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DEFINED BENEFIT PENSION SCHEMES IN THE SNA –  
AUSTRALIAN VIEW<sup>1</sup>

Submitted by Australian Bureau of Statistics

The meeting is organised jointly with Eurostat and the Organization for Economic  
Co-operation and Development

**PREFACE**

1. This paper is the paper presented by Australia to the Task Force on Employer Retirement Schemes in 2005. It is re-presented to this Joint UNECE/OECD/ Eurostat National Accounts meeting as the issues raised and arguments put forward in the paper are still considered to be applicable in the discussion of the treatment of pensions schemes for the purposes of updating SNA93.

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<sup>1</sup> This paper has been prepared by Tony Johnson and Tulsi Ram at the invitation of the secretariat.

## **INTRODUCTION**

2. The Australian national accounts and GFS have recorded the unfunded pension liabilities of governments and the counterpart unfunded pension assets of households since the introduction of SNA93 in the Australian system in 1998. The treatment is broadly consistent with that outlined in the Issues Paper "The Statistical Treatment of Employers' Pension Schemes", prepared by the IMF and discussed by the AEG at its December 2004 meeting.

3. In its discussion of the Issues paper, the AEG agreed that governments have a liability for pensions of their employees regardless of whether they are funded or unfunded. However, there were a number of outstanding issues that required further consideration and the International Task Force on Employers' Retirement Schemes has now been set up to focus on these issues.

4. In January 2003, ABS provided a paper titled "The Treatment of Government Employee Pension Funds in the Australian National Accounts" to the Eurostat Taskforce on Pensions. This followed an earlier paper presented to the 1999 OECD Meeting of National Accounts Experts. The later paper was also submitted to the IMF EDG on Pensions.

5. This current paper draws on some of the material from the earlier ABS papers together with other material to focus on the issues before the Task Force. In particular, the paper deals with specific issues outlined in the task force terms of reference relating to:

- The accounting for defined benefit schemes; and,
- How to estimate the liabilities and associated flow items

6. It does not consider the issue of how the boundary should be drawn between social security and employer pension schemes. This is not an issue of concern for Australia, as we do not have a social security scheme in the SNA sense.

## **EMPLOYEE PENSION SCHEMES IN AUSTRALIA**

7. Both defined benefit and defined contribution employee pension schemes exist in Australia. The latter type covers the majority of employees. Government employees are typically covered by the former type and private sector employees by the latter, although this is not universally so. Some schemes are a mixture of both types.

8. In Australia, a range of different types of pension schemes exists to provide retirement income for general government employees. Most governments operate, or used to operate, pension schemes for their employees that are unfunded or only partly funded. A number of general government schemes have one component funded through direct employee contributions, and another (the employer's contribution) that is unfunded. Under such schemes employee contributions plus investment returns are redeemed upon retirement date, with employer contributions paid in the form of a pension. Other general government schemes comprise only an unfunded employer component. Increasingly, pension schemes for general government employees in Australia are becoming fully funded. The main schemes for the largest general government employer, the Commonwealth (Federal) government, remain unfunded, except for new employees after July 2005.

9. Defined benefit pension schemes represent only a relatively small, but not insignificant,

part of employee sponsored pensions arrangements for non-government employees. They are mainly operated through independent insurance companies or pension funds and there are taxation benefits in doing this rather than maintaining non-autonomous funds. However, some are operated within companies that either maintain special reserves for the purpose or that have unfunded schemes. These are likely to relate to pension arrangements for executives.

## **AUSTRALIAN NATIONAL ACCOUNTS (AND GFS) TREATMENT OF DEFINED BENEFIT PENSION SCHEMES**

### General government unfunded pension schemes

10. The starting point is actuarial based estimates of the net present value of unfunded employee pension liabilities and the associated flows available from public accounts.

11. The change in the liability position (flows) from one period to the next is decomposed into the following components:

- imputed employer contributions for new and existing employees
- plus imputed property income on the outstanding liability to pay pensions
- plus revaluations
- plus revisions due to changes in actuarial assumptions and benefits payable
- less pensions paid

12. The recording in the accounts is as follows:

- unfunded pension claims are recorded as a liability on the balance sheet of the general government sector and as an asset on the balance sheet of the household sector;
- imputed employer contributions are recorded as compensation of employees in the income accounts of the general government and household sectors and as government final consumption expenditure in the use of income account;
- imputed property income flows are recorded in the income accounts of the general government and household sectors;
- change in technical reserves (imputed employer contributions plus property income less pensions paid) are recorded as the incurrence of a liability in the financial account of general government and an acquisition of a financial asset in the financial account of households;
- revaluations and changes in actuarial assumptions and/or defined benefits are recorded in the other changes in assets accounts.

13. The recording of the Australian unfunded pension schemes of general government is shown in Attachment 1. It is presented in the 1993 SNA "T" account schema. It should be noted that this presentation differs slightly from the actual presentation in the Australian system of national accounts because the item 'adjustment for the change in net equity of households on pension funds' is not recorded in the Australian system.

Availability of data items from public accounts

14. In Australia, the Commonwealth Government, the six States and the two Territory Governments as well as the 750 or so individual local government authorities each prepare financial information on the net present value of future benefits and associated flows for budgeting and financial reporting purposes. Financial reporting is also required under Australian Accounting Standards, issued by the Australian Accounting Standards Board. In addition to the information normally available from the public accounts prepared under each government's finance, audit and similar legislative requirements, the Commonwealth, States and Territory Governments also have an inter-governmental agreement to publish, as part of their budget or related documentation, a core set of uniform financial information based on GFS concepts. The Australian Bureau of Statistics, though not formally a signatory to the inter-governmental agreement, plays a key role in ensuring this uniformity as well as conformity to the GFS standards.<sup>1</sup>

15. In relation to their respective defined benefit scheme(s), each Governments has readily acknowledged the legal and contractual nature of their obligation; hence the on-balance sheet nature of their liability has never been under contention. As a result of this acknowledgement and the financial reporting referred to above, especially the reporting on a uniform basis, the key data items relating to the public sector defined benefit schemes are readily available. The estimates of the unfunded liability for defined benefit schemes are regularly available as independently audited information. Moreover, independent professional actuaries also undertake regular reviews of the schemes, typically triennially.

16. The data items available include: accrued employer contributions (in respect of the current service of employees), cash payments (in respect of the past service of retired superannuants), imputed property income flows, and opening and closing liability balances.

Private sector defined benefit schemes

17. Defined benefit schemes are only a small component of employee pension arrangements in the private sector. Recent data show that the assets of private sector defined benefit plans are only 1.5% of the total assets of separately constituted pension funds. Private sector hybrid plans' assets are 13.5% of total assets. The remaining 85% are defined contribution plans.

18. Australia is currently adopting Australian equivalents of the new International Accounting Standards. The soon to be superseded standard requires employers to recognise employee benefits expenses but does not require them, as employer sponsors of defined benefit plans, to recognise an asset or liability in relation to the plan. However, employers are required to disclose details for each plan, for example, accrued benefits, net market value of the plan assets, the difference between them and the date of measurement; and whether they have recognised any amounts in their financial statements and the amounts recognised. A survey conducted by the accounting firm Ernst & Young in March 2004 showed that the predominant corporate practice in Australia has been for employer sponsors to recognise an expense based on the actual amounts of funding paid or payable in respect of a financial period, i.e. cash-based accounting.

19. In the Australian national accounts, the assets and liabilities of separately constituted defined benefit funds are recorded along with the employers' contribution (compensation of employees), based on information available from business accounts. The employer contributions are known to be volatile because of their cash basis, exacerbated by previous period over or under funding positions resulting in 'catch-up' or 'contribution holidays'. No attempt is made to recognise unfunded liabilities or to adjust the data to an actuarial basis. However, as there is an offsetting impact between compensation of employees and the GOS/GMI of employers, there is no impact on GDP. While this treatment is not ideal, in practice the amounts involved are rather small when compared to those involved in government schemes, which are recorded on the preferred basis.

20. Under the new Australian equivalent of IAS 19 - Employee benefits - Actuarial gains and Losses, Group Plans and Disclosures, employer sponsors of defined benefit plans will have to recognise an asset or liability in relation to the plan, based on the actuarial valuation of the obligation towards the employee and the fair value of the plan assets. Any changes in the fair value of the plan are recognised in the profit and loss. Detailed disclosures are required for the expense, assets and liabilities and this information would enable the ABS to identify the components of the expense and the reconciliation of assets and liabilities. The new standard applies to employer sponsors of all types of defined benefit plans - funded and unfunded, autonomous and non-autonomous and those plans managed by insurance enterprises.

21. Importantly, the new business accounting standards are a major step towards the actuarial approach suggested for the national accounts as outlined in the report of the Moderator of the IMF EDG on pensions and in the Issues Paper presented to the December 2004 meeting of the AEG.<sup>2</sup>

## **COMMENTS ON OUTSTANDING ACCOUNTING ISSUES**

22. The International Task Force on Employers' Retirement Schemes has identified some accounting issues that require further consideration. The ABS view on these issues is presented below.

### Output of defined benefit schemes and associated issues

23. Autonomous defined benefit pension funds incur business expenses including labour costs, building rentals and fees paid to investment managers. They recover these costs by charging fees directly to the employer or employee or indirectly by deducting a fee from investment returns, which are shown net. The method for deriving output for these funds is described in 1993 SNA Annex IV.

24. SNA does not recognise an output for non-autonomous pension funds. In principle, it would seem desirable to also impute an output for non-autonomous and unfunded schemes so that in all respects the economic balances and flows would be recorded in the same way regardless of the nature of the scheme (autonomous funds, non-autonomous funds, unfunded, defined benefit or defined contribution). If the operation of an autonomous fund involves the production and consumption of a financial service, it is difficult to argue that the same service is not provided by a non-autonomous or unfunded scheme. In practice, materiality considerations based on country circumstances might be a factor in determining whether an estimate is actually

made.

25. There would appear to be a number of possible approaches to the imputation of output:
- cost basis - this is the approach used in SNA93 for measuring non-market production more generally;
  - percentage of funds invested - based on fees typically charged by autonomous funds (defined benefit and defined contribution funds); or for unfunded schemes;
  - percentage of liabilities - based on fees typically charged by autonomous funds.

26. In common with the treatment of non-market output more generally in SNA, the ABS view is that the cost basis (including capital services) should be used. In Australia, the administration costs of the general government employee schemes are borne by the government so the output is already included implicitly in the government administration industry and GDP.

27. If output is imputed for non-autonomous schemes the question arises as to who consumes the output – the employer or the employee/beneficiary? Consistent with the treatment of autonomous funds in SNA (Annex IV para. 19), the ABS view is that the output should be taken to be a service charge to the employees or beneficiaries. Notwithstanding the point made in the next paragraph, in the case of unfunded schemes operated by general government in Australia there would be no further impact on GDP because an increase in household final consumption expenditure would be offset by a reduction in government final consumption expenditure.

28. If the service charge is deemed payable by the employees/beneficiaries, how is this to be funded? In order to avoid an impact on household saving a payment would have to be imputed from the employer. To the extent that these are current employees the payment would be in the nature of compensation of employees. To the extent that the service is provided to past employees it could be considered that the payment represents past compensation of employees for these employees, in the form of an account receivable that is subsequently 'wound down' as the service is actually provided. In practice, though, recording the funding as compensation of employees (or even as a current transfer) in the period in which the service is actually provided might be a reasonable alternative.

29. A further issue that would have to be resolved concerns the institutional sector and industry to which the imputed output should be classified. If the activity is recorded in the sector and industry of the employer, depending on country circumstances it could result in a number of industries producing life insurance and pension fund products. To the extent that it is only general government that is involved this may be a satisfactory result. An alternative, and one favoured by the ABS would be to establish the non-autonomous scheme as a quasi-corporation classified to the financial corporations sector and financial services industry.

#### Sector allocation of net worth of defined benefit funds

"The liability of a defined benefit pension plan is equal to the present value of the promised benefits." (SNA93, 13.78)

30. SNA93 recognises that defined benefit schemes can be over or under funded, i.e., the scheme's reserve assets may be either greater or less than the present value of future benefits. Any such difference is treated in SNA93 as positive or negative net worth of the scheme.

31. In a revised treatment based on actuarial calculations it is proposed that defined benefit funds have a zero net. In order to achieve this any net worth (positive or negative) due to over or underfunding of the scheme has to be allocated as an asset or a liability of the employer or the employee with the counterpart asset or liability recorded by the defined benefit fund.

32. The ABS view is that any net worth should be allocated to the employer if they have the legal obligation to pay future employee pension benefits. Where a scheme is underfunded, the employer will have a liability of that amount and the fund will have the counterpart asset. Where the scheme is overfunded, the employer will have an asset and the fund a liability. This is consistent with the direction of the new business accounting standards where employers themselves are asked to record a liability or asset based on the difference between the valuation of the obligation towards the employee and the fair value of the plan assets.

### **DATA REQUIRED TO ESTIMATE UNFUNDED PENSION LIABILITIES AND ASSOCIATED FLOWS**

33. Where data relating to a government's defined benefit employee pension scheme is not available from the government's own accounting records, it may still be possible to compile estimates of the unfunded pension liabilities and the associated flows. However, the process would require a large volume of input data that would need to be manipulated systematically over multiple periods, with complex calculations and where the output is sensitive to assumptions. Despite any uncertainties inherent in a model based estimate in the national accounts, it could be expected that the resulting estimates represent a far superior reflection of the true fiscal and economic situation facing governments than a cash based accounting.

34. In a defined-benefit scheme, the benefits payable on retirement are usually promised or predefined by some formula. The key parameters of the formula are normally the employee's length of service and retirement salary. The nominal values of the total retirement benefits to be paid in the future can be calculated based on assumptions such as expected retirement ages, mortality rates, expected inflation, and expected salary increases. As the calculation would be highly sensitive to these assumptions, they need to be soundly based and regularly updated.

35. The nominal values derived above can then be converted to their present values using an appropriate discount rate, such as that reflecting the particular government's long term borrowing rate. This present value represents the accrued gross liability at the end of a period in question. In effect, this accrued liability represents the employees' pension entitlements in respect of service already provided to the government. If the scheme is partially funded, for example, through a trust, which is separate from the employer, then assumptions relating to future earnings may also be relevant in determining the 'unfunded' liability of the government.

36. Over successive accounting periods, the total liability of the pension scheme would change because of the accrual of additional contributions, the payment of benefits to pensioners, changes in the assumptions or variables, and the passage of time. The imputed property expense for a period can be calculated as equal to the increase in the liability resulting from the passage of

time, which occurs because the future benefits are discounted over one fewer accounting period.

As unfunded liabilities essentially represent borrowings by the employer from employees, then the general cost of borrowing for the employer should be used to determine the discount rate. In the case of government, for example, an appropriate rate would be the long-term bond rate.

37. The change in the liability due to changes in assumptions or variables (commonly referred to as actuarial revaluations in accounting terms) may be in the nature of revaluations or other change in the volume of assets.

38. Attachment 2 contains further information on the actuarial calculations made for the unfunded public sector pension schemes for Commonwealth government employees in Australia. Attachment 3 describes a method that can be used to approximate a statistical back-series for liabilities and accrued employee and accrued property income expense, provided the end point liability is known and cash payment data for benefits are available in respect of the back-periods concerned.

<sup>1</sup> These GFS statements that are produced by the various governments may and do differ from GFS statements that are produced by the ABS, as the ABS reserves the right to prepare GFS statistics that are independent from government. The ABS GFS statements are Australia's 'official' GFS statistics.

<sup>2</sup> In Australia, Australian governments are obliged to use the same standards for accounting as businesses where the business standards are relevant. If this is the case in other countries, the adoption of IAS19 by governments will provide a ready source of information for recording defined benefit schemes in the national accounts.



## ATTACHMENT 1

### RECORDING OF UNFUNDED EMPLOYEE PENSION SCHEMES IN THE AUSTRALIAN NATIONAL ACCOUNTS

1. The following accounts show the recording for the general government sector. The accounts showing counterpart flows and claims by the household sector are not shown. The counterpart recording is complicated by the existence of claims by public corporations on general government and claims by households on public corporations.
2. The information derived from government accounts for the reference year is as follows:
  - Unfunded pension liabilities, beginning of year - \$144,100m
  - Unfunded pension liabilities, end of year - \$149,000m
  - Imputed employer contributions - \$4,560m
  - Imputed property income on liabilities - \$9,368m
  - Actuarial revaluations – \$0 (note that in some years substantial amounts have been recorded).

#### General Government Accounts: 2003-04

##### ***Production Account (\$m)***

Uses	Resources
	Non Market Output 4,560
Gross Value Added 4,560	

##### ***Generation of Income Account (\$m)***

Uses	Resources
	Gross Value Added 4,560
Employers' imputed social contributions 4,560	

**Allocation of  
Primary Income  
Account (\$m)**

<b>Uses</b>		<b>Resources</b>	
Interest	9,368		
Balance of Primary Income	-9,368		

**Secondary  
Distribution of  
Income  
Account (\$m)**

<b>Uses</b>		<b>Resources</b>	
		Balance of Primary Income	-9,368
		Imputed social contributions	13,928
Unfunded employee social benefits	9028		
Disposable income	-4468		

**Use of  
Disposable  
Income  
Account (\$m)**

<b>Uses</b>		<b>Resources</b>	
		Disposable income	-4468
Final Consumption Expenditure	4,560		
Adjustment for the change in net equity of households on pension funds	4,900		
Saving	-13928		

**Capital Account  
(\$m)**

<b>Changes in Assets</b>		<b>Changes in Liabilities</b>	
		Saving	-13928
Net Lending	-13928		

**Financial  
Account (\$m)**

<b>Changes in Assets</b>		<b>Changes in Liabilities</b>	
Net acquisition of financial assets	-9,028	Change in net equity of households on pension funds	4900
		Net lending	-13928

### Changes in Assets

## Changes in Assets

Year	2010	2011	2012	2013	2014	2015
Share of GDP	1.1	1.1	1.1	1.1	1.1	1.1

## Assets

[illegible]

144100

-144100

0				

**Balance Sheet -  
Closing (\$m)**

Assets		Liabilities and Net Worth	
		Unfunded pension Liabilities	149000
		Net Worth	-149000

**Changes in  
Balance Sheet  
(\$m)**

Changes in Assets		Changes in Liabilities and Net Worth	
		Unfunded pension Liabilities	4900
		Net Worth	-4900

## **ATTACHMENT 2**

### **PUBLIC SECTOR SUPERANNUATION (PSS) – ACTUARIAL CALCULATIONS**

#### **INTRODUCTION**

Note: The term ‘superannuation’ is used in Australia to describe employer and employee-funded pensions.

1. The Commonwealth Superannuation Scheme (CSS) and the Public Sector Superannuation (PSS) are the two predominant superannuation or pension schemes operated by the Australian Commonwealth Government in respect of its own employees. The CSS has been closed to new memberships since 30 June 1990 and the PSS, which commenced on 1 July 1990, is now become the dominant scheme.
2. The PSS initially started out as a partially funded defined benefit scheme but, as a result of changes effective from 1 July 2005, all new memberships are on a defined contribution basis. This appendix briefly describes the defined benefit component of the PSS scheme, based largely on an actuarial review (the review) prepared for the year 2002 by a firm of private actuaries (Mercer Human Resources Consultancy Pty Ltd), acting as consultants for the Commonwealth Department of Finance and Administration.

#### **BACKGROUND**

3. The PSS was established on 1 July 1990 under the Superannuation Act 1990. The Act, a Trust Deed and various Rules govern the operations of the PSS. All permanent employees of Commonwealth agencies are required to participate, except where the employing agencies have other approved superannuation arrangements.
4. The PSS commenced as a defined benefit scheme, but a change introduced in July 2005 means that all new members now join the defined contribution component of the scheme. The defined contribution component of the PSS has not been dealt with here as the payment of a fixed contribution by the employer makes it inherently different from a defined benefit arrangement.
5. The primary benefit payable under the PSS is expressed as a lump sum, based on a multiple of final average salary that is related to a member's average contribution rate and total service. On exit, the benefit may be wholly or partially taken as a pension, indexed twice yearly to the Consumer Price Index.
6. The PSS is unfunded to the extent that no funds relating to the employer component of the benefits payable are set aside; rather, the employer's obligations are met on an emerging cost basis.
7. The PSS is funded to the extent it includes member contributions (ranging from 5 - 10 % of salary) and productivity contributions paid by agencies in respect of their employees. These

member and productivity contributions are invested by the trustees of the PSS Board and the investment returns achieved are declared annually.

## MEMBERSHIP DATA AND ASSUMPTIONS

8. To estimate the liability and other related aggregates for a defined benefit fund, detailed data on the fund's membership and various assumptions are typically required. The last actuarial review of the PSS was based on the following membership data provided by Comsuper, the administrator of the scheme:

### PSS membership @ 30 June 2002

	<b>Males</b>	<b>Females</b>	<b>Total</b>
Number of Contributors	55,170	74,513	129,683
Salaries - Total	\$2,828 m	\$3,394 m	\$6,222 m
- Average	\$51,263	\$45,542	\$47,976
Number of Deferred Beneficiaries	31,407	44,950	76,357
Number of Age Pensioners	3,650	2,932	6,582
Number of Invalidity Pensioners	520	496	1,016
Number of Reversionary Pensioners	116	215	331

## ASSUMPTIONS

9. The assumptions used in the review were categorised into 'general' (if they were not directly related to the scheme membership) and 'experience' (if they were related to the experience of the membership of the scheme).

10. The assumptions in the general category, for example, in relation to future CPI increases, future investment returns and future salary increases (not related to promotions) have a more critical bearing on the final outcome than other assumptions. The following table summarises some of the general assumptions used in the review and the basis for them:

### General assumptions

<b>Item</b>	<b>Assumption</b>
Consumer Price Index	2.5% increase pa, based on the average increase over the last 10 years, the current outlook for inflation and the Reserve Bank's target
Investment returns	6.0% pa nominal, 3.5% pa real, based on the expected return on government bonds as this would be a reasonable determinant of the cost to the Commonwealth were it to fund the scheme through borrowings
General salary increases (i.e. not promotion related)	4.0% pa nominal, 1.5% real, based on a 1.5% real rate of increase and the relationship between the expected long term salary increases and the discount rate

## **EXPERIENCE ASSUMPTIONS**

11. The assumptions in the experience category were based on a detailed analysis of the membership experience in the three years leading to the review. Matrices relating to the following were used in the review, cross-classified by age and sex:

- salary progression (promotion related)
- invalidity
- contributor mortality
- retirement
- resignation
- retrenchment
- pensioner mortality
- member contributions

## **METHODOLOGY**

### Unfunded liability

12. The method used in the review to derive an estimate of the unfunded liability was based on the "Projected Unit Credit Method". In this method, the same proportion of the final benefit payable is allocated to each year of service.

13. The following steps were involved:

- the membership of the scheme as at 30 June 2002 was projected into the future, based on assumptions relating to future salary growth and rates of exit of members with no allowance for new members;
- the total value of unfunded benefits payable to the projected exits in each future year was determined;
- the projected benefit in each future year accrued by 30 June 2002 was determined as follows:  
Projected Unfunded Benefit at the midpoint of the year of exit X Service at 30 June 2002 / Service at the midpoint of the year of exit (the midpoint of the year was used as the unfunded benefits are assumed to accrue uniformly over the total service of each member);
- the unfunded liability as at 30 June 2002 was determined as the sum of the present values of the accrued projected unfunded benefits.

## **NOTIONAL PENSION INTEREST EXPENSE**

14. The total liability of the scheme over time changes because of the receipt of additional contributions, the payment of benefits, changes in the actuarial assumptions, and the passage of time. The notional interest expense for a period is equal to the increase in the liability resulting from the passage of time, which occurs because the future benefit has been discounted over one fewer accounting period.



## EMPLOYER EXPENSE

15. The employer expense accrued for a period represents the amounts accruing to existing employees in respect of the services provided by them in the period. The amount was calculated based on notional employer contribution rates that would be required to ensure that the employer component of the benefits remained fully funded, assuming the fund was fully funded at the time calculation. For the purposes of the review, a notional employer contribution rate was calculated as a variant of the Projected Unit Credit Method, assuming benefits accrued uniformly over the 3-year review period. The steps involved were:

- the unfunded liability was projected over the 3-year period to 30 June 2005 based on the projected membership at that date using the assumptions referred to above. To project the unfunded liability to 30 June 2005 for the purposes of estimating the notional employer contribution rate, it was also assumed that no new entrants join the PSS;
- the unfunded component of the expected benefit payments to exits during the three years to 30 June 2005 was estimated;
- the notional employer contribution rate was set at a rate such that:  
employer contributions at that rate; plus notional assets at 30 June 2002 (which are equal to unfunded liability at that date); plus any interest earned on the above amounts were adequate to cover the expected benefits payable during the three years and the unfunded liability as at 30 June 2005;
- the notional employer contribution rates were increased by 3% of superannuation salaries to allow for the cost of future productivity superannuation contributions.

16. The contribution rate for the PSS as at 30 June 2002, excluding the productivity contribution of 3%, was 12.4% of the superannuation salaries. The application of this rate to the superannuation salary provides the compensation of employee costs for the year to June 2002.

## METHODOLOGY BETWEEN ACTUARIAL REVIEWS

17. If a scheme was very dynamic and the assumptions volatile, a full actuarial investigation would presumably be desirable each reporting period. However, such investigations are generally resource-intensive and in the case of the PSS they have been done triennially. This means that the latest available assessment has to be used as a benchmark to roll forward the inter-review years, as well as to estimate the quarterly series. These estimates are made by staff of the Commonwealth Department of Finance, using methodology agreed to by the auditor as well as the actuary.

18. The general methodology for deriving the end of year liability, given the actuarial benchmark, was as follows:

- member accrual for service in the period = PSS base salary \* notional employer contribution rate;
- end of year liability = Opening balance + Member accrual + interest – benefit payments;
- interest = interest rate \* (opening balance + 0.5 \* accrual – 0.5\* benefit payments)  
(the adjustment for half benefits assumes that benefits are paid uniformly through the year).

### ATTACHMENT 3

#### EXPLANATION OF THE ABS METHOD FOR DERIVING A BACK SERIES FOR PENSION LIABILITIES AND FLOWS

1. The method was used to estimate (1) accrued superannuation (pension) expense and (2) accrued interest on the nominal superannuation (pension) debt for the general government sector for all jurisdictions for the back series prior to 1998-99, since accrual estimates for these back-periods were not available from government accounting records. The method assumes the availability of a back series for cash payments of benefits and the liability for future benefits at a point in time.
2. For each accounting period the following identity is considered to hold:
  - liability at beginning of period;
  - *plus* accrued expense;
  - *plus* accrued interest on the liability;
  - *minus* Cash payments of benefits;
  - *equals* Liability at end of period.

#### SOURCES OF DATA AND METHODS OF CALCULATION

##### Liability at end of period

3. For the latest period (1997-98), 'Unfunded employee entitlements' from the latest issue of Public Sector Financial Assets and Liabilities (ABS Cat No 5513.0) was taken as the starting point in the calculations (i.e., the outstanding amounts, calculated using actuarial methods, reported by State and Commonwealth Treasuries). For the Commonwealth, an adjustment was made for claims on general government for unfunded liabilities relating to public non-financial corporations. For earlier years the model backcasts to calculate all other EOY and BOY balances.

##### Accrued expense

4. For the Commonwealth, a weighted average of implicit employer contribution rates for different schemes was calculated, based on data from the Commonwealth Actuary for 1988, 1993 and 1996. For each year, this average contribution rate was applied to ABS estimates of public sector wages and salaries. For all other jurisdictions, accrued expenses were calculated as a residual so that the sum of expenses plus interest minus payments over the time series equaled the relevant unfunded liability estimate for the latest period.

##### Accrued interest on the liability

5. For the Commonwealth, the bond rate was initially used to calculate the interest liability for each period. However, using this rate the sum of expenses plus interest minus payments over the time series was greater than the Commonwealth's unfunded liability estimate for the latest period. Accordingly, a discount factor was applied to the bond rate each year to achieve equality (i.e., for the Commonwealth, accrued interest is calculated as a residual). This discounted

Commonwealth rate was then used in the calculation of accrued interest for all other jurisdictions.

Cash payments of benefits

6. Cash pensions paid in respect of employee superannuation, obtained from government records.

\* \* \* \* \*