%	0.0%	0.0%	0.0%
<b>Deferreds</b>	0.3%	20.6%	33.3%	27.3%	18.0%	0.5%	0.0%	0.0%	0.0%
<b>Pensioners</b>	1.3%	0.1%	0.7%	3.0%	24.9%	43.5%	20.3%	5.8%	0.4%
<b>Total Membership</b>	<b>2.3%</b>	<b>14.2%</b>	<b>21.6%</b>	<b>19.7%</b>	<b>20.4%</b>	<b>13.8%</b>	<b>6.2%</b>	<b>1.8%</b>	<b>0.1%</b>

## 5. Technical specifications

### Methodology

- 5.1. The methodology underlying this valuation follows that prescribed in the Technical Compilation Guide (2020) for Pension Data in National Accounts produced by Eurostat and the European Central Bank.
- 5.2. The Technical Compilation Guide recommends that the Projected Benefit Obligation or the 'PBO' methodology be applied when determining pension obligations of defined benefit schemes in respect of public service employees.
- 5.3. The State's Accrued-to-date liability ("ADL") in respect of the public service was estimated accordingly - that is; the entitlements or obligations representing the present value of retirement benefits to be paid in the future on the basis of accrued rights of public servants as at year-end 2018. 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 was not given to rights accrued by present or future employees after the relevant valuation year. The ADL is also known as the 'closed group valuation' approach.
- 5.4. Under the PBO approach, it was assumed that pension and gratuity benefits are updated 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. The PBO approach thereby allows country-specific differences in indexation policies to be reflected in the estimations.
- 5.5. For the calculation of the ADL in respect of Irish public service occupational pension, accrued benefits were updated in line with wage growth pre-retirement and pensions are also updated in line with wage growth post retirement (with the exception of post 2013 entrants whose benefits are updated in line with CPI), reflecting the historic discretionary practice of parity pay linkage.
- 5.6. For the estimation of pension liabilities, the EU Technical Guide notes the importance of distinguishing 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 accrued 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.
- 5.7. 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 60% of the employee's retirement pension, plus associated children's pensions.
- 5.8. The estimation of retirement benefit entitlements for active members closely follows the approach adopted in respect of current pensioners.
  - 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.
  - 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 period of the participant until retirement.
  - The projection of the future career starts after the year for which the latest data on past earnings is available i.e. from 2019 onwards.
  - The pension benefit at the future point of retirement has been calculated for all active employees for whom detailed data has been obtained.
- 5.9. This valuation was carried out using ProVal. This is an actuarial valuation system used by actuaries for valuation and projection of pension related expenditure.

- 5.10. 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 line basis which captured the various rules and entitlements by sector (e.g. Civil Service, Health, and Education) and by cohort (pre 1995, post 1995, post 2004 and post 2013 entrants).
- 5.11. The full range of liabilities valued includes 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.
- 5.12. 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 below.
- 5.13. The ADL calculated under the PBO approach constitutes the state's obligations to make pension and other benefit payments to current and their dependants on and from the valuation date.

### Overview of assumptions

- 5.14. A large number of critical financial and demographic assumptions were required in order to calculate an estimate of the value of retirement benefits payable in the future.
- 5.15. The macroeconomic assumptions are those produced by the European Commission for Ireland and intended to be used in the 2021 Ageing Report.
- 5.16. 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.
- 5.17. The assumptions should be considered in totality and any one element should not be considered in isolation.
- 5.18. 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 5.1: Primary assumptions for ADL purposes for EU Balance sheet**

	Current valuation	Previous valuation
Discount Rate	4.00% p.a.	5.00% p.a.
Inflation	2.00% p.a.	2.00% p.a.
Real Salary increases <sup>10</sup>	Labour productivity per hour growth rate for Ireland which translates to an overall nominal rate of 1.48% p.a. in the long term	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	88% ILT 15 (for males) 91% ILT 15 (for females)	Proxy to 88% ILT 15 (for males) Proxy 91% to ILT 15 (for females)
Mortality Post Retirement Improvement Factors	Yes	Yes

<sup>10</sup> 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 2021 Ageing Report.

## Financial assumptions

### Discount rate

- 5.19. 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.
- 5.20. For government-managed pension schemes, central government debt securities are generally considered as a suitable basis for the discount rate.
- 5.21. Furthermore, the choice of the discount rate is ideally based on the following criteria:
- 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 , for example, European central government debt securities.
  - The maturity of these debt securities should be similar to that of pension entitlements, i.e. at least 10 years, but preferably longer.
  - In order to guarantee 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.
  - A stable discount rate should be applied to avoid the noise resulting from frequent changes.

The **discount rate** applied to estimates of future pension benefits in the case of accrued-to-date entitlements is one of the single most important assumptions to be made in the modelling of pension schemes, since its accumulated impact over many decades can be very large.

The discount rate from a chosen approach may change over time, which would lead to revaluations in the accounts. The current valuation uses a 4% p.a. discount rate compared to 5% p.a. at the previous valuation which leads to a material increase in the value of the obligation at this valuation.

- 5.22. In line with the above criteria, for the first Table 29 data transmission – December 2017 on 2015 data– it was recommended by the Ageing Working Group to set the discount rate at 3% p.a. in real terms and 5% p.a. in nominal terms.
- 5.23. As a general rule, since Table 29 data are collected every three years, for every transmission the discount rate is aligned with the one recommended in the Ageing Report, also a triennial exercise.
- 5.24. The ultimate long-term interest rate assumptions adopted by the Ageing Working Group for the 2021 Ageing Report have been lowered to a level of 2.0% p.a. for the discount rate in real terms for the EU countries. As a result the nominal target discount rate is set at 4.0% p.a. (the inflation target being: 2%) for EU countries.
- 5.25. The choice of the discount rate in business accounting standards differs. International accounting standards (IAS) aim for a discount rate that reflects market yields on the balance sheet of “high quality corporate bonds”. In this context, “high quality” is generally defined by business accountants as bonds with a high rating. Where the markets for corporate bonds are thin, it is possible to use yields on central government bonds.
- 5.26. Where assumptions and methodology are prescribed by another party, ASP PA-2 (paragraph 2.8) requires the actuary, as a Fellow of the Society of Actuaries in Ireland, to comment of their willingness to support the prescribed assumptions and methodology. With respect to the discount rate assumption, it is believed that a nominal discount rate in the range 2.9% to 4.4% 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.

### Inflation

- 5.27. There is no definitive way to assess future Irish price inflation, as index-linked securities are not generally available in Ireland. It is possible to assess Eurozone inflation by examining the difference in yields available on nominal and index-linked bonds.
- 5.28. 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.

## Wage growth

- 5.29. 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 2021 Ageing Report — reflecting productivity growth per capita — should if possible be used for the estimation of pension entitlements.
- 5.30. 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 2021 Ageing Report.

For defined benefit schemes the level of pension entitlements depends also significantly on future **wage growth**.

The Irish public service schemes apply a formula to the member's salary to determine the level of the initial pension.

An overall wage growth assumption (including promotional allowance) of 3.48% p.a. has been set based on the Technical Compilation Guide and the 2021 Ageing Report.

**Table 5.2 Average wage growth rates per 2021 Ageing Report**

	2025	2035	2045	2055	2065
Real	1.65%	1.37%	1.54%	1.54%	1.54%
Nominal	3.65%	3.37%	3.54%	3.54%	3.54%

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

## Post-retirement pension increases

- 5.32. Pension increases are a discretionary benefit and require Ministerial consent. Pensions for pre-2013 cohorts are assumed to increase at pay 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.
- 5.33. Post-2013 cohorts, i.e. Single Scheme members' benefits are indexed in line with increases in the Consumer Price Index (“CPI”).

## Other financial assumptions

- 5.34. The table below sets out the other financial assumptions used in this valuation.

**Table 5.3 Other financial assumptions**

	Current valuation	Previous valuation
State pension contributory increases	3.48% p.a.	3.45% p.a.
Valuation of supplementary pension	Yes	Yes
Allowance for administration costs	Nil	Nil

## Demographic assumptions

### Life expectancy / mortality rates

- 5.35. The assumed life expectancy in retirement is the most critical demographic assumption.
- 5.36. There is an element of discretion<sup>11</sup> 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 commonly used for assessing liabilities of occupational pension schemes in Ireland and reflect a longer life expectancy than the population average.
- 5.37. A standard mortality table recommended by the Society of Actuaries in Ireland was used in the present analysis.
- 5.38. The base table used for the post-retirement mortality assumptions reflects a base table with the rate of mortality improvement factors reflecting an analysis performed by the CSO in 2013 which showed that while mortality continued to improve, the rate of improvement was slower than compared with previous estimates.
- 5.39. Mortality is based on 88% of ILT15 for males and 91% of ILT15 for females, with allowance for future improvements in line with CSO projection from 2011.
- 5.40. 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.
- 5.41. In practice, a proxy basis [58% ILT15 (males) / 62% ILT15 (female)] in conjunction with annual improvement loadings (for each year between 2014 and year of retirement) was derived as an approximation to a two-dimensional generation-based table. This proxy basis was used at the last valuation.
- 5.42. Future mortality improvements are in line with those used by the CSO in its 2013 population and labour force projections (i.e. initial rates of 3% (males) and 2.5% (females) tending to a long-term rate of improvement of 1.5% p.a. by 2036).
- 5.43. These improvements in mortality rates can best be illustrated by considering the life expectancies after retirement of average active members. The table below shows the impact of the anticipated mortality improvements on the life expectancy of a 65 year old member.

**Table 5.4: Life Expectancies with allowance for future mortality improvements**

Gender	Life expectancy of a 65 year old member reaching retirement in 2018	Life expectancy of a 65 year old member reaching retirement in 2038
Male	21.4 years	23.8 years
Female	23.9 years	25.9 years

- 5.44. Since the previous valuation, the Department took part in a mortality investigation in conjunction with the Society of Actuaries in Ireland. The investigation considered the appropriateness of the 88% ILT15 (males) and 91% (ILT15) with CSO (2013 version) improvements mortality tables relative to Irish pensioner in payment mortality experience. The results were published in October 2020<sup>12</sup> and concluded that the mortality table 88% ILT15 (males) and 91% (ILT15) with CSO (2013 version) improvements had been a good fit for the actual experience.
- 5.45. As mortality changes have proven particularly difficult to predict, it is intended to keep these assumptions under review at future valuations.

<sup>11</sup> 5.2.1 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."

<sup>12</sup> 2020 Self-Administered Pension Schemes Pensioner Mortality Study

### Assumed retirement ages

5.46. The table below sets out the assumed retirement ages used in this valuation to calculate the ADL.

**Table 5.5: Table of Normal Retirement Ages assumed in ADL Valuation**

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

5.47. The above table of assumed retirement ages were set with reference to the following retirement ages in the public service.

- Employees recruited before 1<sup>st</sup> April 2004 generally have a minimum retirement age of 60 and a maximum of 70;
- Employees recruited after 1<sup>st</sup> April 2004 and before 31<sup>st</sup> December 2012 generally have a minimum retirement age of 65 but no maximum retirement age;
- Employees recruited after 1<sup>st</sup> 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<sup>13</sup> and to age 68 in 2028;
- Security forces currently have earlier minimum retirement ages.

### Other demographic assumptions

5.48. The table below sets out the other financial assumptions used in this valuation.

**Table 5.6: Table of Normal Retirement Ages assumed in ADL Valuation**

	Current valuation	Previous valuation
Proportion married	90%	90%
Age gap between spouses	Males are assumed to be three years older than females.	Males are assumed to be three years older than females.
Ill health loading	5%	5%
Staff turnover	No allowance	No allowance
Early retirement	No allowance	No allowance

### Sensitivity to Assumptions

5.49. 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 related increases (such as in respect of salary and pensions in payment increases) are the most significant financially. Section 6 of this paper sets out sensitivity analysis of the results.

### Overall appropriateness of assumptions

5.50. 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 is an element of discretion<sup>14</sup> 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 commonly used for

<sup>13</sup> The increase in State Pension Age from 2021 has been postponed and is currently in review by the recently established Pensions Commission. Any subsequent changes to legislation will be reflected in future actuarial valuations.

<sup>14</sup> 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."

assessing liabilities of occupational pension schemes in Ireland and reflect a longer life expectancy than the population average.

- 5.51. 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 2.9% to 4.4% 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 6 – sensitivity analysis.

#### **Appropriateness of Discount Rate**

- 5.52. 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.
- 5.53. 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 0.90% p.a. At the other end of the range a yield reversion assumption of 0.80% was allowed for such that the overall yield on bonds would be 1.7% p.a. over the long term
- 5.54. The discount rate is a critical assumption for funding purposes and interlinked with investment strategy. The baseline is a 100% bond / Liability Driven Investment (“LDI”) investment strategy (the ‘least risk’ portfolio) which gives a discount rate in the range of 0.9% p.a. – 1.7% p.a.
- 5.55. 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.
- 5.56. In keeping with the above, an equity risk premium (“ERP”) in the range of 3.0% p.a. - 4.0% p.a. could be considered reasonable.
- 5.57. Using a long term investment strategy of 67% equities and 33% long dated Eurozone government bonds assuming no yield reversion coupled with a 3% ERP, an assumed investment return of 3.9% p.a. on equities and 0.9% p.a. on bonds would be derived resulting in a long term discount rate of 2.9% p.a..
- 5.58. Alternatively assuming 0.8% yield reversion coupled with a 4% ERP, an assumed investment return of 5.7% p.a. on equities and 1.7% p.a. on bonds would be derived resulting in a long term discount rate of 4.4% p.a.
- 5.59. Overall, plausible discount rates in the range 2.9% - 4.4% p.a. would be calculated based on economic conditions prevailing at balance sheet date.
- 5.60. 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 used for simplicity.

## 6. Results of ADL

### Overview of results

- 6.1. The value of the State's ADL in respect of public service occupational pension schemes was estimated to be €149.6bn, or 46.2% of GDP<sup>15</sup>, as at 31<sup>st</sup> December 2018. This figure represents the present value of all accrued retirement entitlements in respect of current and former employees in the public service, calculated in accordance with the revised assumptions prescribed by Eurostat for year-end 2018 valuations.
- 6.2. The ADL figure of €149.6bn represents a significant liability for the State as it is the present value of all future retirement benefits to be paid to current and former public servants in respect of service to 31<sup>st</sup> December 2018.
- 6.3. The State's ADL calculated using the assumptions prescribed at the previous valuation is €124.9bn. This ADL figure is comparable with the previous estimate of €114.5bn calculated by the Department as at 31<sup>st</sup> December 2015.
- 6.4. In line with previous valuations, the new ADL estimate of €149.6bn was calculated under the assumption that future pension increases would be in line with pay-parity. The valuation was also carried out assuming that pension increases would be in line with increases in the CPI in which case the ADL figure was estimated to be €126.6bn, or 39.1% of GDP<sup>16</sup>, as at 31<sup>st</sup> December 2018. This represents a €23bn, or a 15%, decrease in the ADL as a result of the different post-retirement indexation policy assumed.
- 6.5. A breakdown of the accrued liabilities by active employees, pensions in payment and deferred members is set out in Table 6.1 below. The breakdown of the ADL at the previous valuation date and of the current ADL carried out on the previous valuation assumptions is included for the purpose of comparison.

**Table 6.1. High Level Results of ADL**

	Previous valuation	Current valuation		
		Previous valuation assumptions	Revised valuation assumptions	Consumer Price Inflation pension increase
	€ bn*	€ bn*	€ bn*	€ bn
Active Employees	53.9	59.5	74.8	63.5
Pensions in Payment	56.5	60.6	68.7	57.8
Deferred Members	4.1	4.8	6.1	5.3
<b>Total</b>	<b>114.5</b>	<b>124.9</b>	<b>149.6</b>	<b>126.6</b>

#### Notes:

1. The ADL makes no allowance for the cost of paying the State Pension (Contributory) to eligible public service employees.
2. \*The ADL figures set out above assume that current and future pensions in payment would be increased in line with pay parity with the exception of those in the Single Scheme whose pensions are indexed in line with CPI reflecting the terms of that scheme.
3. There are a small number of funded public service schemes that have been excluded from this analysis as the asset base is expected to result in an immaterial addition or reduction to the ADL.
4. The ADL makes no allowance for the commercial semi-state sector.

<sup>15</sup> Or, 75.9% of Modified GNI in the year 2018

<sup>16</sup> Or, 64.3% of Modified GNI in the year 2018

## Breakdown of results

- 6.6. A breakdown of the State's accrued liability estimate of €149.6bn across each sector of the public service is set out in Table 6.2 below.
- 6.7. The majority of the ADL is in respect of Education, Health and the Civil Service with approximately 33%, 26% and 14% of the accrued liabilities pertaining to these sectors, respectively.
- 6.8. The allocation of the ADL across sectors in the public service is dependent on many factors but, to a great extent, is a function of the number of current and former employees in each sector. For example, Education and Health have the largest number of active employees and pensions in payment and thus have the greatest associated ADL figures.

**Table 6.2. A breakdown of the ADL by Sector in the Public Service**

	Active Employees	Pensions in Payment	Deferred Members	Total Public Service
	€ bn	€ bn	€ bn	€ bn
Civil Service	10.7	8.9	0.9	20.5
Education	23.1	24.2	2.5	49.8
Health	21.6	15.1	1.7	38.5
Defence	3.9	5.8	0.1	9.8
Justice	5.3	6.6	0.1	12.0
NCSAs	3.7	3.0	0.3	6.9
Local Authorities	6.5	5.1	0.5	12.1
<b>Total</b>	<b>74.8</b>	<b>68.7</b>	<b>6.1</b>	<b>149.6</b>

- 6.9. Table 6.3 below shows an estimated breakdown of the ADL according to entrant category in the public service. Most of the accrued liability is in respect of the pre 1995 category with 68% of the ADL corresponding to this pension category. The post 1995 category, post 2004 category and Single Scheme represent 22%, 9% and 1% of the total ADL, respectively.
- 6.10. The allocation of the ADL across pension schemes is heavily correlated with the number of years of service and the retirement ages associated with each pension scheme. For example, almost €102bn or 68% of the liability is in respect of the pre 1995 pension scheme as a result of those in this pension scheme generally having greater service and lower retirement ages than those in the post 1995 and post 2004 pension schemes.
- 6.11. While the Single Scheme does not yet have a relatively material effect on the ADL figure (c. €1.1bn), it is expected that it will reduce spending on retirement benefits by over 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.

**Table 6.3. A breakdown of the ADL by Entrant Category in the Public Service**

	Active Employees	Pensions in Payment	Deferred Members	Total Public Service
	€ bn	€ bn	€ bn	€ bn
Pre 1995	33.8	65.1	2.7	101.6
Post 1995	27.5	3.2	2.1	32.9
Post 2004	12.4	0.4	1.2	14.0
Single Scheme	1.1	0.0	0.1	1.2
<b>Total</b>	<b>74.8</b>	<b>68.7</b>	<b>6.1</b>	<b>149.6</b>

- 6.12. The ADL figure of €149.6bn was calculated under the pay-parity model whereby pensions are generally increased in line with, and on the same date as, pay awards granted to serving employees.
- 6.13. The post-retirement indexation policy is however at the discretion of the Minister of the Department of Public Expenditure and Reform. In particular, Section 47 of the Single Scheme legislation, the Public Service Pensions (Single Scheme and Other Provisions) Act 2012, allows the Minister, subject to resolution passed by both Houses of the Oireachtas, to extend the CPI-based adjustment of Single Scheme pensions to the generality of other public service pensions. Accordingly, the ADL was also calculated under the assumption that future pension increases

would increase in line with price inflation, or CPI. The resulting 15% fall in the ADL from €149.6bn to €126.6bn highlights the significant costs associated with pay parity for the State.

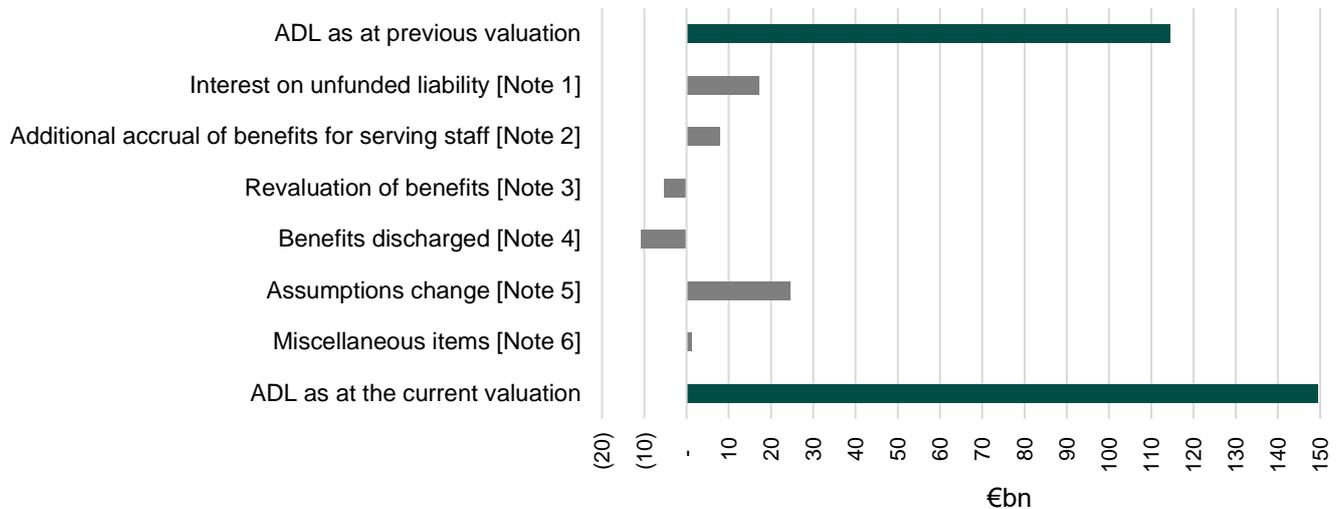
- 6.14. A breakdown of the alternative estimate of the ADL as €126.6bn, calculated under the assumption that pension increases would be in line with CPI for all pension schemes, is set out in Table 6.4 overleaf.

**Table 6.4. A breakdown of the ADL by Sector in the Public Service with CPI Indexation assumed**

	Active Employees	Pensions in Payment	Deferred Members	Total Public Service
	€ bn	€ bn	€ bn	€ bn
Civil Service	9.1	7.5	0.7	17.3
Education	19.7	20.6	2.2	42.5
Health	18.6	12.8	1.5	32.9
Defence	3.1	4.6	0.1	7.8
Justice	4.3	5.5	0.1	9.9
NCSAs	3.2	2.5	0.2	5.9
Local Authorities	5.5	4.3	0.5	10.3
<b>Total</b>	<b>63.5</b>	<b>57.8</b>	<b>5.3</b>	<b>126.6</b>

### Analysis of movement in ADL

6.15. The ADL has increased from €114.5bn at year end 2015 to €149.6bn at year end 2018. The following graph highlights the main experience items over the inter-valuation period.



#### Notes:

1. The interest on unfunded liability represents the increase in the present value of the obligation as a result of moving three years closer to settlement.
2. The actuarial estimate of benefits earned by serving staff over the period. The cost of accrual is shown gross of employee contributions and PRD which were approximately €3.9bn over the period.
3. The revaluation of benefits, in the form of pensionable remuneration and pensions in payment increases, were lower than expected over the period which has given rise to an actuarial gain in experience.
4. Benefits were paid, primarily in the form of pensions in payment as well as gratuities at the point of retirement. Paying these benefits releases the reserve held in respect of same; thereby reducing the obligation.
5. The value of the reported obligation has increased by €24.7bn as a result of assumption changes specified by Eurostat for this review. This highlights the sensitivity of the results to the valuation assumptions used, in particular to that of the annual discount rate underlying the calculations.
6. There is movement due to other factors in the obligation due to items such as mortality experience being different to that expected; data revisions, modelling differences as a result of the change to the valuation system.

## Sensitivity analysis

- 6.16. A number of critical assumptions set out in section 5 underlie the valuation results presented in this review. Scenario tests were further carried out in addition to the base case to quantify the responsiveness of the results to changes to certain parameters i.e. key financial and demographic assumptions. The following sensitivity analysis of the results allows for an understanding of the main areas of subjectivity and judgement inherent in the ADL calculations as a result of the uncertainty surrounding assumptions underpinning long term projections.
- 6.17. 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.
- 6.18. 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.

### Discount Rate

- 6.19. The sensitivity of the ADL results to the discount rate used in the valuation is illustrated in Table 6.5 below. The impact of a +/- 1% p.a. change in the discount rate is presented. All other parameters were assumed to remain unchanged when carrying out this sensitivity test.

**Table 6.5 ADL as at 31<sup>st</sup> December 2018**

	Discount rate ↓ by 1% p.a.	Baseline ADL	Discount rate ↑ by 1% p.a.
	€ bn	€ bn	€ bn
Civil Service	24.7	20.5	17.2
Education	60.6	49.8	41.7
Health	47.0	38.5	32.0
Defence	11.9	9.8	8.2
Justice	14.5	12.0	10.1
NCSAs	8.3	6.9	5.9
Local Authorities	14.6	12.1	10.2
<b>Total</b>	<b>181.6</b>	<b>149.6</b>	<b>125.3</b>

### Mortality

- 6.20. The impact of a change in life expectancies by +/- 1 year is set out in Table 6.6 below. All other parameters were assumed to remain unchanged when carrying out this sensitivity test on the ADL results.

**Table 6.6 Accrued Pension Liability as at 31<sup>st</sup> December 2018**

	Life Expectancy ↓ by one year	Baseline ADL	Life Expectancy ↑ by one year
	€ bn	€ bn	€ bn
Civil Service	19.7	20.5	21.3
Education	47.8	49.8	51.8
Health	37.0	38.5	40.1
Defence	9.4	9.8	10.2
Justice	11.5	12.0	12.5
NCSAs	6.6	6.9	7.2
Local Authorities	11.6	12.1	12.6
<b>Total</b>	<b>143.6</b>	<b>149.6</b>	<b>155.7</b>

### Pensionable Remuneration

- 6.21. Table 6.7 overleaf illustrates how a change in the salary inflation assumption of +/- 1% would likely impact the value of the ADL results. The results presented also reflect the impact of changes to the indexation of pensions in payment corresponding to changes made to salary inflation. All other parameters were similarly assumed to remain unchanged when carrying out this sensitivity test.

**Table 6.7 Accrued Pension Liability as at 31<sup>st</sup> December 2018**

	Pensionable Remuneration ↓ by 1% p.a.	Baseline ADL	Pensionable Remuneration ↑ by 1% p.a.
	€ bn	€ bn	€ bn
Civil Service	17.3	20.5	24.5
Education	41.9	49.8	60.2
Health	32.3	38.5	46.7
Defence	8.2	9.8	11.8
Justice	10.1	12.0	14.5
NCSAs	5.9	6.9	8.2
Local Authorities	10.2	12.1	14.6
<b>Total</b>	<b>125.9</b>	<b>149.6</b>	<b>180.5</b>

**Normal Retirement Age**

- 6.22. The sensitivity of the accrued liabilities to a change in the assumed retirement ages of active employees was also analysed. Specifically, the age of retirement was changed such that employees were assumed to retire at their minimum normal retirement age, or at age next birthday if older.
- 6.23. Accordingly, the majority of those in the pre-1995 and post-1995 schemes in the Civil Service, Health, Local Authorities, NCSAs and third level institutions were assumed to retire at their minimum normal retirement age of 60, while those in the primary and secondary school sector were assumed to retire at age 55 (conditional on having 35 years' service). No change was made to the security services.
- 6.24. The ADL was shown to increase by €11 billion in this sensitivity analysis.

**Data input**

- 6.25. The quality and completeness of the data used for this valuation was analysed in Section 4 of this paper. Overall, the data was considered appropriate for the purpose of carrying out the valuation and thus there is reasonably high confidence in the figure of €149.6bn calculated for the value of accrued liabilities.
- 6.26. However, in light of the incompleteness of some data samples and the adjustments made to the data in its entirety, it would be reasonable to expect that the actual value falls within a range of -5% and +5% of the derived ADL figure of €149.6bn, thus within the range of €142bn to 157bn.

## 7. Conclusion

- 7.1. 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 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 2018 was €3.6bn.
- 7.2. This review has not considered the long term sustainability of public service pension schemes. However, it is worth noting that a number of reforms to public service pension have been implemented in recent times. For example, the integration of public service pensions with the State Pension (Contributory) for employees who joined the public service post 6<sup>th</sup> April 1995, the subsequent increase in the minimum retirement age for new entrants from 2004, as well as the Single Public Service Pension Scheme introduced from 2013 which itself will, in time, reduce liabilities by around 35% from what would otherwise have been the case.
- 7.3. 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. The storage of the records in an electronic and ideally centralised format could be further progressed.
- 7.4. An updated actuarial review of public service pension obligations is required to be completed no later than three years after this review, under Regulation (EU) No 549 / 2013.

## 8. Appendices

### Appendix A – Glossary

#### **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. 1/80<sup>th</sup> towards pension and 3/80<sup>ths</sup> towards gratuity for each year of service.

#### **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.

#### **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.

#### **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.

#### **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.

#### **Actuary**

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

#### **Added years**

Extra years of pensionable service that may be granted to those in professional, technical and specialist positions, or in case of early retirement on grounds of ill health.

#### **"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.

#### **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".

**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.

**Early retirement**

The retirement of a member, with immediate retirement benefit, before normal pensionable age. The benefit may be reduced because of early payment.

**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.

**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.

**Gratuity**

A tax efficient lump sum payment, payable at pension age or on death.

**Indexation**

A system whereby pensions in payment and/or preserved benefits are increased at regular intervals by reference to a specified index, e.g. that of prices or earnings.

**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".

**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”.

**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, or on early retirement with reduction of benefit because of early payment.

**Net pensionable remuneration**

Pensionable remuneration less twice the annual rate of the maximum State Pension (Contributory) payable under the social welfare system to a person with no dependants, calculated on the last day of service. See also "co-ordination".

**Purchase of notional service/additional benefit**

Members of civil or public service pension schemes who are likely to have less than 40 years' service at their retirement, can top up their benefits through schemes of purchase of notional service. This means buying back missing years of service by lump sum or a regular payment which would be a percentage of their salary. Purchase of additional benefit by lump sum payment is also possible under the Single Scheme.

**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".

**Pay parity**

A term used to describe the practice 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.

**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 the vast majority of public service occupational schemes.

**Pension plan**

Another term for pension scheme.

**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.

**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 pensionable emoluments and allowances, subject to 3-year averaging. 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).

**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.

**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.

**Public service/sector pension scheme**

An occupational pension scheme for employees of central or local government, statutory and other semi-state bodies. In general, schemes are not funded and pension benefits are paid as they fall due by the State from current spending. The public 'sector' includes the commercial semi-state companies, which operate funded pension schemes.

**Scheme**

Scheme means an occupational pension scheme.

**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.

**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. However, the increase in State Pension Age from 2021 has been postponed and is currently in review by the recently established Pensions Commission. Any subsequent changes to legislation will be reflected in future actuarial valuations.

**Supplementary pension**

The difference between the combined occupational pension and State Benefit actually payable to the pensioner and the occupational pension that person would have received if not his/her occupational pension was not integrated (or co-ordinated) with the State Pension.

## Appendix B – Main benefit provisions

	Pre 6 <sup>th</sup> April 1995 entrant	6 <sup>th</sup> April 1995 – 31 <sup>st</sup> March 2004 entrant	Current post 1 <sup>st</sup> April 2004 entrant	Single Public Service Pension Scheme entrant
<b>Minimum retirement age</b> <i>(when benefits can be taken without actuarial reduction)</i>	<i>Standard</i> : 60 <i>Security</i> : 50 (with max service) <i>Teachers</i> : 55 (with 35 years' service)	<i>Standard</i> : 60 <i>Security</i> : 50 <i>Teachers</i> : 55	<i>Standard</i> : 65 <i>Security</i> : 55 (50 for Permanent Defence Force)	<i>Standard</i> : 66, increasing with the State Pension (Contributory) age to 67 in 2021 and to age 68 in 2028.  <i>Security</i> : Current earlier minimum retirement ages for the security sector continue to apply.
<b>Employee contribution</b>	<i>Civil Servants</i> : Implicit  :1.5% pensionable remuneration  <i>Gardaí</i> : 1.75% of pensionable remuneration  <i>Teachers</i> : 5% of pensionable remuneration.  + Spouses/Civil Partners and Children's Scheme : 1.5% of pensionable remuneration  + Pension Related Deduction / Additional Superannuation Contribution  + PRSI Class B/D: 0.9% + 3.1% on excess over €75,000.	3.5% of net pensionable remuneration <sup>17</sup> + 3.0% of gross pensionable remuneration  + Spouses/Civil Partners and Children's Scheme : 1.5% of pensionable remuneration  + Pension Related Deduction / Additional Superannuation Contribution  + PRSI Class A : 4.0%	3.5% of net pensionable remuneration + 3.0% of gross pensionable remuneration  + Spouses/Civil Partners and Children's Scheme : 1.5% of pensionable remuneration  + Pension Related Deduction / Additional Superannuation Contribution  + PRSI Class A : 4.0%	<i>Standard</i> : 3.5% of net pensionable remuneration + 3.0% of gross remuneration.  <i>Security</i> : 4.2% of net pensionable remuneration + 3.3% of gross pensionable remuneration  President, Ministers, members of the Oireachtas, the judiciary: 13% of pensionable remuneration  + Pension Related Deduction / Additional Superannuation Contribution  + PRSI Class A : 4.0%

<sup>17</sup> i.e. Pensionable salary less twice the maximum annual rate of State Pension (Contributory) payable to a person with no child or adult dependents

	Pre 6 <sup>th</sup> April 1995 entrant	6 <sup>th</sup> April 1995 – 31 <sup>st</sup> March 2004 entrant	Current post 1 <sup>st</sup> April 2004 entrant	Single Public Service Pension Scheme entrant
<b>Additional Superannuation Contribution (ASC)</b>	2019 & 2020:  <i>Standard:</i> First €32,000 @0% Next €28,000 @ 10% Balance @ 10.5%  <i>Fast Accrual:</i> First €28,750 @ 0% Next €31,250 @ 10% Balance @10.5%  2021 Onwards:  <i>Standard:</i> First €34,500 @0% Next €25,500 @ 10% Balance @ 10.5%  <i>Fast Accrual:</i> First €28,750 @ 0% Next €31,250 @ 10% Balance @10.5%	Same as Pre 1995	Same as Pre 1995	2019:  First €32,000 @0% Next €28,000 @ 6.66% Balance @ 7%  2020 Onwards:  First €34,500 @0% Next €25,500 @ 3.33% Balance @ 3.5%
<b>Employee retirement benefits</b>	Final salary pension  <i>Standard:</i> 1/80 <sup>th</sup> x pensionable remuneration for each year of reckonable service  Max 40 years reckonable service	Final integrated salary pension  <i>Standard :</i> Pensionable remuneration up to 3.33 x State Pension : 1/200 <sup>th</sup> for each year of reckonable service Pensionable remuneration in excess of 3.33 x State Pension: 1/80 <sup>th</sup> for each year of reckonable service  Max 40 years reckonable service	Final integrated salary pension  <i>Standard :</i> Pensionable remuneration up to 3.33 x State Pension : 1/200 <sup>th</sup> for each year of reckonable service Pensionable remuneration in excess of 3.33 x State Pension: 1/80 <sup>th</sup> for each year of reckonable service Max 40 years reckonable service	Career average integrated salary pension: adjusted by CPI, upward only.  <i>Standard:</i> Career average pensionable remuneration up to 3.74 x State Pension : 0.58% (1/172 <sup>th</sup> ) for each year of reckonable service Career average pensionable remuneration in excess of 3.74 x State Pension : 1/80 <sup>th</sup> for each year of reckonable service

	Pre 6 <sup>th</sup> April 1995 entrant	6 <sup>th</sup> April 1995 – 31 <sup>st</sup> March 2004 entrant	Current post 1 <sup>st</sup> April 2004 entrant	Single Public Service Pension Scheme entrant
	<p><i>Gratuity</i> : 3/80<sup>th</sup> x pensionable remuneration for each year of reckonable service : max 120/80<sup>ths</sup></p> <p><i>Gardaí</i>: Double reckonable service for each year of reckonable service over 20 years; e.g. 30 years actual = 40 years reckonable.</p>	<p><i>Gratuity</i> : 3/80<sup>th</sup> x pensionable remuneration for each year of reckonable service: max 120/80<sup>ths</sup></p> <p><i>Gardaí</i>: Double reckonable service for each year of reckonable service over 20 years; e.g. 30 years actual = 40 years reckonable.</p>	<p><i>Gratuity</i> : 3/80<sup>th</sup> x pensionable remuneration for each year of reckonable service : max 120/80<sup>ths</sup></p> <p><i>Gardaí</i>: Double reckonable service for each year of reckonable service over 20 years; e.g. 30 years actual = 40 years reckonable.</p>	<p><i>Gratuity</i>: 3/80<sup>th</sup> x career average pensionable remuneration for each year of reckonable service.</p> <p><i>Gardaí</i> : Career average pensionable remuneration up to 3.74 x State Pension : 0.58% for each year of reckonable service Career average pensionable remuneration in excess of 3.74 x State Pension: 1.43% (1/70<sup>th</sup>) for each year of reckonable service</p> <p><i>Gratuity</i>: 4.29% (3/70<sup>th</sup>) career average pensionable salary for each year of reckonable service.</p>
<b>Pensions in payment</b>	<p>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.</p>	<p>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.</p>	<p>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.</p>	<p>CPI linking; upward only for new entrants' post-operative date.</p>

## Appendix C – Data request variables

### Active Employees

- PPSN
- Date of Birth
- Gender
- Civil Status
- Pension Scheme
- Date of Entry into Scheme
- Minimum Normal Retirement Age
- PRSI Category
- Annual Pensionable Pay [Full Time Equivalent]
- Length of Service
- Full -Time Equivalent (FTE) Work Pattern

### Deferred Members

- PPSN
- Date of Birth
- Gender
- Civil Status
- Pension Scheme
- Preserved Pension Age
- PRSI Category
- Full – Time Equivalent (FTE)
- Pensionable Employment Start Date
- Pensionable Employment Leave Date
- Pensionable Remuneration that future pension will be based on. (pensionable pay + pensionable allowances)
- Pensionable service that pension will be based on

### Pensions in Payment

- PPS Number
- Date of Birth
- Gender
- Civil Status
- Pension Scheme
- Type of Beneficiary
- Pension Commencement Date
- Gross Annual Pension Value (i.e. pre-PSPR / pre-abatement and excluding any Supplementary Pension paid)
- Gross Annual Supplementary Pension Value (if any)

## Appendix D - ADL Supplementary Table

See below the Supplementary Table 29 – Column G - completed as at 31<sup>st</sup> December 2018. The table below has been prepared on the basis of pay parity pension increases in retirement.

			Discount rate 3%	Discount rate 4%	Discount rate 5%
	Column number		G		
<b>Opening balance sheet (€ Bn)</b>					
	1	<b>Pension entitlements</b>	<b>178.5</b>	<b>146.0</b>	<b>121.5</b>
Changes in pension entitlements due to transactions					
Σ 2.1 to 2.5	2	Increase in pension entitlements due to superannuation contributions	6.8	7.2	7.5
	2.1	Employer actual superannuation contributions	0.0	0.0	0.0
	2.2	Employer imputed superannuation contributions			
	2.3	Actual employee contributions	1.4	1.4	1.4
	2.4	Household social contribution supplements <sup>5)</sup>	5.4	5.8	6.1
	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	3.6	3.6	3.6
2 + 3 - 4	5	Changes in pension entitlements due to social contributions and pension benefits	3.2	3.6	3.9
	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
Closing balance sheet					
1+ Σ 5 to 9	10	<b>Pension entitlements</b>	<b>181.7</b>	<b>149.6</b>	<b>125.3</b>

## 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 (31<sup>st</sup> December 2017) and the closing value at the end of a period (31<sup>st</sup> December 2018).

**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 31<sup>st</sup> December 2017 position reflecting the ADL calculation in respect public service occupational pension and associated contingent benefits. The opening ADL is €144.9bn.

**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) which is currently known as Additional Superannuation Contribution (ASC) 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  $4\% \times €144.9bn = €5.8bn$

**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 31<sup>st</sup> December 2017 and 31<sup>st</sup> December 2018 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 31<sup>st</sup> December 2018 position reflecting the ADL calculation in respect of public service occupational pension obligations is €149.6 bn.

Table 29 has been completed on a 3 yearly basis below to include a high level summary of the movement in the ADL since the previous valuation. The table below has been prepared on the basis of pay parity pension increases and consumer price inflation increases in retirement.

			<b>Discount rate 4%</b>	<b>Discount rate 4%</b>
	Column number		G – Pay Parity	G – CPI indexation
<b>Opening balance sheet (€ Bn)</b>				
	1	<b>Pension entitlements</b>	<b>114.5</b>	<b>97.2</b>
<b>Σ 2.1 to 2.5</b>				
	2	Increase in pension entitlements due to superannuation contributions	20.7	19.6
	2.1	Employer actual superannuation contributions	0.0	0.0
	2.2	Employer imputed superannuation contributions	3.1	4.0
	2.3	Actual employee contributions	3.9	3.9
	2.4	Household social contribution supplements <sup>5)</sup>	13.7	11.7
	2.5	Less: Pension scheme service charges	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	10.3	10.3
	2 + 3 - 4	5 Changes in pension entitlements due to social contributions and pension benefits	10.4	9.3
	6	Transfers of pension entitlements between schemes	0.0	0.0
	7	Change in entitlements due to negotiated changes in scheme structure	0.0	0.0
<b>Σ 8 to 9</b>				
	8	Changes in entitlements due to revaluations <sup>6)</sup>	24.7	20.1
	9	Changes in entitlements due to other changes in volume <sup>6)</sup>	0.0	0.0
<b>Σ 10</b>				
	1 + Σ 5 to 9	<b>Pension entitlements</b>	<b>149.6</b>	<b>126.6</b>

## 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 (31<sup>st</sup> December 2015) and the closing value at the end of a period (31<sup>st</sup> December 2018).

**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 31<sup>st</sup> December 2015 position reflecting the ADL calculation in respect public service occupational pension and associated contingent benefits. The opening ADL is €114.5bn.

**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) which is currently known as Additional Superannuation Contribution (ASC) 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  $3 \times 4\% \times €114.5\text{bn} = €13.7\text{bn}$

**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. The primary change to the assumptions is the discount rate which reduced by 1% per annum and the impact is shown in this row.

**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 31<sup>st</sup> December 2018 position reflecting the ADL calculation in respect of public service occupational pension obligations is €149.6 bn.