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AN EQUITY ANALYSIS OF SOME RADICAL SUGGESTIONS FOR AUSTRALIA'S RETIREMENT INCOME SYSTEM

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1. INTRODUCTION

As a result of the introduction of mandatory superannuation in Australia for employees, most individuals now need to consider the impact of superannuation benefits on their retirement income. Yet the taxation of superannuation contributions, fund income, and benefits is extremely complex. As is well known, this complexity for retirees is further increased by the interaction between superannuation benefits and the means-tested age pension.

The interaction of these various components makes it very difficult to evaluate the broad and/or long term implications of changes in superannuation, taxation or social security policy. Indeed, it is reasonable to assume that most individuals and many policy makers do not fully understand the taxation of superannuation benefits and investment options and their inter-relationships with the means-tested age pension. As a result of this complexity together with the rapid rate of change during the last decade, most future and current retirees have great difficulty in formulating the "best" plans for their retirement income.

Many of the complex features seem to have been introduced in an attempt to make the tax system more progressive. Some of the components of the structure, taken in isolation and in the context of a single year, do indeed appear to contribute towards this objective. However, the context of superannuation is one in which it is most appropriate to consider redistribution over a long, rather than short, period. Superannuation provides a mechanism for individuals to shift income from one stage of their life cycle to a later stage, so that any evaluation of redistribution should examine the distribution of a lifetime measure of income, rather than annual income at any one time.

The purpose of this paper is to evaluate the redistributive implications of the current system, allowing for various taxation and age pension arrangements, in terms of the lifetime incomes of individuals within a single cohort (or generation). The present system is then compared with two alternative schemes. These alternatives represent

different degrees of simplification of the current system. The two alternatives presented in Section 3 are simpler and more radical than the 1994 proposal to the Senate Select Committee on Superannuation from The Institute of Actuaries of Australia.

The evaluation of these alternatives requires the use of a simulation model. The full details of the model, referred to as the LITES model (for Lifetime Income, Taxation, Expenditure and Superannuation) are given in Atkinson, Creedy and Knox (1994a) and a brief summary is given in the Appendix. For the purposes of this study, attention is restricted to the experience of a cohort of single males in continuous employment, assumed to be homeowners (for the purpose of administering the means-tests). The restriction to males partly reflects the availability of reliable life time earnings figures.

The paper is set out as follows. The current system is briefly described in Section 2 with the two alternative simplified structures presented in Section 3. The simulation results comparing the three schemes are discussed in Section 4 with comparisons being made in terms of a range of measures of inequality and redistribution. Some conclusions are then presented in Section 5.

2. THE CURRENT SYSTEM

2.1 Superannuation taxation before retirement

Prior to the recent announcements in the 1995-96 Federal Budget, the long term Government objective for superannuation contributions was an employer contribution of 9% of earnings and employee contributions of 3% of earnings. Although the Budget has announced a proposal for the Government to match dollar for dollar employee contributions (subject to certain maximum and income limits), this study has ignored this Government contribution as it has not yet been introduced and there must remain some doubt as to its future introduction.

With this basic assumption of a 9%/3% contribution level, let us also assume that X is the level of the individual's gross earnings. Hence

$$ERC = 0.09\ X$$

$$T_c = 0.15 * 0.09\ X \quad = 0.0135\ X$$

$$EEC = 0.03\ X$$

where ERC represents the employer contributions;

T_c represents the tax on deductible contributions; and

EEC represents the employee contributions

such that the net contribution to superannuation each year,

$$NETC = ERC + EEC - T_c$$

$$= 0.1065X$$

Assuming that these contributions are made mid year, that the superannuation fund (SF_t at time t) earns rate i and that there is a net tax on investment earnings (allowing for imputation and other credits) of 7.5%, then

$$SF_t = SF_{t-1} + 0.925\ I + 0.1065X$$

where $I = i(SF_{t-1} + 0.5*0.1065X)$

and I represents the net investment income received in the year.

An employee may be entitled to a rebate in respect of undeducted contributions. However, the level of the rebate (R_C) is limited to 10% of the employees contributions subject to a maximum of $100 per annum. It is also income-tested so that any individual with earnings in excess of $31,000 receives no rebate. There is also a restriction linked to age and the level of the employer's contribution but this rarely applies due to the severity of the income testing. There is also a rebate (R_L) payable to low income earners. Let R represent the total rebates payable, namely the sum of R_C and R_L.

Assuming that there are no other sources of income, income tax, T_X, is calculated on the value of gross earnings, X, rounded down to the nearest dollar. The Medicare levy must also be added. The total tax payable by the individual, T, may therefore be written as:

$$T = \text{maximum } [T_X + \text{Medicare levy} - R, 0]$$

The individual's disposable income, A, is defined here as the gross earnings less employee superannuation contributions less income tax payable so that

$$A = X - EEC - T \quad = \quad 0.97X - T.$$

In addition, provision can be made for non-superannuation savings which are accumulated each year in a fund (namely F_t after t years). It is assumed that savings are made mid year, the gross annual nominal rate of interest earned on savings is r, and that the tax rate on any interest income is 25%. This assumed flat rate has been chosen as it is not appropriate to assume that interest income is simply added to income from employment for income tax purposes due to the wide range of investment opportunities available. Hence the value of F_t at the end of year t is

$$F_t = F_{t-1} + 0.75\, r\, (F_{t-1} + 0.5\, S) + S$$

where S is the level of non-superannuation savings made in the middle of each year.

2.2 *Taxation in retirement*

Taxation in retirement includes a number of components including a tax on any lump sum benefit, tax on any superannuation pension or annuity and other income tax.

The lump sum tax, T_L, assuming post 1983 benefits, is calculated as follows, with a threshold of $77,796 (as applied in the 1993-94 tax year):

$$T_L = 0 \quad \text{if } L_T \leq 77{,}796$$

$$= 0.164\,(L_T - 77{,}796) \quad \text{if } L_T > 77{,}796$$

where L_T represents the taxable post-1983 lump sum benefit excluding undeducted contributions,

or if there is an excessive benefit, then:

$$T_L = 0.164\,\{L_T\,(1 - E) - 77{,}796\} + 0.484\,L_T\,E$$

where E is the proportion of the superannuation benefit (excluding the amount of undeducted contributions) that is considered excessive.

The taxable benefit is considered excessive when it exceeds $400,000 (if more than half the fund is taken as a lump sum) or $800,000 in other circumstances.

By contrast to lump sums, part of the income arising from purchased annuities is subject to normal personal income taxation and the Medicare levy. The taxable component for annuities purchased by after tax capital (either savings or from after tax lump sum benefits) is the annual income, less the purchase price divided by 14.6. The subtraction represents a spreading of the capital cost over the expected term of the annuity. For non-excessive superannuation annuities, the taxable portion is the annual income, less the amount of undeducted contributions divided by 14.6.

Finally, there exists a special income tax rebate relating to superannuation annuities which is designed to allow for the 15% contributions tax which was levied during the accumulation period of the fund. This rebate is 15% of the non-excessive proportion of the taxable annuity purchased by the superannuation taxable benefit.

2.3 *Eligibility for the age pension*

The amount of age pension awarded is subject to independent means-tests of income and assets, which depend on the marital status of the pensioner and whether or not the pensioner is a homeowner. The individuals considered in this study are all single males and assumed to be homeowners. The full rate of pension for single individuals in 1994 was $8,115 per annum.

The full rate of pension may be reduced depending on the income of the retiree. The income which is subject to the means-test includes all taxable income from sources other than the age pension, but excludes the repayment of capital amounts in any annuity. The reduction in the age pension, Rp, is:

$$Rp = 0 \qquad \text{for } Y \leq 2{,}236$$

$$Rp = 0.5\,(Y - 2{,}236) \qquad \text{for } 2{,}236 \leq Y \leq 18{,}466$$

$$Rp = 8{,}115 \qquad \text{for } Y > 18{,}466$$

where Y is the level of income subject to the income test.

The pension payable also depends on the asset test limitations. In the cases considered in this study, a retiree has only three relevant assets. These are:

1. an interest bearing bank account, in which case the balance in the account is an assessable asset. It is also assumed that the bank balance is reduced by capital drawings each year in such a way as to extinguish the account at age 80;
2. an annuity purchased using after tax money, then the entitlement to the remaining future income stream is deemed to have an assessable asset value. If N is the number of complete years since the first annuity payment, the asset value of the assessable future whole life income stream is taken to be purchase price multiplied by (14.6 - N)/14.6. Hence, this component of the asset test ceases to have any relevance beyond age 80;
3. an annuity purchased directly by a superannuation benefit which is not assessable under the assets test.

Where applicable, the reduction in the pension arising from the asset test, R_a, is:

$R_a = 0$ for assets $\leq$ \$112,750

$R_a = 0.078$ (assets - 112,750) for \$112,750 $\leq$ assets $\leq$ \$216,788

$R_a = 8{,}115$ for assets > \$216,788

where the threshold value of \$112,750 is that which applies to single homeowners.

The actual age pension paid is the smaller one resulting from the independent application of the income test and the assets test.

A tax rebate, P_r, may also be received by some age pensioners. This is calculated as:

$P_r = 972$ if $Y_t \leq$ \$10,260

$P_r = 972 - 0.125\ (Y_t - 10{,}260)$ if \$10,260 $\leq Y_t \leq$ \$18,036

$P_r = 0$ if $Y_t >$ \$18,036

where Y_t represents taxable income. If a pension rebate is payable, the tax payer is also exempt from the Medicare levy.

2.4 Retirement Decisions

At retirement, it is assumed that the individual transforms assets accumulated during the working life (from both superannuation and non-superannuation savings) into immediate expenditure, interest bearing assets and annuities. The superannuation benefit is divided into two components according to their source; namely the employee's 'undeducted contributions' and the balance of the fund, which is called the 'taxable benefit'. This includes all employer contributions and all investment income earned by the fund, including that earned by the undeducted contributions. These two components of the superannuation benefit are treated differently for taxation purposes, as are the lump sums or annuities arising from them. Where only part of the superannuation benefit is taken as a lump sum, the two components are split in the same proportion between the lump sum and any annuity purchase.

The options available to the retiree in choosing how to receive the superannuation benefit are many and have important tax and age pension implications. For instance, all the superannuation benefit may be taken as a lump sum benefit, the appropriate level of lump sum tax paid, and this after-tax benefit may then be combined with other savings before considering the purchase of an annuity. Once the lump sum tax has been paid on a superannuation benefit, the resulting capital is no longer identified in terms of its source. In contrast, if the superannuation benefit is used to purchase an annuity directly without incurring a liability to lump sum tax, the annuity continues to be identified as arising from the superannuation benefit for the purposes of income taxation and the age pension means-tests.

Hence, the source of the capital used to purchase annuity income, whether it be purchased from the superannuation benefit directly or from a taxed capital amount, has continuing implications for the individual's taxation position and age pension entitlement. However, the market price of a retirement annuity is independent of the source of the purchase monies.

There is no doubt that the above arrangements are complex and make it difficult for individual retirees, as well as their financial planners and policy makers who may wish to encourage a particular result. The next section describes two alternative schemes which incorporate major simplifications.

3. ALTERNATIVE SCHEMES

3.1 A Brief Outline

The current scheme described in the previous section makes it very difficult for individuals, financial planners and even policy makers to make appropriate decisions, and introduces a number of disincentives. The taxation and age pension structures produce a number of undesirable features including anomalies at a number of thresholds. In particular the means-testing of the age pension provides a disincentive to save, over a wide range of incomes, and a strong incentive to take the superannuation benefit as a lump sum and to spend part of it at retirement; see Atkinson, Creedy and Knox (1994b). This is also shown by the strong bunching of the income distribution, among retired individuals, at the lower threshold of the means-test (see Creedy and Disney (1990)) although it is acknowledged that this effect may now have been reduced by the easing of the means tests for the "fringe benefits" card.

It is worth noting that the Government advocates means-testing on the grounds that it concentrates benefits on the poor (and thus has a high 'target efficiency') and reduces costs, particularly in the face of an ageing population. However, it is important to assess equity and progressivity in the context of a total retirement income policy, incorporating superannuation, the age pension and other savings.

Recognition of the major disincentives created by the means-tests in terms of savings, employment and complexity, together with the need for a viable and long term comprehensive structure for the provision of retirement income in Australia, led The Institute of Actuaries of Australia (1994a) to propose a revision of the Australian retirement income policy. The proposed structure incorporated a universal and taxable age pension and a simplified taxation system for superannuation. These also form key elements in the two options presented here. Table 1 shows the main characteristics of the two options along with the corresponding features of the current structure.

Table 1: Brief Description of alternative options

	Current Structure	Option A	Option B
Accumulation period			
Basic contribution rates	Employer 9% Employee 3%	Employer 6% Employee 3%	Employer 6% Employee 3%
Contribution tax	15% on deductible employer/ personal contributions	15% on deductible employer contributions	15% on deductible employer contributions
Personal rebate	10% of personal contributions but maximum of $100, income tested with age related maxima	10% of personal contributions with age related maxima	10% of personal contributions but no age related maxima
Investment tax	15% but reduced by credits	no change	no change
Retirement period			
Lump sum tax	16.4% tax on the taxable portion in excess of threshold ($77,796 in 93-94) 48.4% on excessive portion	1.4% up to 2*AWE 21.4% from 2*AWE - 4*AWE 36.4% above 4*AWE	No lump sum tax but a tax on the total super benefit 0% up to 3*AWE 20% from 3*AWE - 10*AWE 40% above 10*AWE No Medicare levy
Tax on annuities	Super - taxed as income except for UPP Non-super - taxed as income except for purchase price	All annuities - taxed as income except for purchase price	Super - no tax Non-super - taxed as income except for purchase price
Super pension rebate	15%	Nil	Nil
Age pension	taxable pension subject to assets and income tests	taxable universal pension	taxable universal pension
Income tax rebate	income tested	no change	no change

3.2 Rationale of proposed changes

One element of the Government's strategy to increase the level of national savings and to provide a structure for the provision of retirement income has been the introduction of the Superannuation Guarantee Charge with the employer's contribution rate rising to 9% of earnings in 2002/03. In addition, the Government has recently announced a minimum employee contribution rate of 3% of earnings. As noted earlier, this paper ignores the recently proposed $ for $ Government contribution.

However, there exist major problems with this approach. The two fundamental flaws within this structure are the very complex taxation arrangements that have developed for superannuation and the lack of any integration between the superannuation and age pension systems. The lack of any meaningful integration is reflected in:

1. differences in entitlement ages with the superannuation preservation age being 55 (rising to 60) and the pension ages being 65 or 60 with the female age rising to 65;
2. differences in the form of benefits as superannuation benefits are primarily paid as lump sums while the means tested pension is provided in pension form;
3. conflicting incentive effects with the existence of the means tests discouraging additional savings and post-retirement investment while the taxation incentives for superannuation exist to encourage savings; and
4. differing bases for calculating the benefit entitlements as superannuation benefits broadly reflect the total level of lifetime earnings while the age pension is adjusted in line with the individual's current income or asset levels.

In view of these major structural defects in the current system, two alternatives are proposed in this paper. In each case, the alternatives are designed to improve the integration between the superannuation and age pension systems and to simplify the taxation of superannuation.

It is recommended that the integration issue can be overcome with the provision of a universal taxable age pension and a corresponding reduction in the level of compulsory superannuation contributions. The abolition of the means tests would improve integration, as a basic pension would be received by all individuals and

superannuation and other long term savings systems could then build upon this foundation. The Institute of Actuaries of Australia (1994a) showed that with the introduction of a universal pension, the level of compulsory employer superannuation contributions could be reduced by 3% of earnings whilst maintaining the same level of net retirement income for most individuals. The common arguments against a universal pension tend to be expressed in terms of the long term cost to the Government or in terms of equity. The IAA (1994b) addressed the long term cost considerations while this paper discusses the equity issues using a number of standard measures.

In many respects the complex taxation arrangements are more difficult to resolve. In this paper two alternatives, referred to as Option A and Option B, are presented, with Option B representing the more radical approach. It is also acknowledged that the Government is currently receiving considerable taxation revenue from superannuation funds and for this budgetary reason, the 15% tax on deductible employer contributions and fund investment income is retained under each alternative.

Option A entails the following proposals.

(i) Abolish the income testing and maximum rebate related to employee contributions so that all employees receive the rebate, thereby acting as an incentive to contribute. However, the existing age related maxima would remain.

(ii) Adjust the levels of lump sum tax rates and remove the associated notion of excessive or maximum benefits. The higher tax rate on large lump sums would act as a substantial disincentive for individuals to increase their superannuation beyond reasonable levels.

(iii) Abolish the concept of undeducted contributions as a result of the presence of a rebate for member contributions.

(iv) Abolish the existing 15% rebate received in respect of superannuation pensions.

(v) Subject all superannuation pensions to taxation and increase the undeducted purchase price used for taxation purposes to the amount of the total investment made in the superannuation annuity. The increase in the undeducted purchase price broadly compensates for the abolition of the undeducted contributions concept and the abolition of the 15% superannuation pension rebate.

Option A provides an incentive for all individuals to contribute by removing the restrictive conditions on the 10% rebate of contributions. It provides much greater encouragement for annuities (or pensions), as the total benefit used to purchase an annuity constitutes a tax exempt undeducted purchase price. From the individual's perspective, it is a much simpler system. A rebate is received in respect of member contributions (although the current age-related maxima on contributions remain), benefits are taxable with a three tier tax system for lump sum benefits, and pensions are subject to income tax but with a constant annual exemption (representing the purchase price divided by the individual's life expectancy).

Option B represents an even more radical proposal and simplifies the taxation structure even further. The rationale behind this proposal is to abolish all maxima (whether expressed in terms of contributions or benefits) and introduce a progressive superannuation benefits tax. This tax, with rates ranging from 0% to 40%, is paid at retirement when the benefit is received by the individual. With these tax rates, there is very little incentive for excessive benefits to accrue. Hence, the concept of maximum benefits can also be abolished. Similarly, if the tax structure is such that there is little incentive for very large contributions, there may be no need for any restrictions on the size of contributions or for age related maxima.

The superannuation tax in option B is paid on the capital value of the total superannuation benefits received (irrespective of the lump sum/pension split) and the tax rate is independent of any other income and excludes the Medicare levy. Any subsequent annuity payments, generated from the superannuation benefit, are exempt from the tax system. This extreme simplification, with the associated removal of the undeducted purchase price concept, may appear generous. However, it must be recognised that under the current system most of an annuity payment purchased by an amount that has already been subject to lump sum tax is exempt from income tax due to the presence of the undeducted purchase price. The extension of this exemption to include the total annuity payment is both a simplification and a concession to annuitants as they do not have access to their capital during the life of the annuity.

Furthermore, from the perspective of national savings, the capital of the annuity remains invested for a longer period and thereby continues to be part of the stock of national savings.

There are other advantages of introducing a single tax on all superannuation benefits at the point of retirement, including:

- it is simple: the tax is paid on one occasion and no further taxation is needed.
- it is equitable as all superannuation benefits are treated in the same manner and multiple benefits are easily accounted for as the tax rate is independent of other income.
- it has revenue advantages: the Government receives the superannuation benefits tax at retirement and hence some of the current revenue from the taxation on pensions is brought forward.
- there are administrative savings as pensioners and the tax department are no longer involved in the complexities of taxing annuities.

Option B involves a 10% rebate on member contributions, retains the existing 15% tax on deductible contributions and investment income, and imposes a benefits tax to be paid at retirement on the accumulated value of the total superannuation benefit. Further administrative simplification could be achieved if the tax on benefits were paid by the fund rather than by the individual in the same way that income tax is paid by employers.

The above two options, incorporating a universal taxed age pension, a lower level of compulsory superannuation contributions and radical changes to the taxation of superannuation represent considerable improvement on the existing arrangements in terms of integration and simplicity. However, before they can be considered further, it is necessary to investigate the consequences of these proposals in terms of the overall equity of the system. The next section assesses the current arrangements with these two options using a selection of measures through the use of the LITES model.

4. SOME COMPARISONS

4.1 The measures used

This section compares the alternative schemes in terms of their progressivity and redistributive impact over the life cycle for a cohort of males using the Kakwani progressivity index and the Gini measure of inequality of net income.

The Gini measure of inequality expresses the extent to which income is distributed unequally between individuals. Hence, to consider the extreme cases: if all individuals received the same income, the Gini measure would be zero and if one individual in the population received all the income, the Gini measure would equal one. The Kakwani measure of progressivity reflects the disproportionality of tax payments at different income levels. Hence, a rate of tax directly proportional to income would result in a Kakwani measure of zero. The tables also show a total tax ratio which represents the present value of taxation (ie the difference between average present values of gross and net lifetime earnings) divided by the present value of gross lifetime earnings for the cohort. The welfare premium shows the difference for a measure of social welfare (based on average income and its distribution) for this scheme and a proportional tax system that raises the same aggregate revenue.

4.2 The simulation results

The results presented illustrate the consequences of a number of different decisions made at the time of retirement. There are two broad classes, one in which superannuation represents the only source of cumulative savings throughout the working life, and the other in which all individuals save 5% of their disposable income each year in addition to superannuation. Under these two broad scenarios five different choices at retirement are examined as summarised in Table 2.

The comparisons are restricted to annuities, which are payable throughout the lifetime of the annuitant, leaving no residual capital value and escalating at 5% per annum. The purchase rate for annuities has been chosen to reflect current market rates and is consistent with the long term economic assumptions used in the simulations.

Any money placed in an interest bearing account contributes to the assets of the individual to the extent of the balance of the account, and is assessed in the application of the assets means-test associated with the age pension. It is assumed that the account is reduced by annual capital drawings and eventually extinguished, but if the retiree dies during the drawing-down period the balance in the account provides a capital bequest. The amount withdrawn from the account each year is the balance of the account at the start of a year, divided by the number of years outstanding until age 80. Also the interest which is earned on this account is taxable as income to the individual in the usual way, and is assessable as income in the application of the age pension income means-test.

Table 2: The alternative decisions at retirement

Choices at retirement	Superannuation with no savings	Superannuation with 5% savings
1	100% of super used to purchase an annuity	100% of super and savings used to purchase an annuity
2	50% of super used to purchase an annuity 50% of super invested in a bank account	50% of super used to purchase an annuity All remaining funds invested in a bank account
3	50% of super used to purchase an annuity 50% of super spent immediately	50% of super used to purchase an annuity All remaining funds spent immediately
4	100% of super invested in a bank account	100% of super and savings invested in a bank account
5	100% of super spent immediately	100% of super and savings spent immediately

The various summary measures of the distribution of the present value of lifetime income are presented in Table 3 (assuming no other savings) and Table 4 (assuming additional savings of 5% of income). The first line of each table assumes that the same rate of post-retirement mortality is experienced, irrespective of the level of lifetime income. In fact, many studies have shown that life expectancy and lifetime

expected, the mortality assumption is particularly important when lifetime annuities are purchased.

The major result shown in Table 3 is that for each method of disposing of the superannuation benefits, the effect (on all measures) of simplifying the tax structure is relatively small. The two simplified structures represent very substantial reductions in complexity, much of which has arisen from an attempt to introduce some progressivity directly into the structure of superannuation taxation. Nevertheless, the substantial simplifications have, in many cases, a minor effect on progressivity, inequality and welfare when compared to the decision made by the individual retiree in choosing how to 'invest' the superannuation benefit. In other cases, the simplification options also reduce the impact of the individual's choice and thereby produce a more consistent result. As an example, the Kakwani index of progressivity varies from 0.247 to 0.460 under the current system in Table 3 but only from 0.241 to 0.289 under Option B.

The authors are not suggesting a 'correct' level for this index of tax progressivity but believe that it needs to be recognised that significant variations occur based on the individual retiree's decision at retirement. It is also worth noting that the 100% lump sum option under the current system produces a higher Kakwani figure whereas the Government's preferred direction of encouraging annuities produces a smaller figure.

Table 4, which allows for additional saving of 5% of disposable income each year, shows a lower progressivity measure, a higher aggregate tax ratio, and marginal effects on inequality. However, the main results are unchanged; that is, the tax simplifications have little effect on the equity measures. As before, the most significant differences arise as a result of the choice of alternative methods of disposing of resources at retirement. However, these differences are reduced considerably under Option B.

Table 3: Comparative measures of equity of life time income assuming no savings

Measure:	**Kakwani Progressivity**			**Gini measure of inequality for after tax income**			**Welfare Premium (Gini based)**			**Total Tax ratio**		
Structure: Choice	*Current*	*Option A*	*Option B*	*Current*	*Option A*	*Option B*	*Current*	*Option A*	*Option B*	*Current*	*Option A*	*Option B*
common q_x												
1	0.3891	0.4452	0.3551	0.2145	0.2142	0.2120	26.250	26.849	26.590	0.1554	0.1389	0.1752
income related q_x												
1	0.2470	0.2827	0.2414	0.2472	0.2468	0.2411	14.357	14.735	16.218	0.1489	0.1346	0.1679
2	0.3268	0.3177	0.2629	0.2317	0.2338	0.2321	20.127	19.362	19.288	0.1475	0.1469	0.1758
3	0.3747	0.3337	0.2655	0.2337	0.2355	0.2332	19.820	18.929	18.992	0.1277	0.1375	0.1718
4	0.3789	0.3260	0.2798	0.2186	0.2198	0.2228	24.813	23.866	22.344	0.1523	0.1707	0.1866
5	0.4600	0.3475	0.2887	0.2253	0.2226	0.2256	23.246	23.226	21.645	0.1182	0.1565	0.1757

Note: Gini measure of inequality for pre-tax income = 0.2860

Table 4: Comparative measures of equity for lifetime income assuming 5% savings

Measure:	**Kakwani Progressivity**			**Gini measure of inequality**			**Welfare Premium (Gini based)**			**Total Tax ratio**		
Structure: Choice	*Current*	*Option A*	*Option B*	*Current*	*Option A*	*Option B*	*Current*	*Option A*	*Option B*	*Current*	*Option A*	*Option B*
common q_x												
1	0.3503	0.4072	0.3357	0.2150	0.2139	0.2118	25.644	26.621	26.398	0.1686	0.1506	0.1811
income related q_x												
1	0.2038	0.2387	0.2099	0.2523	0.2513	0.2466	12.297	12.868	14.111	0.1613	0.1456	0.1753
2	0.2905	0.2891	0.2439	0.2315	0.2331	0.2317	19.811	19.292	19.171	0.1631	0.1607	0.1881
3	0.3461	0.3095	0.2492	0.2339	0.2357	0.2335	19.535	18.647	18.711	0.1364	0.1462	0.1805
4	0.3363	0.3004	0.2596	0.2183	0.2189	0.2220	24.436	23.765	22.247	0.1688	0.1844	0.2001
5	0.4435	0.3253	0.2717	0.2255	0.2227	0.2257	22.966	22.949	21.369	0.1269	0.1652	0.1844

Note: Gini measure of inequality for pre-tax income = 0.2860

5. CONCLUSIONS

This paper has highlighted the complexity of the current structure of superannuation taxation in Australia. The difficulty is exacerbated by the way in which the tax structure interacts with the means-tested age pension. The complicated nature of the system makes it very difficult not only for individuals in their retirement planning, but also for policy makers in attempting to evaluate the redistributive and other implications of the tax structure. Two options for reforming the tax structure were proposed, involving different degrees of simplification. The implications of the proposed reforms for the distribution of lifetime income of a cohort of male employees were examined using a variety of inequality and tax progressivity measures. The study used the LITES simulation model, allowing for a variety of alternative decisions to be made by individuals at retirement.

It was found that the proposed simplifications have relatively minor effects, when compared with the present cumbersome system, on the redistributive impact of the tax structure in a life cycle framework. Indeed, the progressivity of the current system is substantially more sensitive to the decisions made by individuals at retirement regarding the investment of their accumulated savings and superannuation amounts. In this respect, it is also less robust than the alternative options.

Appendix: The LITES Model

The model is designed to calculate the costs and benefits associated with earnings, direct and indirect levels of taxation, savings and superannuation, under a variety of conditions. It enables examination of selected individuals or simulated cohorts, and produces alternative measures of inequality and progressivity. For a full description see Atkinson, Creedy and Knox (1994a).

Earnings profiles

A salary stream X(t) is constructed to represent the working life of the individual, using a stochastic model. Earnings in the first year are obtained by taking a random drawing from a lognormal earnings distribution with mean and variance of logarithms of μ_1 and σ_1^2. Mean log-earnings at time t, $\mu(t)$, are a quadratic function of age and are given by $\mu(t) = \mu_1 + (\theta + g_r)t - \delta t^2$ where g_r is the nominal growth rate of earnings.

The simulation process used to produce the profile X(t) can allow for various types of process of relative income change. There may be 'regression towards the mean' where the relatively richer people experience, on average, relatively lower percentage increases (when $\beta<1$). Furthermore, there may be dependence on the past, where each individual's relative change depends on previous changes (depending on the parameter ρ). The process is described by the following equations:

$$X(t) = \left\{\frac{X(t-1)}{m(t-1)}\right\}^{\beta} \exp\{\mu(t) + u(t)\}$$

$$u(t) = \rho u(t-1) + e(t)$$

where e(t) is a random normal variable with mean 0 and variance σ_u^2, $m(t) = e^{\mu(t)}$. The parameters of the model can be estimated using income distribution data as outlined in Creedy (1992). The parameter values used in the simulations are as follows: $\mu_1 = 9.98064$, $\theta = 0.0385$, $\delta = 0.00086$, $\sigma_1^2 = 0.1817$, $\sigma_u^2 = 0.00575$, $\beta = 1$, $\rho = 0$, $g_r = 0.06$

Age at Death

The age at death of the individual may be determined in one of two ways. The number of years survived in retirement may be specified directly, imposing a common mortality experience on each individual considered. Alternatively, the individual may be subject to a differential mortality experience which reflects the lifetime earnings experience of the individual.

In the case of differential mortality the number of years the individual survives after retirement, DIE, is obtained using:

$$DIE = AVD + B \log \frac{\overline{X}}{RM} + v$$

where $\overline{X}$ is the individual's annual average real earnings, RM is the geometric mean value of the $\overline{X}$s, AVD is the average number of years individuals in the general population survive after retirement, and v is random normal variable with mean 0 and variance SUU. The values used are:
AVD = 14.6, SUU = 50, B = 8, RM = 35966.82, PRATE = 0.05.

Assumptions used

The major economic assumptions used in the simulations are as follows.

Tax on super fund investment income	7.5%
Tax on savings fund investment income	25%
Annual increase in AWOTE	6%
Annual increase in income tax thresholds	5.5%
Annual inflation rate	5%
Gross annual investment rate of return on Super accumulation	9%
Gross annual investment rate of return on Savings accumulation	7%
Gross annual rate of return on Bank account during retirement	5%
The purchase price of retirement annuities	12.5
Escalation rate for annuities	5% pa

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