Government Actuary's Department

Scottish Teachers' Superannuation Scheme

Actuarial valuation as at 31 March 2012
Report by the Scheme Actuary

Date: 27 February 2015

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Contents

1 Executive summary

This report is addressed to Scottish Ministers and provides the results of the actuarial valuation of the Scottish Teachers' Superannuation Scheme carried out as at 31 March 2012.

1.1 At the request of the Scottish Public Pensions Agency on behalf of Scottish Ministers, we have carried out an actuarial valuation of the Scottish Teachers' Superannuation Scheme as at 31 March 2012 (the ***effective date***). The valuation has been undertaken in accordance with *The Public Service Pensions (Valuations and Employer Cost Cap) Directions 2014* as amended, which specify certain assumptions and require other assumptions to be Scottish Ministers' best estimates. HM Treasury has confirmed its consent to the assumptions proposed by Scottish Ministers.

1.2 This report is addressed to Scottish Ministers and sets out the results of the valuation. The ***valuation results*** specify the rate of employer contribution payable for the four year period from 1 April 2015 (the ***implementation period***) and the ***employer cost cap***[1], both of which are to be set in regulations.

1.3 The key results of the valuation are as follows:

> ***Employer contribution rate*** payable for the ***implementation period***: 17.2% of pensionable pay

> ***Employer cost cap***: 12.4% of pensionable pay

> Total Scheme liabilities for service to the ***effective date*** of £20.9bn and ***notional assets*** of £19.6bn, giving a notional past service deficit of £1.3bn.

1.4 Following agreement between Scottish Ministers and HM Treasury, the ***employer contribution rate*** will not be implemented until 1 September 2015. The ***employer contribution rate*** is based on the ***implementation period*** specified in the Directions and has not been adjusted for later implementation. In isolation, this will result in a small deficit at the next valuation.

[1] In accordance with Section 12 of the Public Service Pensions Act 2013 ('the Act').

2 Background

The valuation has been carried out in accordance with the HMT Directions.

2.1 The Scottish Teachers' Superannuation Scheme (STSS or 'the Scheme') provides pensions to teachers who have worked in schools and other educational establishments in Scotland. The Scheme is an unfunded statutory public service pension scheme with the benefits underwritten by the Government. The Scheme is financed by payments from the employer and from those current employees who are members of the Scheme, who pay contributions at different rates which depend on their salaries. The rate of employer contributions is typically set following an actuarial valuation. With effect from 1 April 2009 the employer contribution rate has been 14.9% of pay, which was set following the completion of the previous valuation of the Scheme carried out as at 31 March 2005.[2]

2.2 GAD has been appointed as ***Scheme Actuary***[3] by Scottish Ministers to carry out an actuarial valuation of the Scheme as at 31 March 2012 (the ***effective date***). This report on the valuation is addressed to Scottish Ministers and is also being made available to HM Treasury (HMT).

2.3 The valuation has been undertaken in accordance with *The Public Service Pensions (Valuations and Employer Cost Cap) Directions 2014* as amended[4] ('the Directions'). Terms defined in the Directions are shown in ***bold italics*** when used in this report.

2.4 The Directions require the existing STSS and the new scheme being introduced for the teachers' workforce on 1 April 2015 under Section 1 of the 2013 Act[5] ('the 2015 Scheme') to be taken into account in aggregate for the purposes of the current valuation. The results shown in this report relate to 'the aggregate scheme' that is the combination of the existing STSS and 2015 Scheme.[6]

2.5 The main requirements of the valuation are set out in the Directions. These are to determine the rate of employer contribution payable from 1 April 2015 (***the implementation date***) for the four year period from 1 April 2015 (the ***implementation period***) and the initial ***employer cost cap***,[7] both of which are to be set in regulations.[8] Direction 22 requires a number of results relating to the liabilities,

[2] A valuation as at 31 March 2009 was started but not completed and so did not lead to a change in the contribution rate.
[3] In accordance with direction 4 of *The Public Service Pensions (Valuations and Employer Cost Cap) Directions 2014*.
[4] Amendments are the Public Service Pensions (Valuations and Employer Cost Cap) (Amendment) Directions 2014, the Public Service Pensions (Valuations and Employer Cost Cap) (Amendment) (No 2) and (No 3) Directions 2014 and the Public Service Pensions (Valuation and Employer Cost Cap) (Amendment) Directions 2015.
[5] *The Public Service Pensions Act 2013*.
[6] Teachers can pay money purchase AVCs under *The Teachers' Superannuation (Additional Voluntary Contributions) (Scotland) Regulations 1995 (as amended)*. This is not a connected scheme for the purpose of Section 11 of the *Public Service Pensions Act 2013* and so is not part of the aggregate scheme.
[7] In accordance with Section 12 of *The Public Service Pensions Act 2013*.
[8] The Directions specify the ***implementation date*** for the purpose of the valuation calculations. However, the decision on the actual contribution rate to be implemented and from when is to be taken by Scottish Ministers.

notional assets, and contribution rates to be prepared and reported. These results are set out in Section 4 of this report. Appendix H sets out where other information as required by the Directions is provided in this, or related, valuation reports.

2.6 The ***employer contribution rate*** is expected to be reassessed at the actuarial valuation to be carried out as at 31 March 2016 (and each subsequent four yearly valuation). The next revision to the ***employer contribution rate*** is expected to take effect from 1 April 2019. The financial position relative to the ***employer cost cap*** will also be reconsidered at each four yearly valuation.

2.7 We have previously provided advice and information on certain aspects of the valuation. The following reports were issued in draft.

> *Scottish Teachers' Superannuation Scheme: Actuarial valuation as at 31 March 2012: Report on membership data* draft dated 20 November 2014.

> *Scottish Teachers' Superannuation Scheme: Actuarial valuation as at 31 March 2012: Report on data used for experience analysis* draft dated 25 April 2014.

> *Scottish Teachers' Superannuation Scheme: Actuarial valuation as at 31 March 2012: Advice on assumptions* draft dated 13 May 2014.

> *Scottish Teachers' Superannuation Scheme: Actuarial valuation as at 31 March 2012: Report on methodology* draft dated 20 November 2014.

The reports were not signed off in case further information came to light before the conclusion of the valuation process, including changes to the Directions. The reports have been signed on 27 February 2015 alongside this report. There were no substantive changes to the draft versions of the reports. The finalised reports should be read in conjunction with this report.

2.8 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.

2.9 Appendix I sets out the limitations of this report.

3 Key inputs

This section summarises what calculations were carried out, including the data, methodology and assumptions used, and the analysis performed on the results.

Data

3.1 At the ***effective date***, there were around 74,000 contributors to the Scheme with a total payroll of around £2.69 billion[9] and around 65,000 pensions in payment with total annual pensions amounting to around £0.69 billion. There were around 30,000[10] ex-contributors who had not yet started to receive their pension. Appendix A provides a summary of the membership data. Further details on the data, including the checks carried out on that data, the limitations of those checks and adjustments made, are provided in the report *Scottish Teachers' Superannuation Scheme: Actuarial valuation as at 31 March 2012: Report on membership data* dated 27 February 2015.

Benefits

3.2 The benefits provided to members of the STSS are set out in regulations.[11] A new scheme ('the 2015 Scheme') is being introduced from 1 April 2015 under separate regulations.[12] Most existing Scheme members will transfer to the 2015 Scheme on 1 April 2015. Under transitional arrangements aimed at providing protection for those nearest retirement age, some older members will continue in the existing scheme until they leave due to retirement or otherwise, while others will transfer to the new scheme at a later date.

3.3 The STSS is currently a final salary scheme with two main sections (the normal pension age (NPA) 60 and NPA 65 sections). The NPA 60 section has an accrual rate of 1/80 (with an automatic lump sum of three times the accrued pension). The NPA 65 section has an accrual rate of 1/60 (with lump sum by commutation only). The 2015 Scheme is a career average scheme with NPA equal to State Pension Age, an accrual rate of 1/57, and revaluation of CPI+1.6% a year while in service and CPI out of service. Member contribution rates are tiered in relation to members' salaries and the same rates and tiers will apply under both the final salary and career average schemes.

3.4 Appendix B gives a summary of the benefits provided under the STSS and of those to be provided under the 2015 Scheme. It also sets out the criteria by which Scheme membership will be determined from 1 April 2015 when the 2015 Scheme is introduced. Further details on benefits and the membership of the two schemes from 1 April 2015 is provided in the report *Scottish Teachers' Superannuation Scheme:*

[9] Full-time equivalent. Actual payroll is about £2.37bn.
[10] Around 4,500 of these members aged above NPA are excluded from the calculations because they are considered unlikely ever to claim their pensions.
[11] *The Teachers' Superannuation (Scotland) Regulations 2005 (SSI 2005/393)*.
[12] *The Teachers' Pension Scheme (Scotland) (No 2) Regulations 2014 (SSI 2014/292)*.

Actuarial valuation as at 31 March 2012: Report on membership data dated 27 February 2015.

Notional assets

3.5 The Scheme is financed by contributions from employers and current members of the Scheme. The contributions paid to the Scheme fall into general government revenues. There is no actual fund of assets but an account is maintained of a notional fund made up of contributions paid by employers and members, supplemented by a return on the notional fund at a pre-determined rate and reduced by benefits as and when they are paid to retired and former members of the Scheme. The notional fund stood at £19.6 billion as at the ***effective date***. Appendix C provides further information on the development of the notional fund since the previous valuation as at 31 March 2005. Appendix D sets out the rates of contribution paid since the previous valuation and summarises other events affecting the Scheme since that valuation.

Assumptions

3.6 The Directions specify certain assumptions to be used for the valuation whilst requiring certain other assumptions to be set as Scottish Ministers' best estimates, after taking the advice of the ***Scheme Actuary***. Actuarial advice on the scheme specific assumptions (including variations appropriate for the purposes of determining the ***employer cost cap***), and other relevant information (including an analysis of the Scheme's demographic experience), is set out in the reports:

> *Scottish Teachers' Superannuation Scheme: Actuarial valuation as at 31 March 2012: Advice on assumptions* dated 27 February 2015

> *Scottish Teachers' Superannuation Scheme: Actuarial valuation as at 31 March 2012: Report on data used for experience analysis* dated 27 February 2015.

3.7 Scottish Ministers have consulted relevant stakeholders and instructed us to adopt the best estimate assumptions recommended in our advice, having obtained HMT consent to those assumptions. Appendix E summarises the key assumptions made.[13]

Methodology and calculations

3.8 The Directions specify that the Projected Unit Methodology should be used. Application of this methodology to determine the ***valuation results*** as specified requires some assumptions to be made about the size and make-up of the workforce up to the end of the ***implementation period***.[14]

3.9 To calculate the ***employer contribution rate***, we have placed a net present value on the benefit accrual over the four-year ***implementation period*** and then adjusted for the repayment of the deficit over 15 years and member contributions. The ***employer cost cap*** is a measure of the cost of the 2015 Scheme only. The calculation of the ***employer cost cap*** is similar to that of the ***employer contribution rate*** but is based

[13] Our advice recommended a range of best estimate post-retirement mortality assumptions from which Scottish Ministers have chosen a single assumption to adopt. Appendix E sets out the post-retirement mortality assumption adopted.
[14] 31 March 2019.

on all members being in the 2015 Scheme in April 2015, with assumptions reflecting members' likely behaviour had they never been members of the existing schemes, and no deficit contributions apply.

3.10 Appendix F summarises the actuarial methodology adopted for the valuation in more detail. Further details on methodology, including the approach taken to projecting the workforce and the rationale for that approach, are provided in the report *Scottish Teachers' Superannuation Scheme: Actuarial valuation as at 31 March 2012: Report on methodology* dated 27 February 2015. Appendix F also summarises the calculations undertaken to determine the ***valuation results*** in more detail.

3.11 Section 4 of this report sets out the ***valuation results***.

Analysis of result

3.12 Section 5 of this report provides a reconciliation of the financial position at the previous valuation date, 31 March 2005, and at the ***effective date*** of the current valuation.

3.13 Section 6 provides further information which is intended to assist in the interpretation of the results shown. In particular, this section shows the main sensitivities of the ***valuation results*** to the assumptions set by Scottish Ministers. The most significant of these are post-retirement mortality, withdrawal rates and promotional pay increases.

3.14 Section 7 comments on the main risks which could result in some variations in the ***valuation results*** at subsequent valuations.

4 Valuation results

This section provides the valuation results required by the Directions.

4.1 Direction 22 requires certain numerical ***valuation results*** to be reported. This section provides the information required by the Directions.

Valuation balance sheet at 31 March 2012

4.2 The assets and past service liabilities of the aggregate scheme[15] as at the ***effective date*** calculated in accordance with the Directions, and otherwise as specified in this report, are set out in Table 4.1. The liabilities valued include all benefits currently or prospectively payable under the aggregate scheme to pensioners and deferred pensioners as at 31 March 2012 and to active members as at 31 March 2012 in respect of service completed to the ***effective date***. In the case of active members, liabilities arising from future pay inflation to the assumed future date of cessation of pensionable service are included in the liability shown. Corresponding figures at the previous valuation date are shown for comparison purposes. However, that valuation used a different valuation method, the Entry Age method, so not all results are directly comparable.

Table 4.1: Valuation balance sheet

	£ billion 31 March 2012	***Direction***	**£ billion** 31 March 2005
Aggregate scheme assets	19.6	*25*	13.0[16,17]
Aggregate scheme liabilities[18] in respect of:			
Active members	9.3		7.7[19]
Deferred pensioners	1.1		0.8[19]
Pensioners	10.5		5.3
Total aggregate scheme liabilities	20.9	*24*	13.8
Surplus (Shortfall) as at valuation date	(1.3)		(0.8)

[15] The results shown in this report relate to 'the aggregate scheme', that is the combination of the existing STSS and the 2015 Scheme. All liabilities in respect of service to the ***effective date*** relate to the existing STSS.
[16] Balance in SCAPE fund as at 31 March 2005 quoted in the 2005 valuation report. The 2005 valuation report also included future contributions as assets of the scheme. In this table, the results of the 2005 valuation have been presented with future contributions netted off from the corresponding liabilities. This allows a more direct comparison between the 2005 and 2012 valuation results.
[17] As quoted in the 2005 valuation report. An adjusted amount of £13,630 million is set out in the Directions to correct for omissions in the data used to set the notional fund originally.
[18] Includes liabilities relating to past added years and additional pension and other options paid for by member contributions.
[19] Calculated as the total liability for service before and after the valuation date (including after re-entry following a break in service) less the value of future contributions in respect of the members in the group. The 2005 valuation report showed total liabilities in full with future contributions included as assets of the scheme.

Contribution rates

4.3 Whilst the ***effective date*** of the actuarial valuation is 31 March 2012, the ***employer contribution rate*** determined is that payable in respect of the period 1 April 2015 to 31 March 2019 (the ***implementation period***). The ***employer contribution rate*** required over the ***implementation period*** is determined from the following components.

> The contribution rate, payable from 1 April 2015 for a period of 15 years, required to meet the shortfall between assets and liabilities as shown in Table 4.1

> Plus the contribution rate, payable from 1 April 2015 for a period of 15 years, required to meet any shortfall in the expected cost of benefits accruing between the ***effective date*** and 31 March 2015 and the actual contributions paid by employers and members over the same period

> Plus the contribution rate, payable from 1 April 2015, required to cover the expected cost of benefits accruing by members over the ***implementation period***

> Less normal[20] member contributions expected to be payable during the ***implementation period***.

4.4 The relevant ***valuation results***, expressed as a percentage of pensionable payroll, are summarised in Table 4.2.

[20] Excluding additional voluntary contributions (past added years, additional pension, money purchase AVCs) and contributions for any other options exercised.

Table 4.2: Contribution rates

	%	%		*Direction*
Contribution rate required to be paid for 15 years from 1 April 2015 to correct shortfall at 31 March 2012		4.5	A	*27(1)(a)*
Contribution rate required to cover cost of benefits accruing between 1 April 2012 and 31 March 2015[21]	26.4			*27(1)(b)*
Less normal[22] member contribution rate expected between 1 April 2012 and 31 March 2015[23]	8.8			*28(a)*
Less employer contribution rate expected between 1 April 2012 and 31 March 2015	14.9			*28(b)*
Net contribution shortfall between 1 April 2012 and 31 March 2015	2.7			
Contribution rate required to be paid for 15 years from 1 April 2015 to correct underpayment of contributions between 1 April 2012 and 31 March 2015		0.5	B	*27(1)(c)*
Contribution rate required to cover cost of benefits accruing over implementation period[21, 24]	21.8		C	*27(1)(d)*
Less normal[22] member contribution rate expected over implementation period[25]	9.6		D	*28(c)*
Employer contribution rate required for cost of accrual of benefits over implementation period		12.2	C-D	
Employer contribution rate required over implementation period (A + B + C) - D		17.2		*29*

4.5 Following agreement between Scottish Ministers and HMT, the ***employer contribution rate*** will not be implemented until 1 September 2015. The ***employer contribution rate*** is based on the ***implementation period*** specified in the Directions and has not been adjusted for later implementation.

4.6 The impact of this later implementation, in isolation, will be to create a small deficit in the notional fund at the next valuation. This deficit is likely to require deficit contributions of around 0.1% of pensionable pay payable for 15 years from 1 April 2019.

[21] Cost of accrual excludes past added years, additional pension and other options paid for by member contributions.
[22] Excluding additional voluntary contributions (past added years, additional pension, money purchase AVCs) and contributions for any other options exercised.
[23] Target overall rate expected when member contribution tiers were set (average rate over 2012-15).
[24] Implementation period of 1 April 2015 to 31 March 2019 as defined by the Directions rather than the actual period over which the new contribution rate will be implemented.
[25] Target overall rate as set out in Framework Agreement dated 19 December 2013 http://www.sppa.gov.uk/Documents/STSS/STSS%20Pension%20Scheme%202015/STSS_Framework%20Document_191213.pdf.

Employer cost cap

4.7 The ***proposed employer cost cap*** is determined from the following components.

> The contribution rate, payable from 1 April 2015, required to cover the expected cost of benefits accruing by members over the ***implementation period*** (determined using data, methodology and assumptions adjusted in accordance with Direction 53(3) to (6))

> Less normal member contributions expected to be payable over the ***implementation period***.

4.8 The relevant valuation results, expressed as a percentage of pensionable payroll, are summarised in Table 4.3.

Table 4.3: Employer cost cap

	%		***Direction***
Contribution rate required to cover expected cost of benefits accruing over implementation period, assuming all members are accruing benefits in the 2015 scheme	22.0	A	
Less normal member contribution rate expected over implementation period[26]	9.6	B	
Proposed employer cost cap (A - B)	12.4		*53*

4.9 The ***valuation results*** have been determined in accordance with the requirements as to data, assumptions and methodology as specified in the Directions.

[26] Target overall rate as set out in Framework Agreement dated 19 December 2013 http://www.sppa.gov.uk/Documents/STSS/STSS%20Pension%20Scheme%202015/STSS_Framework%20Document_191213.pdf.

5 Reconciliation of result with previous valuation results

This section looks at how the valuation results have changed since the previous valuation as at 31 March 2005.

5.1 The previous valuation of the STSS was carried out as at 31 March 2005. The framework for that valuation was different to that under which the current valuation has been carried out. This has resulted in some considerable movements in the calculation of the liabilities. Table 5.1 shows how the valuation balance sheet has changed since the previous valuation. Some figures have been calculated in an approximate manner but are sufficient to show the general size of the impact on the balance sheet. Table 5.2 provides further information on the items identified. Impacts are considered in the order listed. Using a different order could change the intermediate figures significantly, though there is no impact on the final shortfall.

Table 5.1: Valuation balance sheet - Comparison with previous valuation

	£ billion	Note
Surplus (shortfall) at 31 March 2005	**(0.8)**	
Change in notional assets	0.6	1.
Change in actuarial method	0.1	2.
Adjusted surplus (shortfall) at 31 March 2005	**(0.1)**	
Interest on surplus (shortfall)	(0.1)	
Shortfall in return on notional assets	(0.1)	3.
Excess of contributions paid against cost of benefits accruing 2005 to 2012	0.0	4.
Experience effects		
Pay increases lower than expected	1.1	5.
Ill health retirements fewer than expected	0.2	
Age retirements earlier than expected	0.0	
Withdrawals higher than expected	0.0	
Less commutation than expected	0.0	
Pensioner mortality lighter than expected	0.0	
Fewer dependant pensions payable than expected	0.0	
Negative inflation in 2009 (pensions held level in 2010)	(0.1)	
Change in long-term financial assumptions	(2.6)	6.
Impact of short-term variation of assumptions	1.4	7.
Impact of change in demographic assumptions	(1.2)	8.
Unattributed	0.1	
Surplus (shortfall) at 31 March 2012	**(1.3)**	

Table 5.2: Explanation of analysis

Note	Explanation
1.	The notional fund has been increased from £13.03bn as shown in the 31 March 2005 valuation report to £13.63bn as set out in the Directions.
2.	There have been three major changes to methodology. Firstly, the Directions require the use of the Projected Unit methodology for the current valuation. The Entry Age method was used for the previous valuation. This change releases a surplus of £0.19bn. Secondly, there has also been a change to the way that non-accruing benefits[27] have been accounted for such that they are recognised at the time of retirement or death rather than spread over all service. This releases a surplus of £0.15bn. Thirdly, the provision of individual data for the 2012 valuation, rather than data grouped by age and gender for the 2005 valuation, has allowed us to carry out more detailed liability calculations for active members. This has created a deficit of about £0.20bn. Overall, a surplus of £0.14bn has been released from these changes.
3.	At the previous valuation the return on the ***notional assets*** was anticipated to be 3.5% a year above pension increases. This rate applied until 31 March 2011 but was reduced to 3% above pension increases after that date, see Direction 25(4). The impact of this change means the ***notional assets*** are lower than anticipated at the previous valuation.
4.	This impact has been assessed on the financial assumptions applying to the 2005 valuation. If the cost of accrual had instead been assessed on the financial assumptions applying to the 2012 valuation then the contributions paid would have been less than the cost of accrual.
5.	Pay increases over the period between the previous and current valuations have been lower than anticipated. This is largely as a result of the pay restraint policy applied to public service workers during the period.
6.	The financial assumptions are set by HM Treasury. Appendix E summarises the financial assumptions set for the current and previous valuations. The most financially significant change in the long term financial assumptions is the reduction in the rate of discount net of pension increases from 3.5% a year to 3.0% a year. This includes the impact of changing from RPI to CPI revaluation of pensions in payment and deferment, which in isolation would have reduced liabilities by about 10%.[28]

[27] Service enhancements on ill-health retirement and death in service and lump sums on death in service.
[28] In line with 2010/11 Annual Accounts which assumed an annual difference between CPI and RPI of 0.75% per annum.

Note	Explanation
7.	The Directions for the current valuation specify some variation in financial assumptions for the period between the ***effective date*** and the end of the ***implementation period***. The short-term assumptions specified result in lower assessed liabilities. No short-term variations were assumed for the previous valuation.
8.	The impact of the change in demographic assumptions is the net result of a number of changes but is dominated by an increase in life expectancy.

5.2 Table 5.3 illustrates how the employer contribution rate has changed since the previous valuation. Again, some figures have been calculated in an approximate manner but are sufficient to show the general size of the impact on the contribution rate. Impacts are considered in the order listed. Using a different order could change the intermediate figures significantly, though there is no impact on the final contribution rate.

Table 5.3: Employer contribution rate - Comparison with previous valuation

	% pensionable pay
Employer contribution rate determined at 31 March 2005	**14.9**
Change in actuarial method	0.6
Change in financial assumptions	5.6
Change in demographic assumptions	1.5
Change in adjustment for past service effects[29]	4.1
Increase in member contributions	(3.2)
Introduction of 2015 Scheme	(6.6)
Change in membership profile	(0.1)
Recognising cost of Public Sector Transfer Club[30]	0.7
Unattributed	(0.3)
Employer contribution rate determined at 31 March 2012	**17.2**

[29] Including contribution shortfall between ***effective date*** and ***implementation date***

[30] Costs arise because the transfer value received is usually less than the liability in respect of the service credit granted. These costs previously came through as items of deficit but will now be charged on an ongoing basis.

6 Sensitivity of valuation results to assumptions

This section illustrates how the valuation results would change if different assumptions were used.

6.1 This section illustrates the sensitivities of the ***valuation results*** to the assumptions determined by Scottish Ministers.[31] Sensitivities are not shown for assumptions specified in the Directions since these are fixed for the purpose of this valuation.

6.2 Table 6.1 shows the sensitivities relative to the past service liabilities, the cost of future accrual, the ***employer contribution rate*** and the ***proposed employer cost cap***. The sensitivities shown are intended to illustrate a range of reasonable outcomes which might have been determined at this valuation. They are not intended to show the possible range of variation in assumptions which might be considered at future valuations and in light of future experience. Section 7 and Appendix G comment on the main risks which could result in some variations in the ***valuation results*** at subsequent valuations.

Table 6.1: Sensitivity of valuation results to Secretary of State set assumptions

	Addition to past service liabilities	**Addition to contribution rate for future accrual**	**Combined addition to employer contribution rate[32]**	**Additional to proposed employer cost cap**
(i) **New entrant profile***: new joiners assumed 2 years older on average	No impact	0.1%	0.1%	0.1%
(ii) **Mortality rates***:				
(a) pensioners subject to mortality rates 5% heavier than assumed[33]	(£0.2bn)	(0.1%)	(0.8%)	(0.2%)
(b) 5% more deaths before retirement than currently assumed	Nil[34]	Nil	Nil	Nil
(iii) **Age retirement rates***: members without full protection to retire (on average) one year later than currently assumed	Nil	0.1%	0.1%	0.1%
(iv) **Commutation*** (other than as directed): all eligible members of the NPA 60 section commute 2% of pension more than assumed	(£0.1bn)	Nil	(0.3%)	No impact

[31] As specified in Direction 19(e).
[32] Combined effect of additions for past service, underpayment of contributions over 2012-15 (not shown separately) and future accrual.
[33] Broadly speaking this is equivalent to assuming members spend 0.5 years less in retirement.
[34] 'Nil' indicates that there is an impact but this appears to be zero to the level of rounding used, ie nearest £50m for past service liabilities and nearest 0.1% for contribution rates.

	Addition to past service liabilities	Addition to contribution rate for future accrual	Combined addition to employer contribution rate[32]	Additional to proposed employer cost cap
(v) **Ill health retirements***				
(a) Rate of ill health retirements: 5% higher numbers of members assumed to retire on ill health grounds than currently assumed	Nil	Nil	Nil	Nil
(b) Severity of ill health retirements: 5% more members assumed to receive upper tier benefits than currently assumed	No impact	Nil	Nil	Nil
(vi) **Members' dependants***				
(a) proportions partnered: 5% more members assumed to have qualifying partners at death	Nil	0.1%	0.2%	0.1%
(b) age difference between member and partner: dependants assumed to be 1 year older than that based on current assumption	(£0.1bn)	(0.1%)	(0.3%)	(0.1%)
(vii) **Withdrawal***: withdrawal rates a third higher	Nil	(0.2%)	(0.5%)	(0.3%)
(viii) **Promotional pay increases***: promotional pay increases 0.5% per annum higher on average than assumed	£0.4bn	0.1%	2.1%	No impact
(ix) **Deferred members over NPA**: Include all deferred members between NPA and 70	£0.2bn	No impact	0.7%	No impact

* Opposite changes in the assumptions will produce approximately equal and opposite changes in the valuation results.

6.3 In each variant of Table 6.1 the sensitivity shown is in relation only to the change in assumption described. The impact of a combination of assumption changes will not necessarily equate to the sum of the relevant rows above.

7 Uncertainties around possible outcomes of the next valuation

This section considers some of the risks relating to the outcomes of the next valuation.

7.1 The results of this valuation are set out in Section 4. Section 6 outlines the sensitivity of the results to those assumptions set by Scottish Ministers. The sensitivities shown in that section are intended to illustrate a range of reasonable outcomes which might have been determined at this valuation had different assumptions been used. The range of reasonable outcomes at this valuation is different to, and not necessarily related to, the possible range of outcomes at future valuations.

7.2 The results of the next valuation (both the ***employer contribution rate*** and the ***cost cap cost of the scheme***[35]) will differ from the results shown in this report for many reasons. Table 7.1 shows some of these reasons. These differences can be split into three categories:

> those that are expected

> those that are likely to occur due to short-term variations between experience and assumptions

> those that are possible but less likely and result from more significant experience variations leading to changes in assumptions or from data errors

7.3 The results of future valuations might affect the level of contributions payable by both employers and members and/or the amount of benefits payable to members for future service. Further information on the cost cap mechanism and how this may affect member benefits and/or contributions after future valuations is provided in Appendix G.

7.4 More explanation relating to the items in the table is given in the remainder of this section.

[35] This will be compared to the ***employer cost cap*** at the next valuation. See Appendix G for further details.

Table 7.1: Items that may affect the next valuation[36, 37]

Item		Employer contribution rate[38]	Cost cap cost of the scheme[38]
Expected:	Reduction in proportion of membership accruing benefits in existing schemes	✓	o
	Partial deficit repayment	✓	N/A
	Short-term mortality improvements & increases in members' average SPA	o	o
	Run-off of short-term financials up to the next valuation date (Final Salary schemes only)	✓	N/A
Likely:	Short-term experience effects:		
	- demographic	✓	✓
	- financial	✓✓	✓
	Assumption changes:		
	- short-term financials after the next valuation date	✓✓	✓✓
	- mortality improvements	✓✓	✓✓
Possible:	Errors found in data sets from previous valuations	✓✓	✓
	Unanticipated membership changes	✓✓	✓
	Assumption changes:		
	- demographics set by Scottish Ministers	✓✓	✓

Key[39, 40]:N/A = not applicable,

o = impact is likely to be less than 0.5% of pay,

✓ = impact may well be more than 0.5% of pay but, although possible, is quite unlikely to be more than 2% of pay,

✓✓ = impact may well be more than 2% of pay.

[36] All cost pressures are assumed to feed through to the ***employer contribution rate*** and the ***cost cap cost of the scheme*** in line with the Directions; more detail on how the directions treat cost pressures is set out in paragraphs 2.31 to 2.35 of *Public service pensions: actuarial valuations and the employer cost cap mechanism* published by HMT in March 2014.
[37] We have ignored items such as changes to the Directions (apart from those described as "likely" in paragraph 2.39 of *Public service pensions: actuarial valuations and the employer cost cap mechanism*), benefit changes or changes to relevant law (including European law), because it is impossible for us to form any judgement on the likelihood or quantum of such changes.
[38] Each item is considered separately; a combination of these items could have a larger impact than is considered likely for any of those items individually.
[39] Showing relative importance of items in the table, in our judgement at the time of signing.
[40] Shown in increasing order.

7.5 As explained above, some of the factors affecting the results of the next valuation are relatively predictable. For example:

> **Scheme membership:** There will be fewer members of the existing sections of the Scheme as protected members retire and tapered members move across. This will impact the cost of future accrual.

> **Deficit:** Part of the existing deficit will be paid off through the deficit contributions payable before the next ***implementation date***.

> **Mortality improvements:** Life expectancies are expected to continue to increase though the impact of this will be offset to an extent by increases in the average SPA of active members.

> **Short term financials:** The short term financial assumptions up to the effective date of the next valuation will determine some of the experience effects at the next valuation but otherwise will not be relevant to the determination of the valuation results of the next valuation.

7.6 It would be possible to calculate the expected contribution rate at the next valuation allowing for these more predictable effects. However, any estimate would still be subject to considerable uncertainty, not least because of the long period over which the membership would need to be projected.

7.7 Other impacts on the results of the next valuation are less predictable. These include:

> **Data:** If the data used for this valuation is later shown to be materially incorrect, a gain or loss will emerge when it is corrected. For example, if the next valuation reveals that the accrued pensions at this valuation are found to be 5% underreported, all other things being equal, the employer contribution rate could increase by around 3¾% of pensionable pay.

> **Scheme membership:** The distribution of future scheme membership may differ from that projected at this valuation. For example, if the scheme membership unexpectedly grows[41] by 10% by 2016 then this might reduce the ***employer contribution rate*** by about ¾% and the ***cost cap cost of the scheme*** by about ¼%.

> **Short term experience effects:** If experience is not in line with the assumptions made, a gain or loss will emerge over an inter-valuation period. Although the scale of the experience effects seen over the current inter-valuation period is not necessarily indicative of the scale of the effects for future periods, it is reasonable to infer that the impact of demographic experience effects is likely to be considerably lower than the potential impact of financial experience effects. For example, at this valuation none of the items of demographic experience resulted in an impact on the ***employer contribution rate*** of significantly more than ½% of pay whereas the pay experience was equivalent to a contribution impact of around 3¾% of pensionable pay.

[41] Growth due to a surge of new entrants with characteristics in line with the current valuation assumptions

- **Longer term experience effects:** Assumption changes at future valuations in light of scheme experience may have more substantial effects on the results than actual experience effects. The greater sensitivity to assumption changes is because the assumptions typically apply to longer periods than the experience effects are measured over.
- **Other assumption changes:** Assumptions may change for reasons other than scheme experience, and paragraph 2.39 of *Public service pensions: actuarial valuations and the employer cost cap mechanism* flags that some of the assumptions set in the Directions (including short-term financial assumptions) are likely to change. The ***employer contribution rate*** is particularly sensitive to the short-term financial assumptions (the use of short term rather than long term assumptions up to March 2019 for this valuation reduced the ***employer contribution rate*** by about 5% of pensionable pay). ***Valuation results*** are also sensitive to other assumptions set in the Directions, such as the discount rate, mortality improvements and commutation take up. It is expected that any changes to assumptions in the Directions will impact on the ***employer contribution rate***. The impact of changes in assumptions on the cost cap mechanism is described in paragraphs 2.31 to 2.35 of *Public service pensions: actuarial valuations and the employer cost cap mechanism*.

8 Conclusion

This section summarises the valuation results.

8.1 Based on the detailed analysis as set out in this report, the key results of the valuation are as follows:

> ***Employer contribution rate*** payable for the ***implementation period***: 17.2% of pensionable pay

> ***Employer cost cap***: 12.4% of pensionable pay

> Total Scheme liabilities for service to the valuation date of £20.9bn and ***notional assets*** of £19.6bn, giving a notional past service deficit of £1.3bn.

8.2 The next valuation of the Scheme is due to be undertaken as at 31 March 2016. This will set the ***employer contribution rate*** payable from 1 April 2019, determine the opening value of the ***cost cap fund*** and provide the cost cap analysis as required by the Directions for future valuations.

Matt Wood
Fellow of the Institute and Faculty of Actuaries
27 February 2015

George Russell
Deputy Government Actuary
27 February 2015

Appendix A: Summary of membership data and comparison with data at previous valuation

Table A1: Actives

NPA 60

	2005 Number of members (nearest 10)	2005 Total pensionable pay (i) (£m)	2005 Average pensionable pay (£)	2005 Average age (ii) (years)	2005 Average reckonable service (years)	2005 Average accrued pension (£)	2012 Number of members (nearest 10)	2012 Total pensionable pay (i) (£m)	2012 Average pensionable pay (£)	2012 Average age (ii) (years)	2012 Average reckonable service (ii) (years)	2012 Average accrued pension (£)
Male	- (iii)	712	- (iii)	47.8	17.8	- (iii)	15,000	603.6	40,240	49.1	18.5	9,320
Female	- (iii)	1,675	- (iii)	45.4	13.8	- (iii)	43,740	1,624.5	37,140	47.3	16.2	7,520
Total	- (iii)	2,390	- (iii)	46.1	14.9	- (iii)	58,740	2,228.1	37,940	47.8	16.8	7,980

NPA 65

	2005 Number of members (nearest 10)	2005 Total pensionable pay (i) (£m)	2005 Average pensionable pay (£)	2005 Average age (ii) (years)	2005 Average reckonable service (years)	2005 Average accrued pension (£)	2012 Number of members (nearest 10)	2012 Total pensionable pay (i) (£m)	2012 Average pensionable pay (£)	2012 Average age (ii) (years)	2012 Average reckonable service (ii) (years)	2012 Average accrued pension (£)
Male	-	-	-	-	-	-	4,090	128.0	30,310	38.1	3.4	1,780
Female	-	-	-	-	-	-	11,130	318.5	28,630	33.8	2.7	1,300
Total	-	-	-	-	-	-	15,210	446.5	29,350	35.0	2.9	1,430

(i) The pay shown is full-time equivalent (FTE) pay
(ii) Weighted by FTE pay
(iii) The number of active members as at 31 March 2005 was not quoted in the 2005 valuation report due to concerns around the quality of the active membership data provided.

Mixed Service

	2005 Number of members (nearest 10)	2005 Total pensionable pay (i) (£m)	2005 Average pensionable pay (£)	2005 Average age (ii) (years)	2005 Average reckonable service (years)	2005 Average accrued pension (£)	2012 Number of members (nearest 10)	2012 Total pensionable pay (i) (£m)	2012 Average pensionable pay (£)	2012 Average age (ii) (years)	2012 Average reckonable service (ii) (years)	2012 Average accrued pension (£)
Male	-	-	-	-	-	-	90	3.2	37,190	47.6	8.7	4,340
Female	-	-	-	-	-	-	370	12.7	33,970	45.6	8.0	3,630
Total	-	-	-	-	-	-	460	15.8	34,570	46.0	8.2	3,760

All members

	2005 Number of members (nearest 10)	2005 Total pensionable pay (i) (£m)	2005 Average pensionable pay (£)	2005 Average age (ii) (years)	2005 Average reckonable service (years)	2005 Average accrued pension (£)	2012 Number of members (nearest 10)	2012 Total pensionable pay (i) (£m)	2012 Average pensionable pay (£)	2012 Average age (ii) (years)	2012 Average reckonable service (ii) (years)	2012 Average accrued pension (£)
Male	- (iii)	712	- (iii)	47.8	17.8	- (iii)	19,170	734.7	38,330	47.2	15.9	7,690
Female	- (iii)	1,675	- (iii)	45.4	13.8	- (iii)	55,240	1,955.7	35,410	45.0	13.9	6,240
Total	- (iii)	2,390	- (iii)	46.1	14.9	- (iii)	74,410	2,690.5	36,160	45.6	14.5	6,610

(i) The pay shown is full-time equivalent (FTE) pay
(ii) Weighted by FTE pay
(iii) The number of active members as at 31 March 2005 was not quoted in the 2005 valuation report due to concerns around the quality of the active membership data provided.

Table A2: Deferreds

NPA 60 members with deferred pension entitlement

	2005 Number of members (nearest 10)	2005 Total deferred pension (i) (£m)	2005 Average pension (£)	2005 Average age (ii) (years)	2012 Number of members (nearest 10) (iii)	2012 Total deferred pension (iv) (£m)	2012 Average pension (£)	2012 Average age (ii) (years)
Male	3,600	17.2	4,770	50.7	3,500	19.7	5,630	55.5
Female	11,200	35.4	3,160	52.2	9,700	42.6	4,400	53.4
Total	14,800	52.6	3,550	51.2	13,200	62.4	4,720	54.1

NPA 65 members with deferred pension entitlement

	2005 Number of members (nearest 10)	2005 Total deferred pension (i) (£m)	2005 Average pension (£)	2005 Average age (ii) (years)	2012 Number of members (nearest 10) (iii)	2012 Total deferred pension (iv) (£m)	2012 Average pension (£)	2012 Average age (ii) (years)
Male	-	-	-	-	210	0.3	1,540	39.3
Female	-	-	-	-	530	0.7	1,240	34.8
Total	-	-	-	-	740	1.0	1,320	36.3

(i) 2005 pension amounts exclude increase granted in April 2005
(ii) Weighted by deferred pension
(iii) Includes members over NPA considered unlikely to claim their pensions
(iv) 2012 pension amounts exclude increase granted on 9 April 2012

Mixed Service members with deferred pension entitlement

	2005				2012			
	Number of members (nearest 10)	Total deferred pension (i) (£m)	Average pension (£)	Average age (ii) (years)	Number of members (nearest 10) (iii)	Total deferred pension (v) (£m)	Average pension (£)	Average age (ii) (years)
Male	-	-	-	-	20	0.1	2,730	46.4
Female	-	-	-	-	80	0.2	2,690	48.2
Total	-	-	-	-	100	0.3	2,700	47.8

All members with deferred pension entitlement

	2005				2012			
	Number of members (nearest 10)	Total deferred pension (i) (£m)	Average pension (£)	Average age (ii) (years)	Number of members (nearest 10) (iii) (iv)	Total deferred pension (v) (£m)	Average pension (£)	Average age (ii) (years)
Male	3,600	17.2	4,770	50.7	3,730	20.1	5,390	55.2
Female	11,200	35.4	3,160	52.2	10,310	43.5	4,220	53.1
Total	14,800	52.6	3,550	51.2	14,040	63.6	4,530	53.8

(i) 2005 pension amounts exclude increase granted in April 2005
(ii) Weighted by pension
(iii) Includes members over NPA considered unlikely to claim their pensions
(iv) The 2012 valuation liability calculations exclude, in total, 235 members who are over age 70 and 1,043 members who are aged between NPA and 70 at the valuation date
(v) 2012 pension amounts exclude increase granted on 9 April 2012

Deferred members without pension entitlement [i]

	2005 Number of members (nearest 10)	2012 Number of members (nearest 10) (ii)
Male	1,590	4,300
Female	4,610	11,710
Total	6,200	16,010

(i) These members do not have enough qualifying service to be entitled to a deferred pension from the Scheme. They are entitled to a refund of their contributions or a transfer value payment, depending on the length of their service and when they left active service.
(ii) Includes members over NPA considered unlikely to claim their pensions. The 2012 valuation liability calculations exclude, in total, 399 members who are over age 70 and 2,868 members who are aged between NPA and 70 at the valuation date

3: Pensioners

Type of benefit		2005 Number of members (nearest 10)	2005 Total pension (ii) (£m)	2005 Average pension (£)	2005 Average age (i) (years)	2012 Number of members (nearest 10)	2012 Total pension (iii) (£m)	2012 Average pension (£)	2012 Average age (i) (years)
Age, ARB (iv) and Premature retirement	Male	12,770	144.4	11,310	70.1	17,380	247.4	14,230	69.9
	Female	22,620	175.4	7,750	70.6	34,160	336.6	9,850	69.5
	Total	35,390	319.8	9,040	70.4	51,540	583.9	11,330	69.7
Ill-health retirement	Male	2,290	24.8	10,840	62.3	2,060	28.2	13,680	67.3
	Female	4,560	39.8	8,720	62.9	4,330	47.5	10,970	67.4
	Total	6,850	64.6	9,430	62.7	6,390	75.7	11,850	67.4
Spouses and other dependants	Male	1,420	3.8	2,700	57.1	1,630	5.1	3,110	63.3
	Female	3,870	13.7	3,540	68.2	5,320	27.5	5,180	74.5
	Total	5,300	17.6	3,320	65.8	6,940	32.6	4,700	72.8
All	**Male**	**16,480**	**173.0**	**10,500**	**68.7**	**21,070**	280.6	**13,320**	**69.5**
	Female	**31,060**	**229.0**	**7,370**	**69.1**	**43,800**	411.6	**9,400**	**69.6**
	Total	**47,550**	**402.0**	**8,460**	**68.9**	**64,870**	692.2	**10,670**	**69.6**

(i) Weighted by pension
(ii) 2005 pension amounts exclude increase granted in April 2005
(iii) 2012 pension amounts exclude increase granted on 9 April 2012
(iv) Actuarially reduced benefits

Appendix B: Summary of benefits

B1 The Directions require the STSS and the new scheme being introduced for the teachers' workforce on 1 April 2015 ('the 2015 Scheme') to be taken into account in aggregate for the purposes of the current valuation. The summary of benefits provided is shown separately for the STSS and the 2015 Scheme. The criteria by which Scheme membership will be determined from 1 April 2015 are also shown. A full summary of the Schemes' provisions is set out in the *report Scottish Teachers' Superannuation Scheme: Actuarial valuation as at 31 March 2012: Report on Membership data* dated 27 February 2015.

STSS (existing sections)

B2 The main benefit provisions of the Scheme for each category of member are shown in Table B1.

Table B1: Main benefit provisions of STSS

	NPA 60 Section	NPA 65 Section
Basis of provision	Final salary	Final salary
Contracted out/in prior to 2016+	Contracted out	Contracted out
Normal Pension Age (NPA)	60	65
Pension accrual rate	1/80	1/60
Retirement lump sum accrual rate	3 x pension plus commutation at £12:£1pa	Cash by commutation only (£12: £1pa)
Final pensionable pay	Better of a) last 12 months' pensionable pay b) average of best 3 consecutive years' pensionable pay in last 10 years (revalued in line with the Pensions Increase (PI) Act to date of exit)	
Dependant benefits	50% of member pension (pre-commutation)	37.5% of member pension (pre-commutation)
Ill health pension	Total incapacity benefit – Pension based on actual service plus half of potential service to NPA Incapacity benefit – Pension based on actual service (but no reduction for immediate payment)	
Pension increases	In payment – increased in line with the PI Act, on excess over GMP In deferment – total pension increased in line with the PI Act	

+future benefits unaffected by contracting-out status

2015 Scheme

B3 The main benefit provisions of the 2015 Scheme are shown in Table B2

Table B2: Main benefit provisions of 2015 Scheme

	2015 Scheme
Basis of provision	Career average with revaluation of CPI + 1.6% pa whilst in service
Contracted out/in prior to 2016⁺	Contracted out
Normal Pension Age (NPA)	Higher of a member's State Pension Age and 65
Pension accrual rate	1/57
Retirement lump sum accrual rate	Cash by commutation only (£12: £1pa)
Final pensionable pay	Not applicable
Dependant benefits	37.5% of member pension (pre-commutation)
Ill health pension	Total incapacity benefit – incapacity benefit plus 50% prospective service to NPA, multiplied by 1/57 of the member's annual rate of pensionable earnings Incapacity benefit - accrued pension, no reduction
Early retirement	Benefits reduced for early payment. The reduction is actuarially neutral on a deferred benefit basis, except that for retirements directly from active status the reduction applying to the period between age 65 and NPA is 3% a year (up to a maximum of 3 years)
Pension increases	In payment – increased in line with the PI Act, on excess over GMP In deferment – total pension increased in line with the PI Act

⁺benefits unaffected by contracting-out status

Criteria for scheme membership from 1 April 2015

Protected Members

B4 All active members who, as of 1 April 2012, have 10 years or less to their current Normal Pension Age (i.e. NPA 60 section members who are aged 50 and over on 1 April 2012, and NPA 65 and Mixed Service section members who are aged 55 or over on 1 April 2012) will see no change in when they can retire, nor any decrease in the amount of pension they receive at their current Normal Pension Age. This protection will be achieved by the member remaining in their current scheme until they retire.

Tapered Members

B5 Active members who, as of 1 April 2012, are between 10 and 13½ years of their Normal Pension Age (i.e. NPA 60 section members who are aged between 46½ and 50 on 1 April 2012, and NPA 65 and Mixed Service section members who are aged between 51½ and 55 on 1 April 2012) will have limited protection with linear tapering so that for every month of age that they are beyond 10 years from their Normal Pension Age, they lose 2 months of protection. At the end of the protected period, they will be transferred into the new pension arrangements.

Unprotected members

B6 All other active members will transfer to the new arrangements on 1 April 2015.

Appendix C: Notional assets and cashflows

C1 The Directions specify the calculation of the ***notional assets*** as at 31 March 2012. The calculation is set out in Table C1. Income and benefit payments have been derived from the STSS Annual Accounts for each year and the relevant information is summarised in Table C2. The notional return credited each year in line with the return specified in the Directions is also shown. Income and expenditure is assumed to occur mid-year for the purposes of crediting the notional return.

Table C1: Notional assets

	£ billion		Direction
Scheme Notional Assets at 31 March 2005 (adjusted since 31 March 2005 valuation)	13.6	A	Schedule 2
Change in Scheme Notional Assets since in respect of:			
Income received	3.5	B	25
Benefits Paid	5.0	C	25
Notional Investment Returns	7.5	D	25
Scheme Notional Assets at 31 March 2012 (A + (B – C)) + D	**19.6**		**25**

Table C2: Cashflows

	2005/06 £ m	2006/07 £ m	2007/08 £ m	2008/09 £ m	2009/10 £ m	2010/11 £ m	2011/12 £ m
Income	434.1	447.2	489.7	495.1	547.0	544.5	526.1
Benefit payments	524.2	572.1	647.8	702.3	776.3	839.6	933.2
Notional investment returns[42]	855.2	1,035.8	1,147.7	1,404.8	356.4	1,172.3	1,529.0
(%)	6.3%	7.2%	7.5%	8.7%	2.1%	6.7%	8.4%

C2 Future cashflows to the Scheme will comprise income and benefit payments. The liabilities set out in this report are based on the overall cashflows expected to arise in all future years based on the assumptions used. Over shorter time periods it is likely that actual cashflows will differ from those taken into account when considering the longer term. Given the sensitivity of cashflow projections to particular time periods they are required for, none are provided in this report. It is recognised cashflow projections based on the valuation data may be required for other purposes.

[42] Calculated in accordance with direction 25(4). In basic terms, the rate of return is the measure of price inflation (which can be negative) compounded with the net discount rate applying at the time.

Appendix D: Events since the 2005 actuarial valuation

Changes to Scheme benefits from 1 April 2007

D1 A new section of the Scheme ('the NPA 65 Section') was introduced for new members and some returning members, depending on the period of absence. The section for existing members ('the NPA 60 Section') remained in place, with some amendments. These amendments included provision for commutation of pension at retirement, provision of benefits to a wider range of dependants and the introduction of a two tier ill health benefit. The benefits provided from both sections are summarised in Appendix B.

Member contributions

D2 Between 1 April 2005 and 31 March 2007, member contributions were payable at the rate of 6.0%. From 1 April 2007 up until 31 March 2012, member contributions were payable at the rate of 6.4%.

D3 Changes to member contributions were introduced after the ***effective date*** as set out in Table D1.

Table D1: Member contribution rates 1 April 2012 to 31 March 2015

	Member contribution rate		
Earnings	**2012/13**	**2013/14**	**2014/15**
< £15,000	6.4%	6.4%	6.4%
£15,000 - £25,999	7.0%	7.0%	7.2%
£26,000 - £31,999	7.3%	7.9%	8.3%
£32,000 - £39,999	7.6%	8.8%	9.5%
£40,000 - £44,999	8.0%	9.2%	9.9%
£45,000 - £74,999	8.0%	10.1%	11.0%
£75,000 - £99,999	8.4%	10.6%	11.6%
£100,000 - £111,999	8.4%	11.2%	12.4%
>£112,000	8.8%	11.2%	12.4%

Employer contributions

D4 Prior to 1 April 2007, employer contributions were paid at the rate of 12.5% of pensionable pay. Between 1 April 2007 and 31 March 2009, employer contributions were payable at the rate of 13.5%. From 1 April 2009, employer contributions have been paid at the rate of 14.9% of pensionable pay.

Pension increases

D5 The government announced that Consumer Price Index (CPI) rather than the Retail Price Index (RPI) would be used to set pension increases with effect from the April 2011 increase. The financial assumptions were amended accordingly as set out in Appendix E. The actual rate of increase awarded since the 2005 valuation are set out in Table D2. The known rates of increase awarded since the ***effective date*** are also shown. These have been taken into account in the valuation.

Table D2: pension increases since the previous valuation

Year	Pension Increase
April 2005	3.1%
April 2006	2.7%
April 2007	3.6%
April 2008	3.9%
April 2009	5.0%
April 2010	0%
April 2011	3.1%
April 2012	5.2%
April 2013	2.2%
April 2014	2.7%

Appendix E: Summary of assumptions

Table E1: Financial assumptions at current and previous valuation

	Current valuation 31 March 2012				Previous valuation 31 March 2005
Discount rate	3% pa real; 5.06% pa nominal				3.5% pa real; 6.5% pa nominal
Pension increases	2.0% pa				2.9% pa
Long term salary growth	4.75% pa, 2.75% pa in excess of assumed CPI				4.4% pa, 1.5% pa in excess of assumed RPI
Short term variations in assumptions	Year	Gross discount rate	Pension increases	Salary growth	None
	2012/13	5.27%	2.2%	1.8%	
	2013/14	5.78%	2.7%	0.5%	
	2014/15	5.27%	2.2%	1.5%	
	2015/16	5.16%	2.1%	2.0%	
	2016/17	n/a	n/a	2.5%	
	2017/18	n/a	n/a	3.0%	
	2018/19	n/a	n/a	3.0%	

Demographic assumptions

E1 Full details of the demographic assumptions are provided in the report *Scottish Teachers' Superannuation Scheme: Actuarial valuation as at 31 March 2012: Advice on assumptions* dated 27 February 2015. Sample rates and values are provided below.

E2 Retirements on or after NPA are assumed to occur on a member's birthday. Other decrements are assumed to occur mid-year.

Pensioner mortality

Table E2: Baseline mortality assumptions[43]

Group	Males	Females
Normal-health pensioners	120% of S1NMA_L	Age-dependent adjustments to S1NFA_L: ≤79: 83% 80-84: 95% 85-89: 110% ≥90: 119%
Existing ill-health pensioners	Age-dependent assumption: ≤71: 73% of S1IMA >71: 128% of S1NMA	Age-dependent assumption: ≤71: 100% of S1IFA >71: 123% of S1NFA
Future ill-health pensioners	100% of S1IMA	100% of S1IFA
Dependants	122% of S1NMA	99% of S1DFA

E3 As specified by HMT, future improvements in mortality will be assumed to be in line with those underlying the ONS 2012-based population projections.

E4 Resultant expectations of life are shown in Table E3 together with comparative figures for the previous valuation.

Table E3: Future life expectancy[44] (normal health retirement)

	2005 valuation	2012 valuation
Current pensioners		
Male aged 60	25.7	28.2
Male aged 65	20.8	23.3
Female aged 60	27.8	30.9
Female aged 65	22.9	25.9
Future pensioners – current age 45		
Male life expectancy from age 60	27.2	29.8
Male life expectancy from age 65	22.5	25.3
Female life expectancy from age 60	29.2	32.4
Female life expectancy from age 65	24.5	27.8

43 Expressed by reference to the S1 series of standard tables published by the CMI, adjusted to 2012 to take account of improvements in population mortality derived using rates from the UK Interim Life Tables.
44 Cohort life expectancy, based on age at relevant valuation date with future improvements in line with assumptions used in the relevant valuation.

Age retirement from service

Table E4: Age retirement rates for members remaining in the existing scheme after 31 March 2015

Age	NPA 60		NPA 65	
	Males	Females	Males	Females
55	0.04	0.03	-	-
56	0.07	0.05	-	-
57	0.09	0.07	-	-
58	0.12	0.11	-	-
59	0.16	0.14	-	-
60	0.41	0.49	0.04	0.03
61	0.37	0.44	0.07	0.05
62	0.33	0.35	0.09	0.07
63	0.36	0.33	0.12	0.11
64	0.54	0.45	0.16	0.14
65	0.65	0.56	1.00	1.00
66	0.64	0.59	1.00	1.00
67	0.67	0.62	1.00	1.00
68	0.67	0.62	1.00	1.00
69	0.67	0.62	1.00	1.00
70	1.00	1.00	1.00	1.00

Table E5: Age retirement rates for new entrants to the 2015 scheme

Age	SPA 65		SPA 66		SPA 67		SPA 68	
	Males	Females	Males	Females	Males	Females	Males	Females
55	-	-	-	-	-	-	-	-
56	-	-	-	-	-	-	-	-
57	-	-	-	-	-	-	-	-
58	-	-	-	-	-	-	-	-
59	-	-	-	-	-	-	-	-
60	0.04	0.03	0.04	0.03	0.04	0.03	0.04	0.03
61	0.07	0.05	0.07	0.05	0.07	0.05	0.07	0.05
62	0.09	0.07	0.09	0.07	0.09	0.07	0.09	0.07
63	0.12	0.11	0.12	0.11	0.12	0.11	0.12	0.11
64	0.16	0.14	0.16	0.14	0.16	0.14	0.16	0.14
65	1.00	1.00	0.50	0.50	0.33	0.33	0.25	0.25
66	1.00	1.00	1.00	1.00	0.50	0.50	0.33	0.33
67	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50
68	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Table E6: Age retirement rates for members with service in NPA 60 and 2015 schemes

Age	SPA 67		SPA 68	
	Males	Females	Males	Females
55	0.03	0.02	0.01	0.01
56	0.06	0.04	0.02	0.01
57	0.07	0.05	0.02	0.02
58	0.10	0.08	0.03	0.03
59	0.12	0.11	0.04	0.04
60	0.33	0.38	0.13	0.14
61	0.33	0.40	0.16	0.16
62	0.28	0.32	0.15	0.15
63	0.28	0.27	0.17	0.16
64	0.34	0.30	0.22	0.19
65	0.60	0.49	0.36	0.33
66	0.54	0.52	0.40	0.39
67	0.69	0.65	0.54	0.53
68	0.74	0.70	0.92	0.90
69	0.74	0.70	0.92	0.90
70	1.00	1.00	1.00	1.00

Table E7: Age retirement rates for members with service in NPA 65 and 2015 schemes

Age	SPA 65		SPA 66		SPA 67		SPA 68	
	Males	Females	Males	Females	Males	Females	Males	Females
55	-	-	-	-	-	-	-	-
56	-	-	-	-	-	-	-	-
57	-	-	-	-	-	-	-	-
58	-	-	-	-	-	-	-	-
59	-	-	-	-	-	-	-	-
60	0.04	0.03	0.04	0.03	0.04	0.03	0.04	0.03
61	0.07	0.05	0.07	0.05	0.07	0.05	0.07	0.05
62	0.09	0.07	0.09	0.07	0.09	0.07	0.09	0.07
63	0.12	0.11	0.12	0.11	0.12	0.11	0.12	0.11
64	0.16	0.14	0.16	0.14	0.16	0.14	0.16	0.14
65	1.00	1.00	1.00	1.00	0.76	0.76	0.41	0.41
66	1.00	1.00	1.00	1.00	0.78	0.78	0.48	0.48
67	1.00	1.00	1.00	1.00	1.00	1.00	0.61	0.61
68	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Ill-health retirement from service

Table E8: Ill-health retirement rates for all members

Age	Males	Females
20	-	-
25	0.0000	0.0000
30	0.0000	0.0001
35	0.0001	0.0002
40	0.0003	0.0003
45	0.0008	0.0008
50	0.0022	0.0020
55	0.0039	0.0039
60	0.0056	0.0059
65*	0.0069	0.0079

*rates are zero if above the NPA of the relevant section

E5 55% of ill-health retirements (both for males and females) are assumed to qualify for higher tier awards.

Voluntary withdrawal from service

Table E9: Withdrawal rates (net of re-entry within 5 years) for all members

Age	Males	Females
20	0.064	0.041
25	0.052	0.037
30	0.018	0.015
35	0.016	0.010
40	0.013	0.009
45	0.013	0.009
50	0.014	0.011
55	0.014	0.012
60	0.014	0.012
65*	0.014	0.013

*rates are zero if above the NPA of the relevant section

Commutation of pension for cash at retirement

Table E10: Proportion of pension assumed commuted for cash

	NPA 60 section	NPA 65 section*	2015 scheme*
Males	5%	15%	15%
Females	4%	15%	15%

* As specified in direction 18(e)

Death before retirement

Table E11: Death before retirement rates for all members

Age	Males	Females
20	0.0001	0.0000
25	0.0001	0.0001
30	0.0002	0.0001
35	0.0003	0.0002
40	0.0004	0.0003
45	0.0005	0.0004
50	0.0008	0.0006
55	0.0013	0.0009
60	0.0023	0.0012
65	0.0035	0.0017

Promotional pay increases

Table E12: Promotional salary scales for members

Age	Males	Females
20	89	89
25	100	100
30	125	124
35	151	143
40	168	152
45	179	158
50	186	164
55	190	168
60	192	170
65	194	172

Family statistics

Table E13: Proportion married or partnered at retirement for future pensioners

	Accrual before 1/1/2007 Proportion married	Accrual on or after 1/1/2007 Proportion married or partnered
Males	75%	75%
Females	60%	60%

Table E14: Proportion married or partnered for current pensioners (at the effective date)

Age	Accrual before 1/1/2007 Proportion married		Accrual on or after 1/1/2007 Proportion married or partnered	
	Males	**Females**	**Males**	**Females**
50	72%	60%	76%	62%
60	72%	60%	76%	62%
70	72%	48%	74%	49%
80	60%	24%	61%	24%
90	34%	7%	34%	7%

E6 Male members are assumed to be three years older than their partners and female members are assumed to be two years younger than their partners.

Appendix F: Summary of methodology and calculations

Methodology

F1 The Directions specify the use of the projected unit methodology and that benefits should be attributed to periods of service in accordance with the requirements of International Accounting Standard 19: Employee Benefits.

F2 Since 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, and the expected cost of providing benefits varies for members with differing benefit provisions within the existing scheme (notably for members with differing normal pension ages), projecting the membership gives a materially different estimate of the valuation result.

F3 Since for short term workforce planning purposes Scottish Ministers assume that the total payroll will be broadly stable in real salary roll terms, the total salary roll of the active membership has been projected forward in line with the valuation general salary increase assumptions. We have projected the current membership to run off in accordance with the valuation assumptions from the ***effective date*** to the end of the implementation period. We have allowed for new entrants into the Scheme in order to match the total projected salary roll. The profile of new entrants is assumed to be the same as that of recent entrants into the Scheme. Full details of the membership projection is provided in the report *Scottish Teachers' Superannuation Scheme: Actuarial valuation as at 31 March 2012: Report on methodology* dated 27 February 2015.

Calculations

F4 The following provides a brief explanation of the actuarial calculations used to derive the ***valuation results***.

Scheme benefits

F5 First, an estimate is made of the amount of benefit to be received by each scheme member (and their dependants, where applicable) over each future year of the Scheme, from the ***effective date*** onwards. In order to do that, it is necessary to make some assumptions about the future service and salaries of the scheme members, and the length of time over which they will receive benefits. (More information about the assumptions is set out in Appendix E.)

F6 Having estimated the benefits as a stream of projected cashflows from the ***effective date*** onwards, the second step is to calculate the capital sum which would need to be held at the ***effective date*** in order to pay all of the benefits. This requires an assumption to be made as to rate of return which would be earned by the capital sum if it were invested. In the case of the Scheme, there is no actual sum of money, but the valuation approach is predicated on the premise that there is a notional fund with a notional investment return.

F7 This capital sum is often referred to as the 'present value' of the benefits and is calculated by 'discounting' the future cashflows back to the ***effective date*** using the valuation discount rate (see Appendix E). The present value can alternatively be considered as the amount of money which would need to be invested at an assumed interest rate (equal to the discount rate) in order to pay all the benefits. The result of the calculation is, by its nature, a planning or budgeting estimate, not a 'valuation' as such.

Calculations

F8 For the valuation, it is necessary to separate the capital sum into two parts: (i) the sum needed to pay out benefits which relate to service *prior to* the ***effective date*** ('past service'), and (ii) the sum needed to pay out those benefits which relate to service *after* the ***effective date*** ('future service').

Past service position

F9 In relation to the past service element, we compare the capital sum (or present value) relating to past service with the balance in the notional fund at the ***effective date***. If all the assumptions made during previous reviews had been borne out exactly, and assuming no errors in previous data sets are revealed, the notional fund would exactly equal the capital sum now needed to pay for those past service benefits. But, if actual events have differed from the assumptions made, then the notional fund will exceed, or fall short of, the capital sum now estimated to be needed.

F10 To the extent that the notional fund is *less* than the capital sum needed to pay out all the benefits relating to past service, the fund is said to be in *deficit*. This deficit needs to be met by additional contributions. If the notional fund *exceeds* the capital sum required for past service benefits, it is said to be in *surplus* and there would be a reduction in the contributions that would otherwise be paid for future service.

Future contributions

F11 To arrive at the level of contributions required to meet benefits estimated to arise out of future service, we calculate the percentage of total pensionable pay which, if paid from the ***effective date*** onwards, would be sufficient to make up the capital sum needed to pay out the benefits. (Or, using the terminology from above, we calculate the contribution rate which has the same 'present value' as the benefit stream which the contributions will pay for.) In making this calculation, we adopt the same assumptions that we mentioned above regarding the future service and salaries of the scheme members and the rate of return which would be earned by the capital sum if it were invested.

Appendix G: The cost cap mechanism

G1 This report recommends an ***employer contribution rate*** and proposes an ***employer cost cap*** (the ***valuation results***) based on a number of assumptions about the future. Section 7 outlines the main reasons why future ***valuation results*** may differ from the results shown in this report. This section gives further information on the cost cap mechanism and the factors which may influence the level of contributions payable by, or amount of benefits payable to, members at future valuations.

Allocation of cost savings/increases at future valuations

G2 The cost cap mechanism specifies that:

a. if the ***cost cap cost of the scheme*** determined at a future valuation differs from the ***employer cost cap*** by more than 2% of pay, then member contributions or benefits will be adjusted.

b. if the ***cost cap cost of the scheme*** is within 2% of the ***employer cost cap***, then member contributions and benefits will not be adjusted.

Liabilities considered for future valuation results

G3 The ***employer contribution rate*** takes into account the whole of the aggregate scheme's liabilities ie those attributable to all service in both the existing and 2015 schemes.

G4 By contrast, only part of the aggregate scheme's liabilities are considered for the calculation of the ***cost cap cost of the scheme***. In particular the ***cost cap fund*** is intended to exclude costs relating to deferred and pensioner members of the existing schemes. More detail is set out in paragraphs 2.24 to 2.27 of *Public service pensions: actuarial valuations and the employer cost cap mechanism*.

G5 The prior value of the ***cost cap fund*** will be first determined at the actuarial valuation due to be carried out as at 31 March 2016. This will be based on the scheme's liabilities only for members who are active (that is, still in employment) as at 31 March 2015. As members with existing scheme benefits progressively leave active service, their liability will move outside the ***cost cap fund***. Of the liabilities expected to establish the cost cap fund as at 31 March 2015 a significant proportion of the liabilities will relate to members who are in protection (including tapered protection) and who are expected to retire in the relatively short term. Over this period, the cost cap mechanism may therefore be exposed to significant variations in pay experience and retirement patterns.

G6 Over the longer term, the cost cap mechanism will become relatively more sensitive to other demographic assumptions, particularly rates of voluntary withdrawal and the impact of this on the age profile of the active membership. The ***cost cap cost of the scheme*** is also sensitive to changes in longevity expectations. Initially, this only relates to active members but once members with 2015 scheme service have retired, then any changes in expectations of their longevity will also have an impact on the ***cost cap cost of the scheme***. Further, although the retirement age of active members is intended to vary in line with longevity expectations, the timing of any legislative changes to retirement age is unlikely to be synchronised with the timing of future valuation cycles.

G7 More information about the employer cost cap mechanism can be found in of *Public service pensions: actuarial valuations and the employer cost cap mechanism* published by HMT in March 2014.

Appendix H: Location of material required by Directions

Direction	Description	Location
21(a)(i), (ii)	Summary of membership data and checks carried out	Appendix A *Scottish Teachers' Superannuation Scheme: Actuarial valuation as at 31 March 2012: Report on membership data* dated 27 February 2015
21(a)(iii)	Adjustments made to data Projections made	*Scottish Teachers' Superannuation Scheme: Actuarial valuation as at 31 March 2012: Report on membership data* dated 27 February 2015 *Scottish Teachers' Superannuation Scheme: Actuarial valuation as at 31 March 2012: Report on methodology* dated 27 February 2015
21(b)	Average age of active members	Appendix A1
21(c)	Statement of compliance with directions	Paragraph 2.3
21(d)	Summary of regulations, directions and professional standards	Paragraphs 2.3-2.5, GAD website
21(e)	Summary of main provisions of the schemes	Appendix B *Scottish Teachers' Superannuation Scheme: Actuarial valuation as at 31 March 2012: Report on membership data* dated 27 February 2015
21(f)	Analysis of demographic experience	*Scottish Teachers' Superannuation Scheme: Actuarial valuation as at 31 March 2012: Advice on assumptions* dated 27 February 2015
21(g)(i), (ii)	Statement of assumptions, including rationale	*Scottish Teachers' Superannuation Scheme: Actuarial valuation as at 31 March 2012: Advice on assumptions* dated 27 February 2015 See also Appendix E of this report
21(g)(iii)	Illustration of sensitivity to assumptions	Section 6
21(h)	Other liabilities valued	None
22(a), (b)	Valuation balance sheet	Section 4, Table 4.1
22(c)	Notional asset cashflows	Appendix C, Table C2
22(d), (e), (f)	Contribution rates	Section 4, Table 4.2
53	***Proposed employer cost cap***	Section 4, Table 4.3

Appendix I: Limitations

I1 This report is intended solely for the use of Scottish Ministers for the purposes of determining the ***employer contribution rate*** payable for the period 1 April 2015 to 31 March 2019 and the initial ***employer cost cap***, both of which are to be set in regulations. The information and advice in this report should not be relied upon, or assumed to be appropriate, for any other purpose or by any other person. GAD does not accept any liability to third parties, whether or not GAD has agreed to the disclosure of its advice to the third party.

I2 We are content for Scottish Ministers to release this report to third parties, provided that:

> it is released in full

> the advice is not quoted selectively or partially

> GAD is identified as the source of the report, and

> GAD is notified of such release.

I3 Third parties whose interests may differ from those of Scottish Ministers should be encouraged to seek their own actuarial advice where appropriate. GAD has no liability to any person or third party for any act or omission taken, either in whole or in part, on the basis of this report.

I4 GAD is not responsible for any decision taken by Scottish Ministers, except to the extent that the decision has been made in accordance with specific advice provided by GAD. Advice provided by GAD must be taken in context and is intended to be read and used as a whole, not in parts. GAD does not accept responsibility for advice that is altered or used selectively. No significant action should be taken based on oral advice alone. Clarification should be sought if there is any doubt about the intention or scope of advice provided by GAD.

I5 GAD relies on the accuracy of data and information provided by the Scottish Public Pensions Agency (SPPA). GAD does not accept responsibility for advice based on wrong or incomplete data or information provided by SPPA or Scottish Ministers.