



Government Actuary's Department

Armed Forces pension arrangements:

Actuarial valuation as at 31 March 2012

Report on methodology

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1 Introduction

- 1.1 This report is addressed to the Ministry of Defence (MoD). This report should not be reproduced or disseminated to other parties without prior consent. The Government Actuary's Department (GAD) does not accept any liability to third parties, whether or not it has agreed to the disclosure.
- 1.2 The purpose of this report is to summarise the methodologies adopted for certain aspects of the valuation calculations. It also explains why the approaches taken are necessary and the impact of the approaches taken on the valuation result.
- 1.3 The data and assumptions to be used for the valuation are the subject of separate reports.
- 1.4 Throughout this report the totals given for summed data may not be exactly the same as the sum of the components shown due to rounding effects.
- 1.5 Appendix A outlines the information which was provided to HM Treasury (HMT) to assist with their review of the methodology issues which are not covered directly by the HMT valuation directions¹.

¹ HM Treasury's *The Public Service Pensions (Valuations and Employer Cost Cap) Directions 2014* as amended.



2 Grouping of individual active member records

- 2.1 Individual active members have been grouped together for the purposes of calculating liabilities. This grouping is necessary to accommodate the volume of data within our valuation system. The membership is grouped according to pension arrangement (AFPS 75, AFPS 05 etc.), category (Officer or Other rank), gender and member's protected status (protected under transitional arrangements or unprotected). Within those larger groups the membership is then grouped by age (to nearest birthday).
- 2.2 The tables below shows the total number of individual records for the main schemes and the number of grouped records used for calculation purposes.

Table 2.1 – Number of records for Protected Members

Scheme	Officers/ other ranks	Individual records	Grouped records	Individual records	Grouped records
		Males		Females	
AFPS 75 ²	Officers	5,263	21	242	13
	Other ranks	4,330	13	213	12
AFPS 05 ³	Officers	1,899	20	36	14
	Other ranks	2,620	14	43	10
FTRS PS ⁴	Officers	13	9	5	4
	Other ranks	133	14	10	7
RFPS ⁵	Officers	456	16	40	10
	Other ranks	289	15	17	8
Total		15,003	122	606	78

Table 2.2 - Number of records for Unprotected Members

Scheme	Officers/ other ranks	Individual records	Grouped records	Individual records	Grouped records
		Males		Females	
AFPS 75	Officers	12,330	21	2,034	22
	Other ranks	65,720	23	6,543	23
AFPS 05	Officers	7,496	27	1,508	26
	Other ranks	70,173	30	6,891	29
FTRS PS	Officers	2	2	1	1
	Other ranks	54	13	8	7
RFPS	Officers	437	29	107	24
	Other ranks	1,883	32	170	31
Total		158,095	177	17,262	163

² Armed Forces Pension Scheme 1975

³ Armed Forces Pension Scheme 2005

⁴ Full-Time Reserve Service Pension Scheme 1997

⁵ Reserve Forces Pension Scheme 2005



3 Active membership projections

- 3.1 The Directions require the actuary to calculate the cost of benefits accruing over the periods 1 April 2012 to 31 March 2015 and 1 April 2015 to 31 March 2019.
- 3.2 In addition to the assumptions used, the main factors affecting the expected cost of the benefits are:
- (i) The scheme benefits being accrued by members; and
 - (ii) The profile of the active membership over these periods.
- 3.3 The former is particularly important due to the changes being introduced on 1 April 2015 as a result of the reform of the Armed Forces Pension Scheme and related arrangements (AFPS or 'the Scheme'). The expected cost of benefits provided to members remaining in the existing scheme differs from the expected cost of providing those members with benefits in the 2015 scheme (AFPS 15). Further, the expected cost of providing benefits varies for members with differing benefits within the existing arrangements (notably for members within different pension schemes eg AFPS 75 compared to AFPS 05).
- 3.4 The Directions therefore implicitly require the actuary to determine the expected active membership up to 31 March 2019 in order to determine the valuation results. However, for a practical application of the methodology we have focussed on the membership of the Scheme as at 31 March 2015, 1 April 2015⁶ and 31 March 2019.

Approach to determining the active membership of the AFPS as at 31 March 2015 and 31 March 2019

- 3.5 The valuation system does not directly allow for the run off of members from the various categories and replacement with new entrants. Because of this it is necessary to separately project the membership within each pension arrangement and category at the valuation date to the start and end of the implementation period (1 April 2015 to 31 March 2019) to enable the valuation results to be calculated.

⁶ The active membership will essentially be the same on both 31 March 2015 and 1 April 2015. The difference is that unprotected members will transfer across to the 2015 scheme on 1 April 2015. For the purpose of this report, any reference to data as at 31 March 2015 also applies to the data as at 1 April 2015.



- 3.6 There are two main alternative approaches which could be used to determine the active membership at future dates:
- (i) Assume the active population remains relatively stable by total salary roll at each age. Appropriate adjustments would be made to allow for the proportion of members in AFPS 05 and RFPS to increase during the period from 1 April 2012 to 31 March 2015, as new entrants will all join those schemes. From 1 April 2015 adjustments would be made to allow for unprotected members to transfer to AFPS 15 and for new joiners to join AFPS 15.
 - (ii) Project forward the 31 March 2012 data and allow for expected changes in the workforce at future dates.
- 3.7 There are a number of uncertainties regarding the development of the membership profile of the Armed Forces, for example deployment characteristics, the effect of the MoD's New Employment Model and the increase in volunteer reserves. We also note that the shape of the membership distribution (see chart 3.1) includes a dip relating to ages around the mid-thirties. We believe that this is partly as a result of historic recruitment patterns but it also relates to the typical points of departure in the scheme (e.g. departure after 12 years of service and departure at IP/EDP point) and so to some extent this feature would still exist in a stable membership scenario.
- 3.8 MoD informed us that its best estimate is that the membership profile of the Armed Forces (in relation to age and rank) will remain broadly stable over the period to 2019. We recognise that the membership profile in practice is unlikely to be entirely stable, but given the very significant uncertainty in the development of the membership profile, a stable membership profile is considered to be the most reasonable assumption. This means that the first projection option above seems most appropriate.
- 3.9 We have therefore projected the membership over the period from the valuation date until the end of the implementation period so that the overall profile in terms of distribution of payroll by age, gender and officer/other rank will remain stable. If an alternative assumption were adopted, the contribution rates determined as part of the valuation (both the employer contribution rate and the cost cap) would be likely to differ.
- 3.10 To allow for the changing split of the membership by scheme, within each gender and officer/other rank group we have assumed the following:
- > For each age group on 31 March 2015, the proportional split of payroll between AFPS 75 and AFPS 05 (and similarly between FTRS PS and RFPS) will be the same as the proportional split on 31 March 2012 for members who were three years younger. So for example the proportional split of payroll between AFPS 75 and AFPS05 for 40 year old male other ranks as at 31 March 2015 will be the same as the split for 37 year old male other ranks as at 31 March 2012. The overall stable membership profile is maintained by adding new entrants at younger ages in AFPS 05 and RFPS.
 - > All unprotected members are assumed to enter AFPS 15 on 1 April 2015.



- > For each age group on 31 March 2019, the proportional split of payroll between AFPS 75, AFPS 05 and AFPS 15 (and similarly between FTRS PS, RFPS and AFPS 15) will be the same as the proportional split on 1 April 2015 for members who were four years younger. The overall stable membership profile is maintained by adding new entrants at younger ages in AFPS 15.
- 3.11 The distribution of the membership by payroll at the valuation date and at the start and end of the implementation period is shown in the charts below. This is before adjustment for overall paybill in line with the MoD's OBR projections. The categories shown relate to the scheme membership before 1 April 2015; by 31 March 2019 all the unprotected members will have moved into AFPS 15.

Chart 3.1: 2012 membership profile by pay

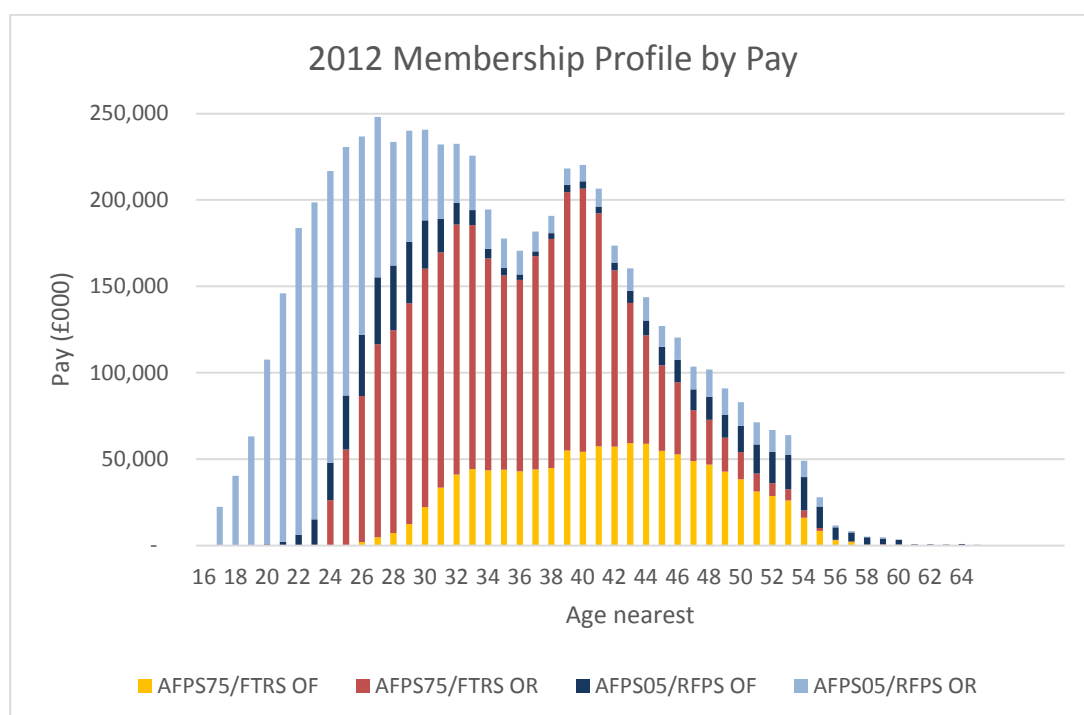




Chart 3.2: 2015 membership profile by pay

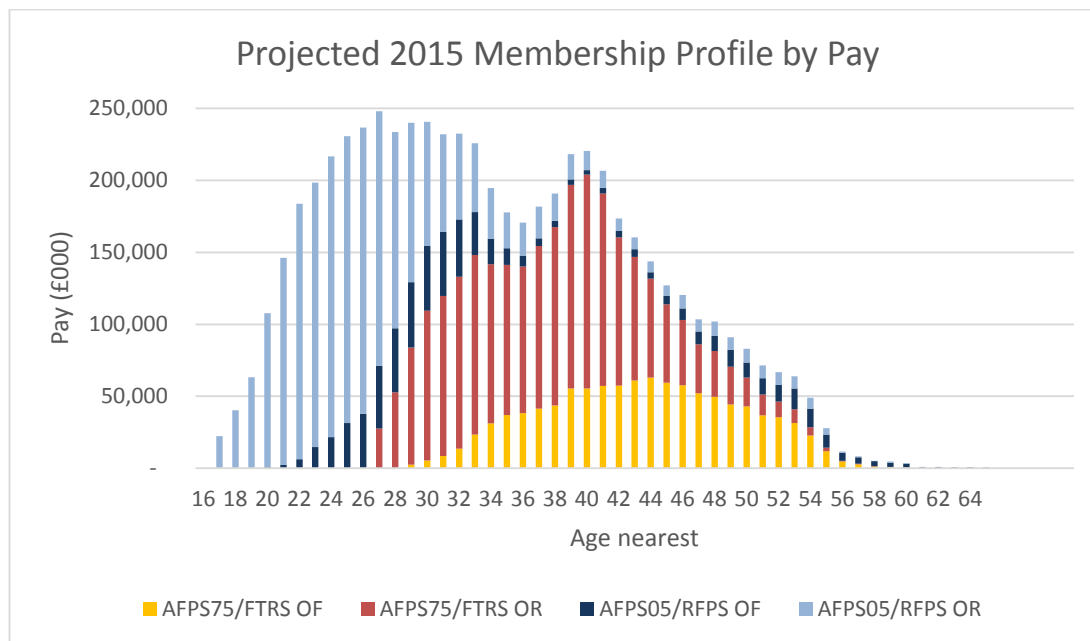
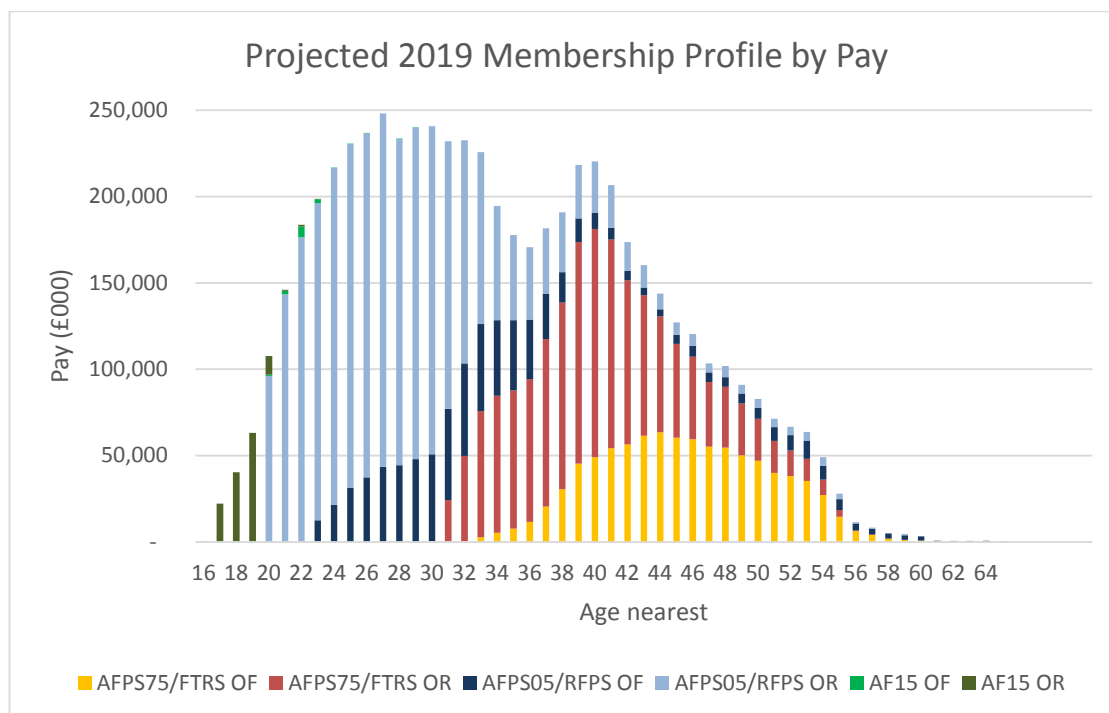


Chart 3.3: 2019 membership profile by pay





- 3.12 The resultant proportions of payroll by protection status as at the start and end of the implementation period are shown below together with the proportions at the valuation date. Also shown is the average age of each group of members.

Table 3.1: Projected payroll

	31 March 2012		1 April 2015		31 March 2019	
	Proportion of payroll	Average age*	Proportion of payroll	Average age*	Proportion of payroll	Average age*
Unprotected	86.05%	31.8	91.55%	32.7	96.89%	33.6
Protected	13.95%	49.6	8.45%	51.6	3.11%	54.2

* weighted by pay

- 3.13 In line with MoD's projections provided to OBR in autumn 2014, based on a total payroll of approximately £6.1bn as at 31 March 2012, the total payroll (in 2012 terms) is projected to be approximately £5.4bn at 31 March 2015 and £5.3bn at 31 March 2019.

Projecting the membership beyond 31 March 2019

- 3.14 The total pensionable payroll as at 31 March 2019 is assumed to be in line with MoD's projections provided to OBR in autumn 2014 (see paragraph 3.13). After 2019, the total salary roll is assumed to increase in line with general salary increases set out in Direction 17. The salary roll up to 31 March 2030 is required to determine the deficit contributions payable under Direction 27(1)(a) and (c).

Membership projections for the employer cost cap

- 3.15 The same membership projections are used for the cost of accrual over 2015-19 (Direction 27(1)(d)) and the proposed employer cost cap (Direction 53).



4 Accrual cost methodology

- 4.1 As discussed in section 2 of this report, individual active members have been grouped together for the purpose of calculating liabilities. This grouping is necessary to accommodate the volume of data within our valuation system.
- 4.2 Direction 11 requires the use of the projected unit methodology to determine the valuation results.
- 4.3 When determining the costs of accrual as required by the Directions 27(1)(b), 27(1)(d) and 53(1), the cost has first been determined at the start and end of the relevant period based on the (projected) membership of the sections of the scheme and the applicable assumptions at those times. The overall cost of accrual for the period is then determined as the average cost of accrual at the start and end, weighted by the expected payroll (in 2012 terms) at these times.
- 4.4 Directions 14, 16 and 17 specify some modifications to the financial assumptions in the short term. An implication of the short term modifications is that the projected unit methodology is expected to result in an increasing standard contribution rate over successive periods. For example the cost of accrual under the existing scheme is lower in 2012 than in 2015 (for a similar group of members). This affects the employer contribution rate calculations but has no effect on the cost cap calculation since short term assumptions are explicitly disregarded for this purpose in Direction 53.
- 4.5 Non-accruing benefits such as lump sums payable on death in service or enhancements payable on ill-health retirement or death in service are recognised only at the time of retirement or death.



5 Approximations

Guaranteed Minimum Pensions (GMPs)

- 5.1 Individual GMP data could not be supplied for members and so the savings have been estimated in an approximate manner.
- 5.2 The approximation is based on the ratio of GMP to other pension for pensioners who are old enough for GMP to be in payment. This provides an indication of the total GMP that will have been accrued in the Scheme. The approximation is intended to be unbiased but its accuracy will be affected by changes in scheme size and earnings profile over the period of GMP accrual (1978-1997).
- 5.3 The total estimated savings are around 0.2% of total liabilities and allowance for this serves to reduce the deficit contributions (assessed as being required for 15 years from 2015) by around 0.2% of pay, compared with valuing all benefits as fully indexed pensions. All of the savings have been attributed to pensioner members.
- 5.4 The estimation of the GMP savings has no impact on the calculation of the cost cap.

Data issues

- 5.5 The following other approximations have been required as a result of insufficient or unreliable membership data:
 - > All pensioners valued as normal health rather than ill-health and mortality assumptions derived on a consistent basis.
 - > Members of Non Regular Permanent Staff Pension Scheme – approximate uplift to liabilities on headcount basis.
 - > Uplift at age 55 for members who have taken resettlement commutation in AFPS 75 determined on approximate basis.

Further details can be found in the report entitled *Armed Forces pension arrangements: Report on membership data as at 31 March 2012* dated 24 February 2015.

Earnings cap

- 5.6 For members joining AFPS for pensionable service on or after 1 June 1989 pensionable pay is restricted to the 'earnings cap' (unless they have linked service). Due to the way in which individual active member data is grouped for valuation purposes it is not possible to directly restrict pay in the valuation system. The earnings cap has therefore not been allowed for. We note that there are very few members of the scheme whose earnings are either already above the earnings cap or estimated to exceed the earnings cap by retirement and so this approximation is not expected to be material.



Public Service Transfer Club (PSTC)

- 5.7 Allowance has not been made for the potential additional liabilities arising from inward transfers on PSTC terms. The volumes of transfers have historically been small and if they continue at these levels the financial impact is not expected to be material.

Expenses

- 5.8 There is no allowance in the current employer contribution rate in respect of the scheme's administration expenses, and no such allowance has been included in calculating the employer contribution rate required from 2015.

General pay increases

- 5.9 Pay increases are assumed to occur on 1 April each year in accordance with Direction 17, eg an increase of 2% on 1 April 2015.

Dependants' pensions

- 5.10 No allowance has been made for short term dependant pensions or children's pensions (other than those already in payment), on grounds of immateriality.

State Pension Age

- 5.11 A member's Deferred Pension Age in the 2015 scheme is set equal to the greater of 65 and their SPA. Direction 18 sets out the SPA to use for a member in the valuation calculations. Increases in SPA are not instantaneous. For example, someone born on 5 April 1960 has an SPA of 66 years, someone born on 5 October 1960 has an SPA of 66 years and 6 months, and someone born on 5 April 1961 has an SPA of 67.
- 5.12 For the purposes of the valuation calculations we have taken a pragmatic approach to calculate each member's SPA. Using the example above, anyone born between 5 April 1960 and 30 September 1960 is assumed to have an SPA of 66, and anyone born between 1 October 1960 and 5 April 1961 is assumed to have an SPA of 67. The same approach has been adopted for the transition between other SPAs. This approach is not expected to have a material impact on the valuation results.

Deferred members above Deferred Pension Age

- 5.13 Those deferred members already above their Deferred Pension Age are assumed to claim their benefits immediately. No liability is valued for deferred members who are seven years or more past Deferred Pension Age, in line with MoD's assumption that they will not claim their benefits.



Appendix A: Copy of methodology summary provided to HMT on 9 October 2014

Brief description of overriding assumption(s)	Reduction in total headcount in line with AS 2014 forecasts provided to OBR by MOD. However, profile of population will remain stable in terms of distribution of headcount and pay by age and rank.
Rationale	Stable profile agreed by MOD stakeholders to be best available assumption given uncertainty about MOD's New Employment Model, take-on of volunteer reserves etc. New entrants assumed to replace members at youngest ages, which reflects recent experience.
Payroll at 31/3/12	£6.1bn
Projected payroll at 31/3/15 (in 2012 terms)	£5.4bn
Projected payroll at 31/3/19 (in 2012 terms)	£5.3bn
Brief description of transition from pay at 2012 to 2015/2019 if not broadly linear	Large drop (in 2012 terms) between 2012 and 2015. Small further fall to 2016 – then assumed to be stable until 2019.
Average age* of actives at 31/3/12	34.3
Average age* of new entrants 2012-2015	19 for other ranks; 24 for officers
Average age* of new entrants 2015-2019	19 for other ranks; 24 for officers

* weighted by pay

And further assumptions/approximations

Grouping of active members (to run through Superval)	Grouped by age, gender, scheme and officer/other rank. Around 500 groups to cover 191,000 active members in 2012.
Rate up of data	No significant rate ups as salary and pension rolls close to accounts. Minor rate ups for known missing data.
Application of methodology	Accrual cost of any required period will be taken as the average of the cost for the membership at the start and end of the period (with appropriate selection of YoU mortality in the runs used)
Salary used in the assessment of accrual	Salary at the time of accrual with revaluation to retirement (not average revalued salary over all service)
GMP	Savings calculated approximately based on GMP data above GMP payment age. Approximation intended to be unbiased
Earnings cap	Not material for AFPS
Public sector transfer club	No allowance. Club transfers in are not significant and allowance would not be material at 0.1% level.



Choice	N/A
Allowance for re-entry by current actives	No allowance
Allowance for re-entry by current deferreds	none
Cost of non-accruing benefits (eg lump sum on death in service and service enhancements)	Recognised only at the point liability emerges (eg on death in service or ill-health retirement)
Cost of double accrual	N/A. Non-uniform accrual for AFPS 75 is treated using agreed accrued rights methodology.
Allowance for expenses	None
Allowance for final salary definition, in excess of salary in final year	None
Allowance for pay freeze on promotional/progression salary increases	None
Allowance for short-term spouse pension	None
Modelling of early retirement	None. There is no early retirement from active service. Early payment of deferred benefits is actuarially neutral and so no allowance is made.
Modelling of late retirement	No late retirement assumed where actuarially neutral enhancement applies
Modelling of members with non-integer SPA	Use nearest integer
Treatment of deferred members above NPA	Members more than 7 years above deferred pension age excluded in accordance with MOD's accounting policy
Application of interest to notional assets	Discount rate assumed to apply uniformly over any particular year; all cashflows treated as applying mid-year
Member contribution yields	N/A
Allowance for children's pensions	No allowance as not expected to be material