



Enterprise Metrics

**Report
for
Australian Institute of Superannuation Trustees
and
Financial Services Council**

Retirement outcome projections under 12% SGC

July 2012



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This report provides a general discussion and should not be interpreted as providing specific advice or recommendations for any particular situation. This report does not constitute financial product advice under the Australian Financial Services licensing regime. Individuals should seek independent advice before making any financial decisions.



1 Executive summary

1.1 Summary

The increase of Superannuation Guarantee Charge (SGC) from 9% to 12% has recently been enacted. The purpose of this report is to better understand the impact of this increase from the perspective of retirees.

Two measures of income replacement on retirement are applied to population cohorts (that is, groups of people of the same age). The test applied is whether 65% of those cohorts achieve replacement. The measures used, applied at age 65, are:

- ▶ A constant replacement rate of 65% of pre-retirement income before tax income
- ▶ Variable replacement rates that maintain after-tax pre-retirement income.

Outcomes vary for individuals depending on which replacement rate approach is used. In both case the impact of the Age Pension is included.

The constant replacement rate approach has been used in prior research. A Senate Select Committee in 2002 proposed a target replacement of 60% - 65% of pre-retirement income as a reasonable level for (financial) adequacy in retirement. This report focuses on replacement of income on retirement, but notes the distinction between replacing income and the adequacy of that income.

Increasing the SGC from 9% to 12% makes a material difference to the proportion of cohorts achieving replacement rates by either measure, and increases the likelihood that new entrants into the workforce may retire with incomes that achieve replacement criteria. The modelling shows that the 12% SGC regime increasingly improves retirement savings for younger age cohorts, culminating in at least 65% of future retirees currently aged 25 years or younger achieving the specified replacement rates. This outcome is achieved under both measures of replacement rates.

In contrast, under a 9% SGC regime, no age cohorts modelled attain the specified replacement rates in the future under either replacement rate measure.

1.2 Outcomes in 2052

The 9% SGC regime, assuming a SGC contributing working life of 40 years, matures in 2042. That is, each person entering the system in 2002 or later would have had an SGC requirement of 9% for their full working life. To reflect retirement at age 65 and obtain a valid comparison with the 12% SGC regime, the key comparison should be based on the age cohort currently aged 25 and retiring in 40 years at age 65, that is, in 2052. The following comparisons include the Age Pension and use the base set of assumptions (including allowance for marital status and home ownership).

Table 1.2.1: Proportion of cohort currently age 25 attaining replacement in 2052

Replacement Rate Approach	9% SGC regime	12% SGC regime
Constant 65% of pre-tax income	61%	69%
Variable full after-tax pre-retirement income	56%	66%



The cohort currently aged 20, assumed to retire at age 65 and so benefiting from 45 years of SGC contributions, generates results higher than those in the table above (74% and 72% for the constant and variable replacement rates respectively), confirming the value of a longer accumulation phase. However, the results under the 9% SGC regime for both replacement rate approaches remain below the target 65%. As the 9% SGC regime is mature for this cohort, these results suggest the 9% SGC regime support the conclusion that this regime should not be expected to achieve the target aggregate replacement rate of 65% at any stage.

In contrast, the 12% SGC regime achieves the target aggregate replacement rate in 2052 for the current 25 year old cohort, before it matures (in 2060, reflecting 12% SGC contributions commencing in 2020 and a 40 year contributing period). The 12% SGC regime (all other things remaining unchanged!) will also attain higher aggregate replacement rates in the future as the deferral period to the commencement of 12% SGC contributions reduces.

1.3 Individual replacement rates

The approach of determining replacement in terms of fully replacing after-tax income is new on several counts:

- ▶ **Replacement rates:** The concept of replacement is refined by focussing on individual retirees maintaining net income immediately after retirement. A progressive income tax system implies that using a constant target proportion of pre retirement income as a replacement rate for all income levels may overstate and oversimplify modelling results at the aggregate population level. An approach of varying individual after-tax replacement rates, reflecting specific circumstances, is therefore also used in this report to contrast with the approach of using a constant proportion of pre-retirement income as a target replacement rate.

Aggregate replacement rates achieved using variable individual replacement rates are lower than those obtained when using the constant individual replacement rate of 65%. However, when the test applied is whether or not aggregate replacement rates of 65% are achieved, both individual replacement rate approaches obtain the same results (as summarised above).

Replacement rates do not address questions of adequacy, in the sense of whether income received is considered appropriate or sufficient to meet a retiree's needs. Such discussion may reflect differing opinions and perspective. Nor do they address questions relating to gender. However an adequacy 'floor' is applied in the modelling in order to obtain more realistic results.

- ▶ **Population level results:** Results for individual retirees, reflecting gender, various superannuation accumulation choices, and also varying circumstances on retirement, are combined to provide population level results. This provides population replacement rates for different cohorts of retirees (current ages 20, 25, and so on). The impact of changing parameters can then be seen through the change in replacement rates for each cohort on retirement. Examining cohort results provides insight into the effectiveness of the superannuation system as it matures over time, and also provides insight into key drivers of retiree outcomes.



1.4 Key insights

Three key insights emerge from the modelling. These can inform current policy debates regarding superannuation and retirement incomes, and more broadly the overall retirement experience of retirees in Australia.

▶ **SGC increase benefits retirees:**

- After 2052 over 65% of cohorts participating in the superannuation system, under the 12% SGC regime, achieve full replacement on retirement at age 65.
- The 9% SGC regime, even when mature, does not deliver this result.

Projections made under both the 9% and 12% SGC regimes reflect additional concessional contributions, non-concessional contributions, and other government initiatives.

▶ **Age Pension a core consideration:** There is a strong interaction between income streams from superannuation and the Age Pension which need to be considered when planning overall expected income streams.

- Over 75% of retirees, currently and through to approximately 2050, are projected by Treasury to receive full or partial Age Pension, with the proportion receiving a full pension declining over time. The Age Pension therefore cannot be ignored when discussing population replacement rates.
- At age 65, about 70% of males and females are currently married (or are otherwise partnered), and the majority of both singles and couples are homeowners. Age Pension benefits vary materially depending on marital status and homeownership. Living costs for couples are less than those for two singles, and less for homeowners than non-homeowners. Population replacement rates therefore need to reflect these financial advantages.
- The increase in SGC rates provides benefits to both members, as shown through higher replacement rates, and to the government, as the interaction between the Age Pension and superannuation will reduce pressure on funding the Age Pension. This may assist the government in addressing the projected large expected increases in health and age care costs for retirees.
- The Age Pension, representing Pillar 1 of the Australian retirement income system, meshes with Pillars 2 and 3 (mandatory and voluntary additional superannuation accumulation) effectively and equitably. It also provides strong support for the management of both longevity risk and future inflation for retirees.

▶ **Longevity and mortality improvement:** The consequences of mortality improvement are powerful and should not be ignored.

- The need to reflect mortality improvement is demonstrated by comparing the population replacement rates under the 12% SGC regime including mortality improvement with those under the 9% SGC regime ignoring mortality improvement.



In all cases the results for the 12% SGC regime and reflecting mortality improvement are less than those for the 9% regime excluding mortality improvement. That is, the increase of SGC from 9% to 12% does not fully offset the impact of future mortality improvement.

- The common statement that current mortality provide life expectancies at age 65 of about 18.5 and 21.6 years for males and females respectively does not reflect mortality improvement and understates the number of years such retirees are projected to live, on average, by 2 - 3 years.

In summary, a balanced discussion of retiree financial outcomes needs to consider at least three core strands and their interactions: the benefits that flow from superannuation accumulations, the Age Pension reflecting marital status and home ownership, and longevity and mortality improvement.

While the focus of this Report is at a policy and strategic level, this conclusion is also relevant at an individual retiree level.

1.5 Background

Enterprise Metrics was engaged jointly by the Australian Institute of Superannuation Trustees (AIST) and the Financial Services Council (FSC) to investigate the proportion of Australians expected to achieve a 65% replacement rate on retirement under the increase in the SGC rate from 9% to 12%, assuming a retirement age of 65.

The retirement environment for Australians is broader than the single dimension of an individual's accumulated superannuation monies. Most obviously, the Age Pension and related benefits have a significant impact on retiree's financial outcomes. This Report focuses on participants in the superannuation system using defined contribution superannuation and does not consider defined benefit issues. Other dimensions, such as health care and aged care, are also not considered.

The focus of this work is not on any real member of a superannuation fund, but on a set of hypothetical 'average' members with certain characteristics with the objective of better understanding typical expected outcomes so that population replacement rates can be obtained. In reality, no member should be expected to be identical to any of these hypothetical members.

It is emphasised that modelling work, by its very nature, cannot be precise as it makes projections of future outcomes under uncertainty and depends on the quality and availability of data and assumptions used. However, modelling provides insight into some possible future outcomes and so can contribute to the current superannuation debate.

This report provides a general discussion and should not be interpreted as providing specific advice or recommendations for any particular situation that may arise.

1.6 Approach

The Report proceeds as follows:

- ▶ **Context:** Some background information sets the scene for the modelling and clarifies some key concepts and issues.



- ▶ **Replacement rates:** A discussion and refinement of replacement rates, with a demonstration of the importance of clarity around this topic.
- ▶ **Accumulation model:** The structure and parameters used for the accumulation phase of superannuation. It is during this phase that employer contributions are made, salary sacrifice undertaken, and other concessional and non-concessional contributions made, all for the purpose of amassing a balance in preparation for retirement.
- ▶ **Drawdown model:** The structure and parameters used for the drawdown phase of superannuation. This includes modelling the Age Pension. During this phase the amounts accumulated during the Accumulation Phase are utilised for living purposes. Results at the level of individuals are determined.
- ▶ **Population model:** The objective is to assess replacement rates at an aggregate or population level. This includes reflecting the impact of people living as a part of a couple and/or owning a home. The process of moving from individual projections to aggregate assessments provides the overall replacement rates. Results at an aggregate or population level are provided.
- ▶ **Assumptions:** There are many assumptions, both structurally and in terms of the parameters used, in the development and use of the model. Some are discussed in the Report and further parameters are listed in an Appendix. These assumptions and parameter choices should be considered carefully when reading the Report and assessing its conclusions.



2 Context

2.1 The Australian superannuation system

At a summary level the Australian approach to supporting retirement incomes reflects a three pillar approach, consistent with established World Bank recommendations. In summary this three pillar approach is:

- ▶ A taxpayer funded means-tested age pension for people who are unable to fully support themselves in retirement. This is the Age Pension. In some circumstances this role is fulfilled by other commonwealth pensions. The Age Pension is means tested and targets poverty alleviation.
- ▶ A minimum level of compulsory employer superannuation contributions made in respect of those in the workforce. This is addressed by the Superannuation Guarantee Charge (SGC).
- ▶ A voluntary private superannuation option and other savings for retirement. The voluntary aspect of superannuation is encouraged, to certain limits, by preferential tax treatment of contributions and investment returns.

2.2 Other income

Sources of retirement income from outside the superannuation system may also be available to some. While this source of retirement support can be significant for some and so is pertinent in principle, it is not pursued further here due to data limitations. Reviewing ATO data for the 2008-2009 tax year also suggests that many who have income from sources such as dividends and interest may not be strongly involved with the superannuation system as they pay no income tax, with little if any salary or wages reported, and so are not subject to the SGC regime. It is also unclear to what extent such sources of other income should be expected to continue into retirement, especially when the focus is on income received for living purposes in contrast to being deemed (for example for assessing Age Pension purposes).

This means that potential contributions from other sources, including Reverse Mortgages (despite high levels of home ownership amongst retirees) and ownership of investment properties or investment portfolios, are not considered further. Reverse mortgages, in Australia, are currently not prevalent in any case.

In contrast to home ownership, it can also be argued that ownership of investment properties or investment portfolios is a phenomenon more typical of high income earners who are not the focus of this Report (see section 2.4).

2.3 The Age Pension

The Age Pension is accessible to all Australians subject to residence requirements and means testing. The 2010 Intergenerational Report and Australian Bureau of Statistics (ABS) data show that over 75% of the eligible population (essentially retirees over 65) currently receive a full or part Age Pension (taken to include similar Service and War Widow Pensions) with about 75% of those receiving a full pension. The projection is that in 2047 approximately the same proportion of eligible population will still be receiving a full or part



Age Pension, but that less than 50% will then be receiving a full pension. The Age Pension, either full or in part, is clearly a current and future major source of retirement income for many retirees, so it cannot be ignored and an understanding of its interaction with superannuation is required.

The superannuation system (SGC in particular) is focussed on those who are employed and earn salary or wages.

The Age Pension is means tested with both an asset and an income test applied. Further it provides differing benefits depending on whether a person is part of a couple or not, and whether the person is a home owner or not. The differences are material and so need to be recognised.

There are a number of additional benefits associated with the Age Pension, focussed on specific needs, which in some circumstances provide additional income and in others reduce expenditure. These specifics are not considered further here, although they may provide significant benefits to the targeted recipients. Receipt of the Age Pension and other federal or state support programs for the retired may carry with them other benefits, such as Pensioner Concession Cards, other supplemental allowances and benefits, and reduced cost or free public transport. The value of these benefits may also be significant. These benefits are not considered further here.

The Age Pension will have its start dates moving out so it becomes available at age 67 for all new retirees from 2024 onward. This adjustment is reflected in the modelling, which holds the assumed age of retirement at 65. This implies that accumulation monies are also needed to 'bridge the gap' before the Age Pension can commence in many cases. This leads to a slight reduction in retirement income compared to the situation where the Age Pension continues to be modelled as commencing at age 65 (which will not be the case). It also results in a reduction in retirement income compared to deferring retirement until age 67. This impact is a bit stronger due to retirement being deferred for two years as there is an increase in accumulation amounts and a decrease in the time over which drawdown needs to be applied.

2.4 Average weekly ordinary time earnings (AWOTE)

Discussions relating to superannuation and retirement outcomes often quote dollar results. This raises the issues of both comparability and currency of results.

Where practical, incomes and related matters are discussed in terms of AWOTE, and more specifically in terms of the proportion of the annual income implied by the weekly AWOTE data. This provides the capacity to compare information from differing points in time, and helps maintain the currency of results.

For context, the recent AWOTE for the September 2011 quarter and is approximately \$69,000 per annum.

ATO statistics for the 2008-09 year allow us to relate taxable income (essentially income after concessional superannuation contributions have been deducted) to AWOTE with the following approximate (expressed to the nearest 5%) results:



Table 2.4.1: Taxable income as proportion of AWOTE

Proportion of population	Males	Females	All people
50%	85%	65%	75%
75%	120%	90%	110%
95%	250%	160%	200%

For example, a female with taxable income at the 75th percentile for women has taxable income of approximately 90% of AWOTE. That is, 75% of women in the taxation system have taxable incomes of less than or equal to 90% of AWOTE.

This table shows that very few people, especially women, earn more than 250% of AWOTE. This result is reflected in the model through capping the income taken into the drawdown projections at 250% of AWOTE (approximately \$175,000 in current dollars) at the time of retirement. The imposition of such a cap is consistent with other recent work (March 2012) for the FSC by Rice Warner Actuaries (who use a 200% limit). It is assumed that individuals earning in excess of this cap are likely to have other income available to support their retirement income needs.

Historically there has been a fairly consistent gap between AWOTE and the Consumer Price Index (CPI) of approximately 1.5%, and this gap is retained going forward for projections of salary increases.

2.5 Income pattern in retirement

Key to determining income in retirement, and specifically in the first year of retirement (which is used in determining replacement rates), is the assumed pattern of income over the retirement period. There is debate about typical spending patterns in retirement and their drivers. It seems widely accepted that retirement can be considered in three phases, 'active', 'passive' and 'fragile', typically covering the period to age 75, to age 85 and thereafter respectively. As implied by the names, the active phase of retirement may seek to (at least) maintain current income levels, the passive phase requires less income, and the fragile phase may be difficult to address from a variety of reasons, including declining capacity.

It is common to simplify discussion of retirement income streams by assuming a specific end point of the retiree's life expectancy. While from an individual's perspective this may not be appropriate, from a top-down perspective it is adequate and essentially avoids the difficult issue of modelling the fragile phase of retirement. Life expectancy for females at any age, and 65 in particular, is longer than that for males.

For retirees who have flexibility in their income stream choices there are a number of approaches available. Overall they are along the lines of establishing several layers of income, starting with a base lifetime income stream, adding a layer which is more discretionary and potentially is not expected to last for life, and a third layer which represents 'emergency' or 'one-off' major expenses. At an individual level there are additional issues to consider, such as the impact of aged and health care needs, family interactions and intentions and so on, which make planning and modelling difficult.



The model uses a simple target retirement base income stream structure as follows:

- ▶ The period over which retirement income is required is given by the number of years of life expectancy at age 65. This period is discussed in more detail later.
- ▶ Total income received after retirement in the active phase is indexed to the assumed Consumer Price Index (CPI). The length of this period is to age 75, so is modelled as 10 years.
- ▶ The annual CPI rate used is 3%.
- ▶ Total income in the remaining period from age 75 to life expectancy is assumed not to increase in nominal terms from that on entry to this period. On completion of this period the superannuation account balance is projected to be exhausted.
- ▶ Implicitly it is assumed that retirees stay in good health in this period of passive retirement from age 75. There is some evidence which suggests this relatively slow decline in real income in the passive period is conservative.

2.6 Adequacy

It is one thing to seek to replace an after-tax income, but if this after-tax income in retirement is very small the recipient may not have an acceptable standard of living. The replacement approach is therefore underpinned with a minimum required income floor in retirement. As this floor increases the likelihood of an individual achieving the target replacement rate will decline.

For single retirees a current amount of \$22,000 is used as a floor and for a couple (see section 6.1) a current amount of \$32,000 is used. These are based on the 'modest' income needs reported in the recent ASFA Retirement Standard of December 2011. The singles floor is approximately 32% of AWOTE and so provides a marginal increase relative to a full Age Pension, which is pegged at approximately 28% of AWOTE for individuals. The couple floor is approximately 46% of AWOTE and so also provides a marginal increase relative to a full Age Pension, which is pegged at approximately 42% of AWOTE for couples. For comparative purposes it is noted that the ASFA Retirement Standard for its 'comfortable' income needs is currently approximately \$40,000 and \$55,000, 58% and 80% of AWOTE, for singles and couples respectively.

This Report does not consider issues relating to levels of adequacy further.

2.7 Data

Publically available historical data, when available, has been used either directly or as the basis for developing model inputs. This implies that behaviours that may have impacted that historical data may retain an influence in future projections. While history should not be taken as the sole predictor of the future, the development of these inputs, if historic data is not used as a basis, would be difficult and subjective.

When historic data comes from differing years, it is brought forward to a common start date in the modelling using by indexing with either a Consumer Price Index (CPI) or AWOTE for salary related items.



2.8 Moving from individuals to populations

A population can be represented by a set of sample individuals, and so a population wide result can be obtained by taking a weighted average over the set of sample individuals (reflecting that each sample person does not represent the same proportion of the population).

The modelling therefore applies its projection capacity for an individual to a set of representative individuals, both in the accumulation and drawdown phases, and takes a weighted average over the results. This is done for males and females separately and also in aggregate.

The population receiving Defined Benefit superannuation is not considered (although it may be that this population is comparatively well-off in terms of replacement rates).

2.9 Gender

Females, on average, earn less than males for similar work and also tend to be employed in lower paying roles. Additionally, females have a lower workforce participation rates at all ages compared with males and a higher proportion of part time employees. It is also common for females to take time out of the workforce during their working lives to have children and focus on their upbringing.

These issues combine to lead to the well known result that women typically accumulate smaller superannuation balances than men in preparation for retirement, especially as the superannuation system focuses on a percentage of salary basis for determining contributions to accumulation amounts.

These issues are recognised in part in the modelling. Separate projections for males and females are performed and so the capacity to use differing inputs for expected incomes and opening accumulation balances for males and females is exercised. Since average salaries are used, some of the impact of lower paying roles and part time work is built in through these averages. The impact of females often having time out from the work force is partially recognised by imposing a 5 year break from work, reducing superannuation accumulation, from the ages of 30 - 35. ABS data from 2010 shows that the average age of females for first child birth is increasing and suggests 30 is a reasonable age to use at a high level. The interactions between when and how many children females in different socio-economic groups have are complex and not pursued further here.



3 Replacement rates

3.1 Constant replacement rates

The focus of this work is to provide insight into replacement rates. This requires clarity around the term 'replacement rate'.

In work of this nature it is not uncommon to find a replacement rate is stated, as a single figure. The debate around adequacy, which is not pursued, relies on definitions of replacement rates and so these definitions are therefore usually found in such discussions. A recent report for the FSC (then ISFA) in 2010 by Rice Warner entitled 'Superannuation Adequacy' is a useful source.

Retirement income, relative to pre-retirement income, is typically discussed in terms of either an absolute framework, using dollars, or a relative framework, using replacement rates. A widely used example of the absolute framework approach is the ASFA Retirement Standard. The Senate Select Committee of 2002 concluded that a relative target of 60% to 65% of pre-retirement income was a reasonable level for (financial) adequacy in retirement. Whether an absolute or relative approach is used it is usually accompanied by various assumptions about needs in retirement relative to a working context. There can be considerable debate regarding such assumptions and they tend to be applied at a high level. Despite this, it is common to put a single number forward as being an appropriate replacement targets to apply to all retirees, independent of the retiree's circumstances or expectations.

Replacement rates of between 60% and 65% of pre-retirement gross income are widely quoted as providing an acceptable level of adequacy post retirement, however this does not reflect the circumstances of the individual, including major issues such as marital status and home ownership.

The use of a single replacement rate for all retirees may be valid at a macro level when considering population averages or totals of some form. It also has the advantage of simplicity. However that simplicity hides the variety of retiree circumstances over which the average is taken.

To obtain a population level result, an aggregate (population) replacement rate, the proportion of the population for whom the individual replacement rate has been achieved is determined.

We proceed by examining the impact of the change to the 12% SGC regime, initially using a constant individual replacement rate and then using variable individual replacement rates which better reflect differing circumstances.

It is worth noting that the number 65 arises in three separate contexts in this report:

- ▶ Retirement age of an individual, assumed as age 65
- ▶ Income replacement rate for an individual on transition from employment to retirement, where a constant individual replacement rate of 65% is common
- ▶ Aggregate population replacement rate, which represent the proportion of a given cohort (all having a common age) that achieves the individual replacement rate. A target aggregate population rate is also commonly taken as 65%.



3.2 Constant 65% individual replacement rate: Impact 12% SGC

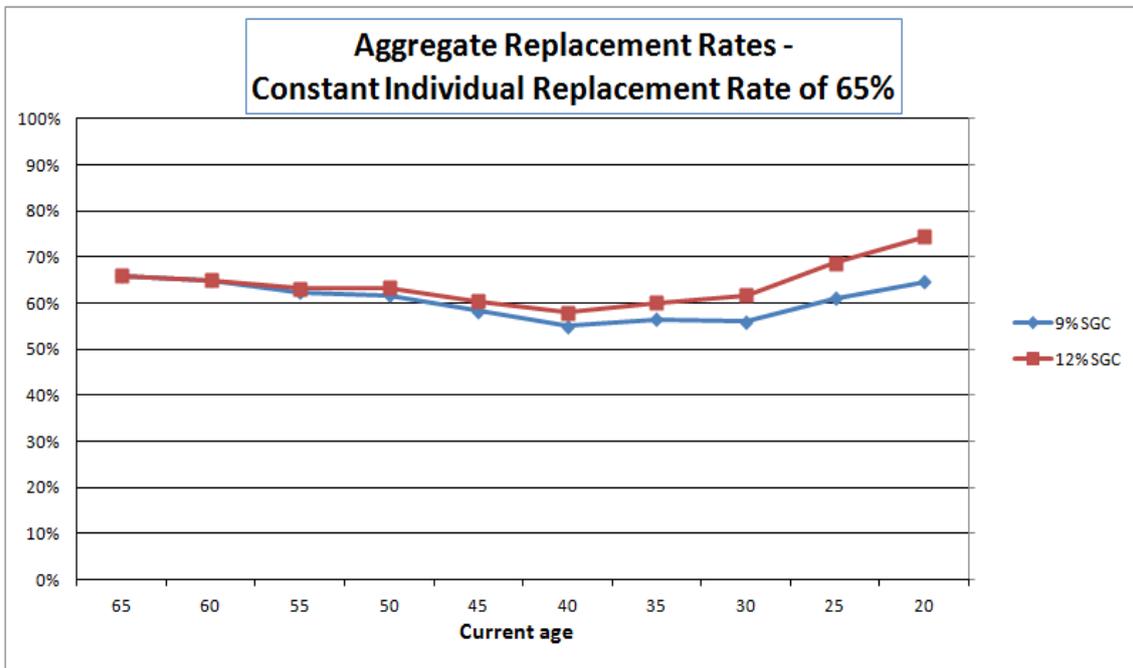
The impact of the transition from the 9% SGC regime to the 12% regime is presented through comparing the aggregate population replacement rates for different cohorts of retirees. As outlined in the scope, the focus of attention is when, or if, the aggregate replacement rates cross the 65% threshold (assuming retirement at age 65).

Model results use all assumptions as specified for the base case, with the exception that the replacement rate is set at 65% for all retirees. The base case assumptions are discussed in more detail in the following sections. The purpose of including results here is not to consider the base case assumptions but to highlight the impact of the change in SGC regime under the assumption of using a constant 65% replacement rate for individual retirees.

Results are presented in a standard graphical format that is used below.

The modelling determines an aggregate replacement rate at retirement (at 65) based on current age. The cohort of retirees currently aged 65 are modelled as retiring immediately. Their aggregate replacement rate is identified by the '65' label on the horizontal axis. The cohort currently aged 60 is projected to retirement at age 65, and their future result is identified by the '60' label. Note this is a result which is modelled to occur 5 years in the future. A similar explanation applies to the rest of the points reported. As the graph is scanned from left to right it provides the projected aggregate replacement rate at age 65 which would emerge five, 10, then 15 etc years into the future under the projection assumptions.

Graph 3.2.1: Aggregate replacement rates using constant individual replacement rate of 65%. Compare 9% and 12% SGC regimes. Base Assumptions otherwise.





Commentary:

- ▶ As expected, the change in SGC regime makes no difference for those retirees already at age 65. As the 12% regime is gradually introduced its impact on the aggregate population replacement rate is increasingly felt as shown by the increasing divergence of the 12% SGC line away (and above) the 9% SGC line.
- ▶ Under the 9% SGC regime the longer term aggregate population replacement rate does not achieve 65%. That is, as the 9% SGC line in Graph 3.2.1 tracks to the right, while increasing, it does not reach 65% (although it does come close). For the age 25 cohort 61% is attained, and for the age 20 cohort, just under 65%

As the 9% SGC regime (if left unchanged) is mature for the cohorts currently aged 20 and 25 this outcome implies that, without changes in behaviours to increase accumulated balances, the 9% SGC regime would not be expected to achieve an aggregate replacement rate of 65% at any stage (when using a constant individual replacement rate of 65%).

- ▶ Under the 12% SGC regime longer term aggregate population replacement rate is below 65% for the cohort currently aged 30, but exceeds 65% for the younger cohorts. That is, as the 12% SGC line in Graph 3.2.1 track to the right, it increase and crosses the 65% threshold between cohort ages 30 and 25. The age 25 and 20 cohorts have aggregate replacement rates of approximately 69% and 74% respectively. Although the 12% SGC regime will not be mature for the cohorts currently aged 25 and 20 this outcome implies that the 12% SGC regime is projected to be sufficient to support an expectation that in the longer run and, in particular, when it matures (if left unchanged), that aggregate replacement rates in excess of 65% can be achieved.
- ▶ The aggregate replacement rates for the cohorts age 65 (retiring immediately) and 60 (retiring in 5 years time), assuming a 65% constant individual replacement rate are approximately 65%. This is attributed to historic issues in the development of accumulation balances, including significantly higher contribution caps and the one-off opportunity to contribute additional monies in the 2007 financial year. As these opportunities are not expected to be available in the future it is a natural consequence that these aggregate replacement rates are not maintained.

In summary, assuming a constant individual replacement rate of 65%, the 9% SGC regime would not be expect to attain an aggregate population replacement rate of 65% at any future time, but the 12% SGC regime can be expected to lead to aggregate replacement rates of 65% or more in about 40 years time (when the current cohort aged 25 attains age 65).

However, as noted above, the use of constant individual replacement rate hides the range of circumstances actually occurring. Consequently a more sensitive approach which may provide an opportunity to gain further insights is developed.

3.3 A new individual replacement rate model

Australia has a progressive income tax system and the following points need to be considered:

- ▶ The median Australian wage earner has taxable income of approximately 75% of AWOTE



- ▶ Applying the standard tax tables (for 2012 onward) and allowing for work deductions of approximately 4% (reflecting ATO 2008-2009 data) gives a median single wage earner an effective tax rate of about 20%. So, at retirement, to maintain parity of disposable income post-retirement about 80% of pre-retirement taxable income is needed on the premise that post-retirement income is not taxable.
- ▶ Applying the same approach to a single wage earner with taxable income of 2 times AWOTE leads to a an effective tax rate of about 33%, suggesting that to maintain parity disposable income post-retirement about 67% of post-retirement taxable income is needed.
- ▶ Both calculations are approximate but the key point is that the post-retirement target full replacement rates to maintain parity vary significantly (from 80% to 67%, and both are above 65%). Clearly, lower taxable incomes would generate higher percentages and larger taxable incomes lower percentages.
- ▶ While acknowledging these calculations are approximate, it seems clear that a single replacement rate of 65% of pre-retirement income after retirement will leave the majority of retirees with a noticeable immediate decline in disposable income on retirement. It seems hard to justify the presumption that, at the point of transition from employment to retirement, an immediate drop in net income is appropriate.

Two conclusions follow. Firstly, using a single replacement rate for all individuals in a population does not reflect the circumstances of individual retirees. Secondly, applying a replacement rate of 100% of after-tax pre-retirement income rather than a replacement rate of 65% of pre-retirement income results in a lower number of individual retirees being projected to attain the replacement rate.

For an individual a target replacement rate is the ratio of after-tax income to before-tax income immediately before retirement. The objective is then to maintain this level of after-tax income immediately after retirement. On retirement the actual replacement rate is the ratio of actual initial retirement income to pre-retirement before-tax income. If the actual replacement rate at least matches the target replacement rate then full replacement has been achieved.

In modelling replacement rates for individuals, several assumptions are made:

- ▶ Full retirement occurs at age 65
- ▶ The retirement income pattern is as described in section 2.5.
- ▶ Before-tax income is used, before income tax and tax allowances for work expenses, but after the deduction of SGC superannuation
- ▶ Income received after retirement is assumed not to be taxed and to exclude tax allowances for work expenses. This reflects retirement income from superannuation being tax free for those aged over 60, and that tax offsets are available if the only other income received is based on the Age Pension.

When full replacement occurs the retiree achieves the objective of having at least as much 'money in hand' on entering retirement as they had at the end of employment. The final year's after-tax income determines the desired level of income in retirement and the target replacement rate. The final year's closing superannuation balance, assumptions made regarding the drawdown income stream, and the interaction with the Age Pension determine the actual replacement rate on retirement.



As above, to obtain a population level result, the aggregate replacement rate, the proportion of the population achieving full replacement is determined.

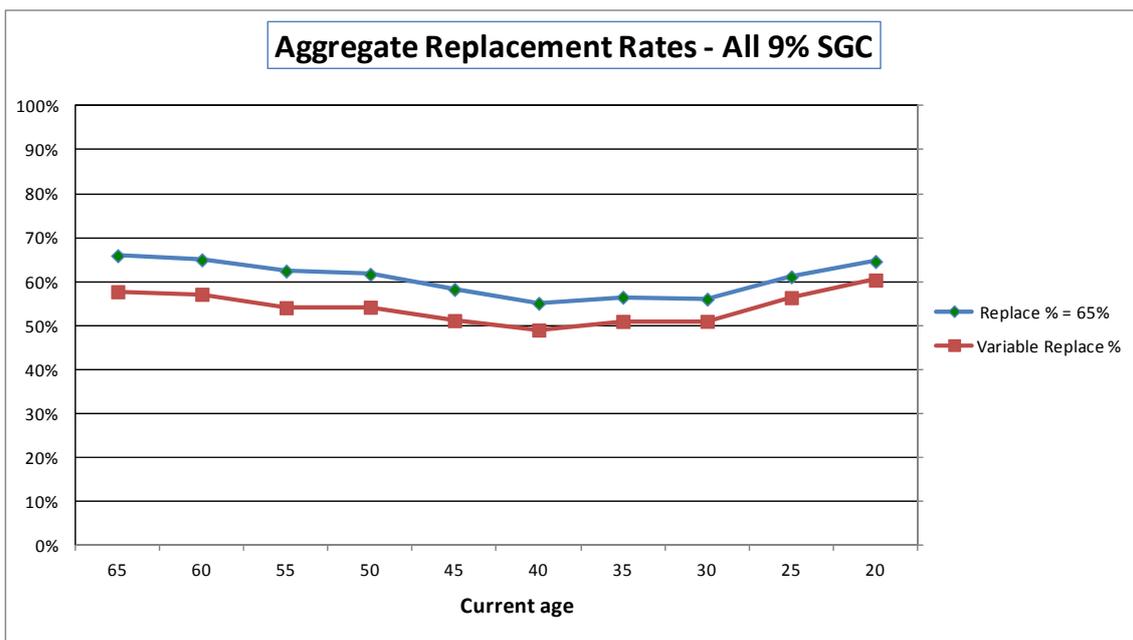
The modelling requires a 'bottom-up approach' of identifying a number of sample individuals from whom specific calculations are made (for example reflecting specific contribution assumptions and specific income tax impacts), and then a population result is obtained by taking a weighted sum of the results. This contrasts with a 'top-down' approach, which applies averages immediately and seeks to obtain high level results at a population or systemic level directly.

A top-down approach applies as averaging process to inputs to the modelling process. The bottom-up approach defers averaging overall population data until later in the modelling process and so provides more insight. Averages inherently obscure features of the data they average over and make underlying interactions and understanding difficult to discern. Additionally, averages may produce incorrect results. When considering whether a benchmark is met (such as whether replacement rates are attained), if there are two results, one attaining the benchmark and one not, comparing the average with the benchmark implies that either both results may be inferred to achieve the benchmark or both do not. Neither conclusion reflects the underlying situation.

It can be argued that the expected after-tax retirement income should be discounted to some extent relative to the pre-retirement after-tax income on the basis of changing lifestyle/income needs. Such arguments can be debated and are not pursued. The issue of the appropriateness of taking a lump sum on retirement either in full for a small balance, or a partial for larger balances, is also not pursued. The modelling assumes full application of accumulation balances to support income streams in the drawdown phase of retirement.

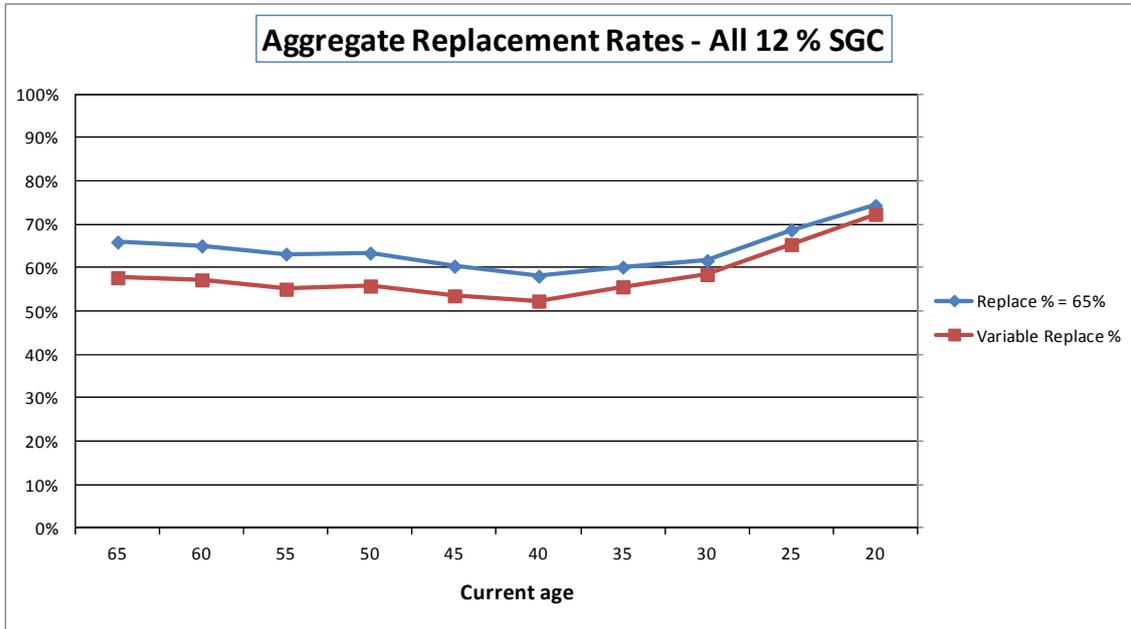
The significant impact of using constant individual replacement rate as compared to the proposed new approach of variable individual replacement rates is now shown. Two sets of results are given, one based on 9% SGC, and the other on 12% SGC.

Graph 3.3.1: Replacement Rates. 9% SGC. Base Assumptions, except replacement rates of 65% are compared to those determined by circumstances.





Graph 3.3.2: Replacement Rates. 12% SGC. Base Assumptions, except replacement rates of 65% are compared to those determined by circumstances.



Commentary:

- ▶ As above, model results use all assumptions as specified for the base case, with the exception of the replacement rate. The base case assumptions are discussed in more detail in the following sections. The purpose of including results here is to highlight the impact of using a more sensitive definition of replacement rate. The difference between the results in the two graphs above is solely due to the difference between using a constant single 65% replacement rate compared to replacement rates determined by considering the specific circumstances of each model point.
- ▶ Comparing the results when using a constant individual target replacement rate of 65%, with all other assumptions as the base case, against those when using a variable target replacement rate reflecting individual circumstances show an overstatement of aggregate population replacement rates in all cases.
- ▶ The overstatements are:
 - Between approximately 4% and 8% under the 9% SGC regime, from Graph 3.3.1
 - Between approximately 2% and 8% under the 12% SC regime, from Graph 3.3.2
- ▶ With population replacement rates in the range of 60% to 70% differences in results of up to 8% imply an overstatement of full replacement rates by a relative margin of over 10%.
- ▶ The conclusion which follows is that using of a constant individual replacement rate, 65% in particular, may be a rather 'blunt' approach and that using replacement rates for individuals that reflect their circumstances may provide more insight.

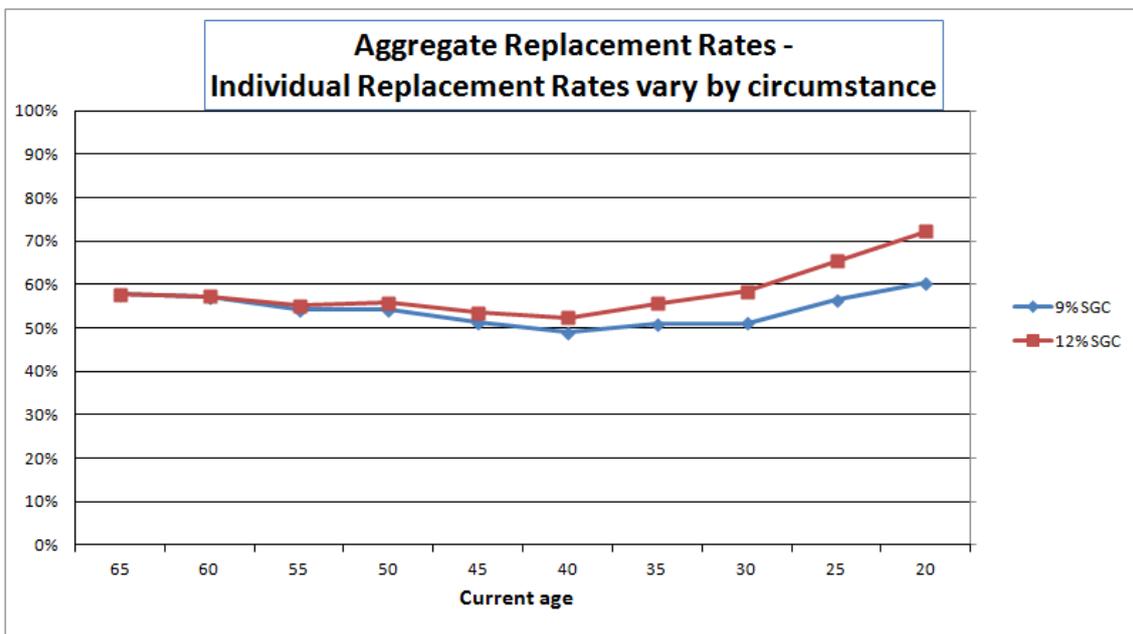


3.4 Variable individual replacement rates: Impact of 12% SGC

For comparison with the results given in section 3.2, the impact of the transition from the 9% SGC regime to the 12% regime using the variable individual replacement rate approach is provided. As before, the focus of attention is when, or if, the aggregate replacement rates cross the 65% threshold (assuming retirement at age 65).

These model results use all assumptions as specified for the base case, including individual replacement rates.

Graph 3.4.1: Aggregate replacement rates using variable individual replacement rates. Compare 9% and 12% SGC regimes. Base Assumptions.



Commentary;

- ▶ The base case assumptions are discussed in more detail in the following sections. The purpose of including results here is not to consider the base case assumptions but to highlight the impact of the change in SGC regime under the assumption of using the individual replacement rate approach.
- ▶ As with constant individual replacement rates, the change in SGC regime makes no difference for those retirees already at age 65. As the 12% regime is gradually introduced its impact on the aggregate population replacement rate is increasingly felt as shown by the increasing divergence of the 12% line away (and above) the 9% line.
- ▶ Again, under the 9% SGC regime the longer term aggregate population replacement rate does not achieve 65%, only reaching approximately 56% and 60% for the age 25 and 20 cohorts.

That is, the 9% SGC regime (if left unchanged) when mature and without changes in behaviours to increase accumulated balances should not be expected to achieve an aggregate replacement rate of 65% at any stage.



- ▶ Again, under the 12% SGC regime longer term aggregate population replacement rates are below 65% for cohorts currently aged 30 or more, but exceed 65% for the cohorts currently aged of 25 and 20. Those cohorts having aggregate replacement rates of approximately 66% and 72% respectively.

That is, although the 12% SGC regime will not be mature for the cohorts currently aged 25 and 20 this outcome implies that the 12% SGC regime is projected to be sufficient to support an expectation that in the longer run and, in particular, when it matures (if left unchanged), that aggregate replacement rates in excess of 65% can be achieved.

- ▶ The comments regarding the age 65 and 60 cohorts made in section 3.2 apply here.

In summary, using the variable individual replacement rate approach, the 9% SGC regime should not be expected to attain an aggregate population replacement rate of 65% at any future time, but the 12% SGC regime can be expected to lead to aggregate replacement rates of 65% or more in about 40 years time (when the current cohort aged 25 attains age 65).

While the aggregate replacement rates achieved using the variable individual replacement rate approach are lower than those obtained when using the constant individual replacement rate of 65%, when the test applied is whether or not an aggregate replacement rate of 65% is achieved, the results obtained for both individual replacement rate approaches are the same.

In the remainder of this report replacement rates, and the determination of whether full replacement is achieved, the variable replacement rate approach reflecting the circumstances of each model point, is used.

As previously noted, attaining full replacement do not address questions of adequacy as the focus of full replacement is on maintaining a position, without making a judgement about the appropriateness of that position. As noted in section 2.6, a discussion of adequacy is not pursued other than to apply an adequacy 'floor' to obtain more realistic results.



4 Accumulation model

The purpose of the accumulation model is, at the level of an individual, to project the amount of superannuation accumulated to age 65. These results then feed into the drawdown model which allows us to determine replacement rates.

The model uses an annual cycle. This reduces the volume of computation and it is considered that seeking to use a shorter cycle (for example monthly) would not produce results with any improvement in accuracy given the level of accuracy of many of the inputs and breadth of the model assumptions.

The starting point for the modelling is the 2012 financial year.

4.1 Model assumptions

There are a number of assumptions made to obtain a model of an accumulation process that is manageable and can be supported by available data. These assumptions include:

- ▶ A person who enters the accumulation phase does not leave it (with the exception of females as discussed in section 2.9)
- ▶ All people in the accumulation phase follow a trajectory that flows from their starting point. That is, their relative circumstances remain the same throughout their modelled working career. In particular, it is assumed their salaries increase in line with AWOTE each year.
- ▶ All people remain in full employment up to age 65, when they immediately retire.
- ▶ Rates of investment return, fees and taxation remain constant throughout the accumulation period. That is, there is no reflection of the impact of future changes or of volatility in investment return.

While it is recognised these assumptions are unlikely to be encountered in reality, it is reiterated that the prime purpose of this Report is to gain an understanding into the impact of the change in the SGC regime which is a relative movement. This contrasts with other purposes for which projections may be made. For example a key purpose for the Australian Treasury's Retirement and Intergenerational Modelling & Analysis Unit's (RIMA) model and projections is to support budget considerations. These are not focused on relative impacts but on absolute impacts in terms of dollar budget items.

4.2 Model

At its heart the accumulation model is straightforward. It takes an opening superannuation account balance and an opening salary and then, based on a set of product and economic assumptions, year by year accumulates a superannuation balance up to age 65. The need to recognise different opening balances accommodates people who are already part way through the superannuation system and so have accumulated balances at the beginning of their projection.

Accumulation amounts at age 65 will vary by a person's age when the projection starts, their opening balance, and their salaries. Publically available data from the ABS and RIMA is used as a starting point to develop salary and opening balance deciles for both males



and females. For each combination of opening income and opening balance, superannuation balances at age 65 are then projected.

Sample individuals starting from age 20 and increasing in 5 year steps to age 65 have their superannuation balances at age 65 projected.

As people progress through their working careers, they may change the amounts they contribute to superannuation. They may make additional voluntary concessional contributions, over the mandatory SGC level, and they may make voluntary non-concessional contributions. Consequently, the superannuation contributions modelled reflect a number of things:

- ▶ A set of voluntary concessional contribution rates, in excess of SGC contributions, expressed as a percentage of salary, for the voluntary contributions has been determined. These rates are expressed in terms of the contribution made when a person makes the voluntary contribution, not as averages over the full set of superannuation contributors. These rates are varied by age but not by gender, as the impact of gender is reflected through the use of different salary and opening balance starting points. There is also summary evidence that, for a given salary, males and females make similar superannuation contributions in percentage of salary terms.
- ▶ To determine the proportions of people making voluntary contributions, ABS data provides a starting point to develop a set of scenarios which reflect the progression of making voluntary contributions. It is assumed that as people age they do not decrease their additional voluntary contributions. The outworking of this is that as people progress through the 5 years age groups an increasing number are assumed to make voluntary contributions.
- ▶ Similarly, ABS data provides a starting point for developing a set of scenarios which reflect the progression of making non-concessional contributions and further scenarios from making both concessional and non-concessional contributions.
- ▶ The modelling includes the impact of concessional contribution caps for those aged over 50 (that is, for balances under \$500,000 the increased cap is \$25,000 in excess of the standard concessional cap). The standard concessional cap is inflated at the rate of increase of AWOTE (as this is the basis of stated in the Income Tax Act, even if it is proposed to be implemented intermittently in increments of \$5,000)
- ▶ The modelling also includes the impact of both the Government Co-Contributions for lower income earners and the Low Earner Rebate on contributions tax.

The combination of reflecting opening ages in 5 year steps, income deciles, opening balance deciles and the progression through various voluntary contribution levels leads to there being just over 30,000 different paths computed, about 15,000 each for males and females.

The set of product assumptions, economic assumptions and voluntary contribution rates used as the base assumptions are provided in Appendix A.



5 Drawdown model

The purpose of the drawdown model is to project income streams for individuals under a range of conditions assuming full retirement at age 65. These results then feed into the population model which allows us to obtain overall replacement rates.

As with the accumulation model an annual cycle is used and it is assumed that modelling starts in the 2012 financial year.

The set of product assumptions and economic assumptions used as the base assumptions are provided in Appendix A.

5.1 Use of accumulated funds at retirement

As noted earlier, accumulation amounts need to be interpreted in the context of a drawdown approach so that an actual replacement rate can be determined. In that sense accumulation balance results are an intermediate step on the path of comparing target and actual replacement rates. The base approach is outlined in section 2.5.

The interaction between the Age Pension and the base drawdown strategy is strong, as discussed later, and actual outcomes for those receiving the Age Pension are better than might be initially expected.

Using a traditional (with or without mortality improvement) life expectancy to specify the period of retirement leaves a chance of approximately 50% of exhausting accumulated superannuation funds prior to death since approximately 50% of the retirees live longer than their life expectancy. The probability of superannuation balances running out prior to death is termed 'exhaustion risk'. For retirees who are eligible for the Age Pension which, in the absence of other sources of income, would include those whose superannuation accounts have been exhausted, the Age Pension will provide ongoing income. Despite this, for many retirees an exhaustion risk of 50% may be too high. The impact of extending the period over which accumulation monies are used to reduce exhaustion risks is considered in section 6.6. The extension is exacerbated by mortality improvement.

5.2 Importance of recognising mortality improvement

The importance of recognising mortality improvement is demonstrated by firstly showing results without mortality improvement and then including the impact of mortality improvement, as projected to occur in practice.

The model uses the most recent mortality tables published by the Australian Government Actuary, based on population data from 2005 – 2007, and denoted ALT2005-2007. The ALT tables include two projections to reflect mortality improvement, one based on the past 25 years and one based on the past 100 years. The 25 years basis is considered more relevant to future experience and is used. There are separate mortality improvement factors for males and females.

Due to the way in which mortality tables are constructed the traditional 'life expectancy' for a given age understates the life expectancy if mortality improvement is not applied (assuming mortality improvements are positive - that is reduce mortality). Life expectancy is the number of years a person is expected to live, with the attendant implication that



approximately 50% of a group will live longer than the group life expectancy, and the remainder less than the group life expectancy.

In 2012 the impact of mortality improvement on life expectancy at age 65 is an increase from 18.5 to 21.6 years (16%) for males, and from 21.6 to 24.2 years for females (12%). As the attainment of age 65 moves out in time, the impact of reflecting mortality improvement increases.

Graphs 5.2.1 and 5.2.2 provide a simplistic measure of the impact of moving from the 9% SGC regime to the 12% regime. In this case it is assumed:

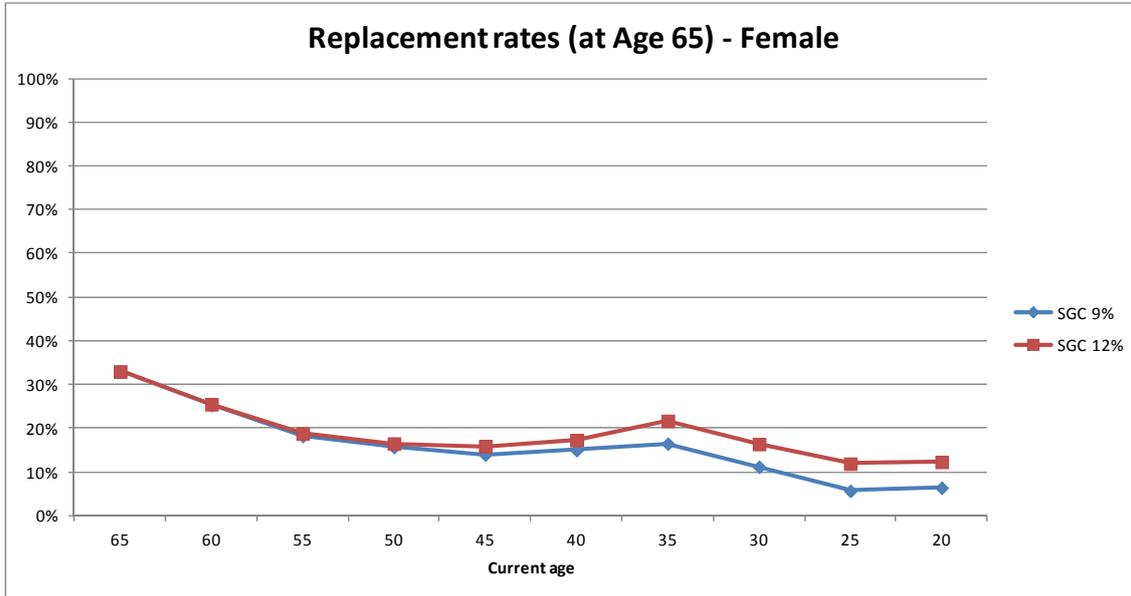
- ▶ Mortality improvement is not recognised
- ▶ The Age Pension is not taken into consideration
- ▶ The income streams do not reflect the impact of future CPI
- ▶ All other assumptions are from the base set of assumptions.

Graph 5.2.1: Replacement Rates – Male. No mortality improvement, no Age Pension and no income stream indexation





Graph 5.2.2: Replacement Rates – Female. No mortality improvement, no Age Pension and no income stream indexation



Commentary:

- ▶ The key thing to note is the difference between the 9% and 12% SGC regimes. That is, the focus is on the relative change due to changing the SGC regime.
- ▶ For example, Graph 5.2.1 indicates that under the 12% SGC regime the male cohort currently aged 30 is projected, on retirement at age 65 in 35 years time, to have a replacement rate of just over 30% but under the 9% SGC regime a projected replacement rate just over 20%.
- ▶ It is emphasised that these base scenarios are simplistic and unrealistic to use in the context of a policy discussion, however they still highlight some interesting points.
- ▶ The impact of imposing the adequacy floor (\$22,000 in 2012 dollars) is seen in the female results as they are lower than the corresponding results for males.
- ▶ Note these results refer to individuals in isolation.

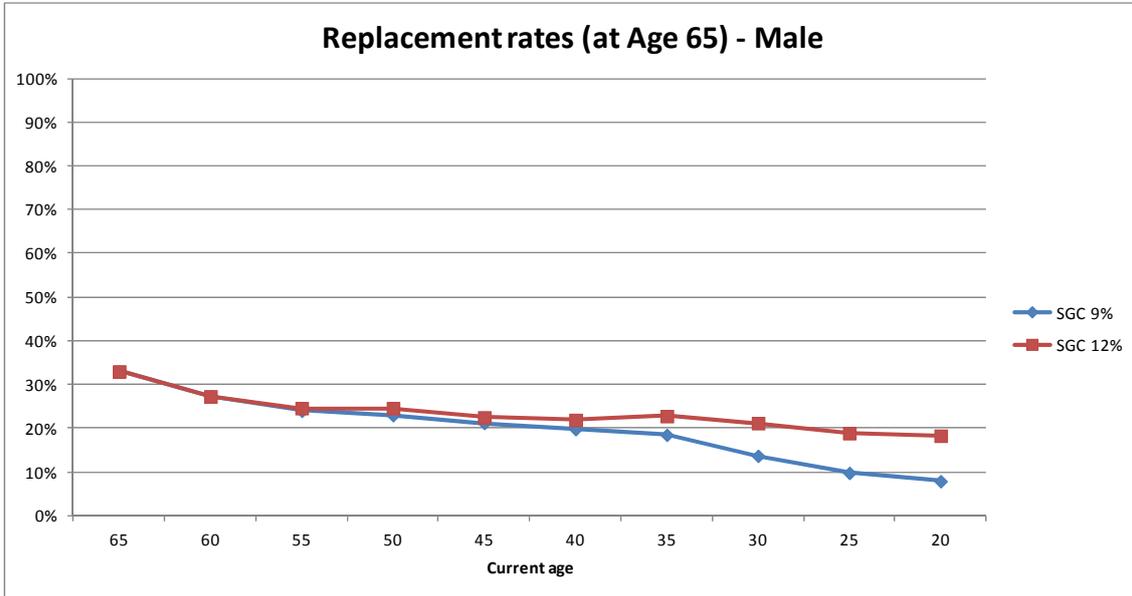
The impact of mortality improvement is now included.

The base assumption is that the 25 year improvement factors (they differ between males and females) provided by the Australian Government Actuary are used in conjunction with their most recent mortality table (ALT 2005-07). Mortality improvement is discussed further in section 6.5.

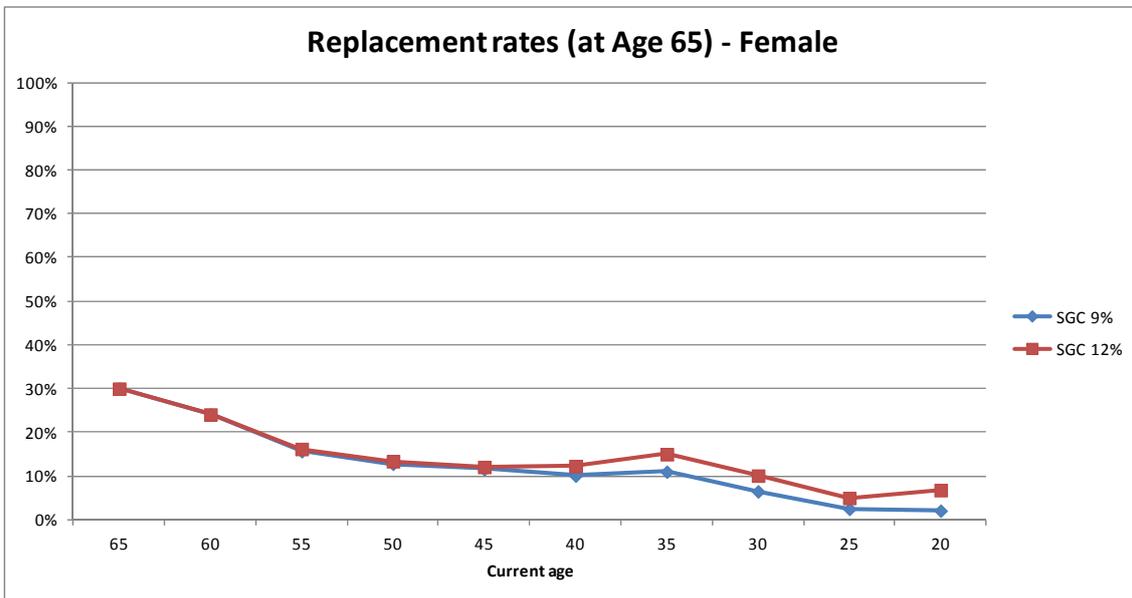
The results below correspond to Graphs 5.2.1 and 5.2.2 with the only change being the application of mortality improvement. The comparison makes clear the strong influence of mortality improvement.



Graph 5.2.3: Replacement Rates – Male. Mortality improvement, but no Age Pension and no income stream indexation



Graph 5.2.4: Replacement Rates – Female. Mortality improvement, but no Age Pension and no income stream indexation



Commentary:

There are multiple factors impacting replacement rates and it can be useful to compare their influences.

- ▶ The impact of not applying mortality improvement but applying the base income stream structure (per section 2.5) is stronger, especially at the older current ages. That is, reflecting the base income stream structure but not reflecting mortality



improvement leads to lower replacement rates for all current ages than those reported in Graphs 5.2.3 and 5.2.4.

- ▶ The impact of applying both mortality improvement and the base income stream structure is that under both the 9% and 12% SGC regimes male replacement rates decline as current age declines, and drop below 10% from current age 30 onward, and female replacement rates drop below 5% from current age 30 onward.

5.3 Importance of including the Age Pension

The Age Pension is now incorporated to provide more realistic scenarios.

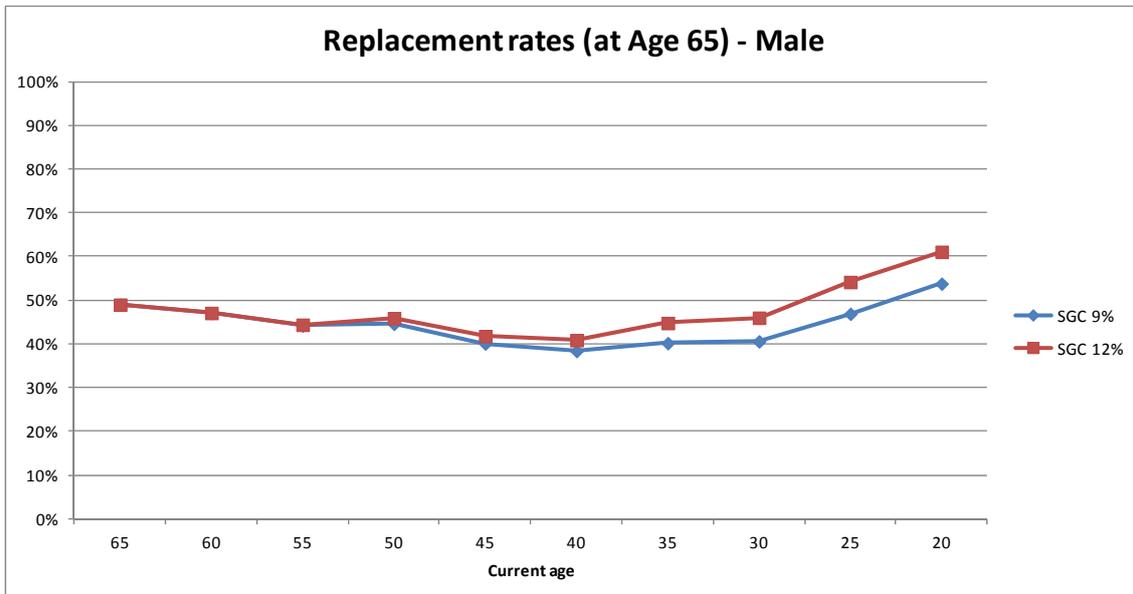
This requires establishing whether the retiree is a member of a couple or not and whether a homeowner or not.

For purposes of a comparison with the prior graphs, it is assumed that:

- ▶ The retiree is single
- ▶ The retiree is a homeowner (as this is the more common than not being a homeowner).
- ▶ Mortality improvement continues to be reflected.
- ▶ Total income inflates at 3% CPI in the first 10 years.

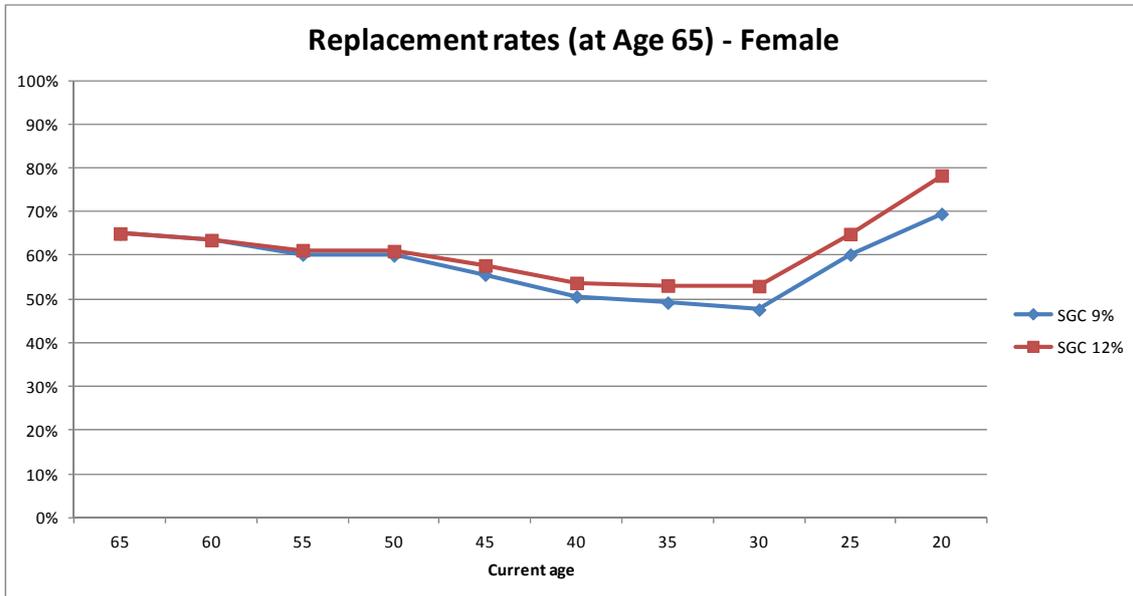
The results obtained are then:

Graph 5.3.1: Replacement Rates – Male. Age Pension, Single, Homeowner, Mortality improvement, and total income stream indexation





Graph 5.3.2: Replacement Rates – Female. Age Pension, Single, Homeowner, Mortality improvement, and total income stream indexation



Commentary:

- ▶ The powerful influence of including the impact of the Age Pension, despite having mortality improvement and inflating the total income stream at CPI in the first 10 years of retirement, is clear. For example, under the 12% SGC regime, Graph 5.23.3 shows that for males currently aged 30 the projected replacement rate reflecting mortality improvement (but not the base income stream structure) is approximately 21%, whereas Graph 5.2 shows that after reflecting both the Age Pension (assuming the male is a homeowner) and allowing for the base income stream structure, the projected replacement rate is about 46%.
- ▶ The gap between the replacement rates for the 9% SGC regime and the 12% SGC regime has narrowed compared to the previous section. This is attributable to the strong offsetting interaction between the superannuation income stream and the Age Pension. As the superannuation income stream increases the Age Pension declines with a relatively small net positive effect.
- ▶ As a retiree who receives the Age Pension ages the Age Pension reacts to superannuation drawdowns by providing increased benefits when the superannuation account balance decreases due to providing an income stream. Since the annual rate of increase of the Age Pension is driven by AWOTE, which is larger than CPI, the outcome for the base case is that the increase in the Age Pension payment may reduce or remove the need to index the superannuation income stream by CPI, yet the overall income stream still reflects the desired level of CPI indexation.

This is an important result to factor into discussions and shows that the Age Pension is perhaps more generous than it is usually given credit for.

- ▶ The replacement rates for females are now better than those for males under both the 9% and 12% SGC regimes. This is attributed to the impact of the relatively stronger impact of the Age Pension for individual females compared to individual males.



As in the prior point, the Age Pension increases provide partial compensation for decreases in the superannuation account balance. Females in the sample points used target a lower level of income in retirement due to having lower incomes prior to retirement.

This should not be taken to suggest that lower retirement incomes for individual females is appropriate, only that focussing on a replacement criterion has this outcome. The adequacy floor also increases female outcomes more strongly than for males. Consequently the Age Pension plays a relatively stronger role for individual females than it does for individual males.



6 Population model

The purpose of the population model is to obtain an overview of the macro result for the population as a whole. These results are built up from the results obtained from a set of sample points (individuals) by taking a weighted summation over these sample points.

6.1 Couples

In the drawdown phase there are financial advantages to being part of a couple as opposed to being two separate individuals. For example, housing costs decline. This advantage is well recognised. The most recent ASFA Retirement Standard (February 2012), for both modest and comfortable incomes shows that the single rate is approximately 70% of the couple rate. Alternatively, the couple rate is approximately 140% of the single rate. This relationship has been consistent in recent ASFA Retirement Standards. The Age Pension is more generous through using Male Total Average Weekly Earnings (MTAWE) as its benchmark and the couple maximum Age Pension of approximately 42% of MTAWE is approximately 150% of the single maximum Age Pension (nearly 28% of MTAWE).

The Age Pension also applies different thresholds and payment amounts depending on whether a person is considered to be an individual or part of a couple. In developing a population model the interaction between the Age Pension and superannuation savings needs to be reflected.

When discussing couples it is assumed, for projection purposes, that both members of the couple are the same age and that when one member of the couple retires, so does the other.

On retirement it is assumed all accumulated monies are pooled (or at least have the same drawdown strategy applied to them). NATSEM research from 2011 supports a high level segmentation of the couple population into three groups:

- ▶ About 40% of the couples having both partners having similar superannuation balances
- ▶ About 50% of the couples having the male with a larger balance than the female
- ▶ About 10% of the couples having the female with a larger balance than the male.

6.2 Home ownership

In the same vein, the Age Pension differentiates depending on whether or not a person is considered to be a homeowner. Again, in developing a population model the need to reflect the interaction between the Age Pension and superannuation savings is clear.

The 2010 Yearbook of Australia provides the following information for the age segment of 65 and over:

Table 5.2.1: Homeownership

	Couple	Individual	All
Homeowner	85%	70%	80%
Not Homeowner	15%	30%	20%



6.3 Retirement cohorts

The above, together with ABS data from the 2006 census indicating that approximately 74% of males and 67% of females of age 65 are in couples, and ABS data indicating that workforce participation does not exceed approximately 90% for males, or approximately 75% for females, allows us develop a number of retirement cohorts reflecting couple, homeowner and aggregate superannuation accumulation balances. Each cohort is then modelled in its accumulation phase as outlined in section 0 with the drawdown outcome for each path of whether or not full replacement occurs determined. Then aggregate population results are obtained by taking a weighted average over all these cohort results. Using the 9% SGC and 12% SGC assumptions then allows comparisons to be made between the aggregate results for each regime.

The following retirement cohorts are all included in the population weighted average:

Table 6.3.1 Retirement cohorts for aggregate population

Cohort	Male	Female
Single, Non homeowner	X	X
Single, Homeowner	X	X
Couple, Non homeowner Balance Factor = 1.0, Replacement Rate Factor = 1.0	X	X
Couple, Non homeowner Balance Factor = 1.65, Replacement Rate Factor = 1.4	X	X
Couple, Non homeowner Balance Factor = 2.0, Replacement Rate Factor = 1.4	X	X
Couple, Homeowner Balance Factor = 1.0, Replacement Rate Factor = 1.0	X	X
Couple, Homeowner Balance Factor = 1.65, Replacement Rate Factor = 1.4	X	X
Couple, Homeowner Balance Factor = 2.0, Replacement Rate Factor = 1.4	X	X

The Balance Factor and Replacement Rate Factor reflect the sets of couples noted above.

- ▶ Couples in which both the male and female are assumed to have the same accumulations and are both assumed to be working so they can accumulate superannuation.

Relative to a single person, the total accumulation amount is multiplied by the Balance factor of 2 and the target replacement rate is multiplied by the Replacement Rate Factor of 1.4. The Replacement Rate Factor reflects the relativities provided by the ASFA Retirement Standard.

- ▶ Couples in which one partner has a large accumulation than the other, but both are still assumed to be working.



Relative to a single person, the Balance Factor is taken to be 1.65. Since the majority of couples comprise a male and a female, and the male earns more than the female in the majority of cases, this factor reflects this scenario and is considered likely to be conservative.

The Replacement Rate Factor remains at 1.4. The use of a single Balance Factor to cover a potentially wide range of circumstances is an approximation, however it is considered not unreasonable, and is consistent with some high level data which is available.

- ▶ Couples in which one partner has an accumulation but the other does not.

This represents those couples in which only one of the partners is employed and so able to participate directly in the superannuation system. Relative to a single person, the Balance Factor is taken to be 1.0 as there is no increment to the balance available on the retirement of the sole employed partner. The Replacement Rate Factor of is also set at 1.0 on the premise that this reflects the couple's lifestyle immediately prior to retirement.

Each cohort, for both the males and females is then weighted, based on the other information noted above, and then weighted averages are taken. An overall population result is obtained by taking the male and female results and weighting them by the proportion of the 65 year old population that is male and female.

The above process does not reflect those who are employed but rely on Defined Benefit (DB) retirement incomes. On the premise that employees in DB funds are more likely than employees in Defined Contribution funds to achieve full replacement and adequacy in retirement, it is suggested this omission is conservative. This group may be of the order of 10% of the superannuation population based on APRA statistical data and the proportion of member accounts in Public Sector funds.

Also, the above process does not include those who may have no or minimal taxable income to declare. In some cases this can be taken as implying the person has no assets or income, however some such people may still be provided for in their life, for example those who may be institutionalised for some reason. In other cases such people may have assets and access to income which is not directly related to employment. At a high level it is estimated this group may be between 5% and 10% of the total population. Adequate data to quantify and segregate this group has not been determined.

Overall it is considered that the results presented in this Report are therefore likely to be a conservative estimate for the total population.

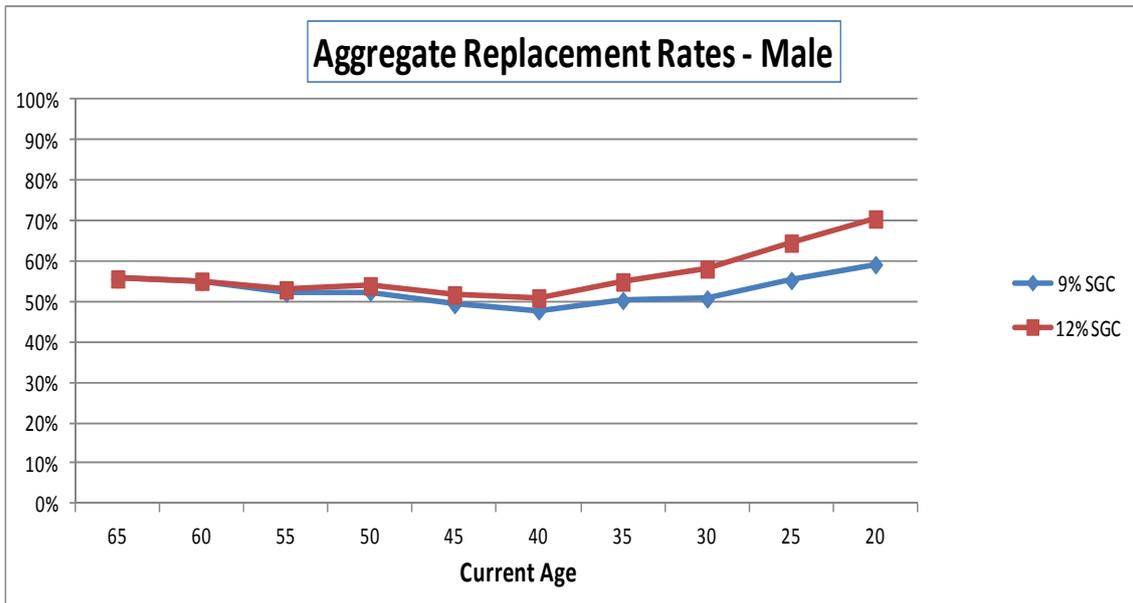
6.4 Base case results

All assumptions are as for the Base case.

Results for male and female populations are included as well as results for the overall aggregate results are provided.



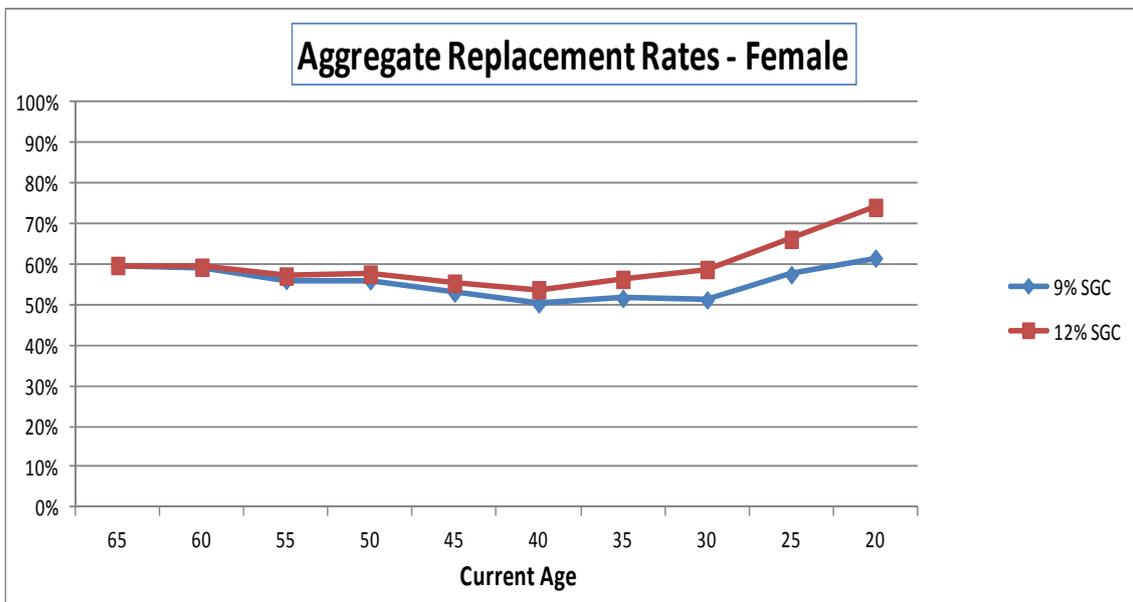
Graph 6.4.1: Replacement Rates – Males. Base case



Commentary:

- ▶ The pattern in this graph is similar to that in Graph 5.3.1. However in this case the result is a population result taking into account the variety of statuses discussed in section 6.3.

Graph 6.4.2: Replacement Rates – Females. Base case

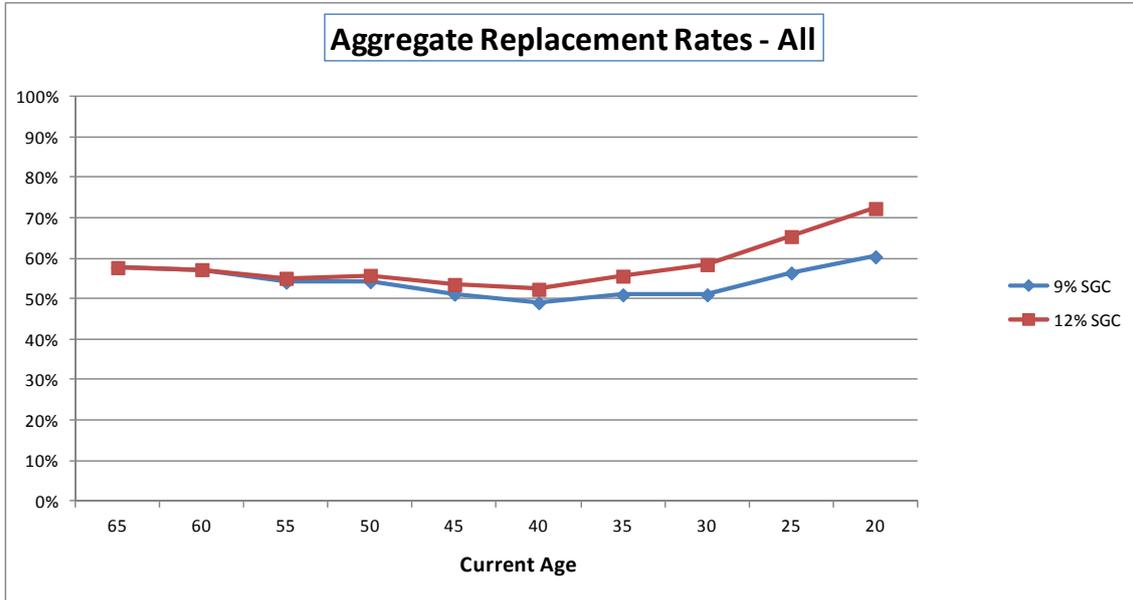


Commentary:

- ▶ The replacement rate for females being slightly higher than those for males is driven, as noted in section 5.3, by the females having a lower dollar target replacement rate than the males.



Graph 6.4.3: Replacement Rates - Aggregate. Base case



Commentary:

- ▶ The 12% SGC regime results in All (population, males and females) aggregate replacement rates exceeding 65 for current ages 25 and lower. For example, for those commencing work now at age 20, over 72% are projected to achieve full replacement on retirement at age 65. This outcome arises, despite the 12% regime not being mature (that is, all participants in it having had 12% SGC taken for their full working lives) until 2059 (assuming working continuously from age 25) or 2064 (assuming working continuously from age 20).
- ▶ The 9% SGC regime, which matures in 2047 for a 20 years old entering in 2002 and retiring in 2047 at age 65, does not achieve a 65% replacement rate with only about 60% of those now aged 20 achieving full replacement on retirement at age 65.

6.5 Mortality improvement

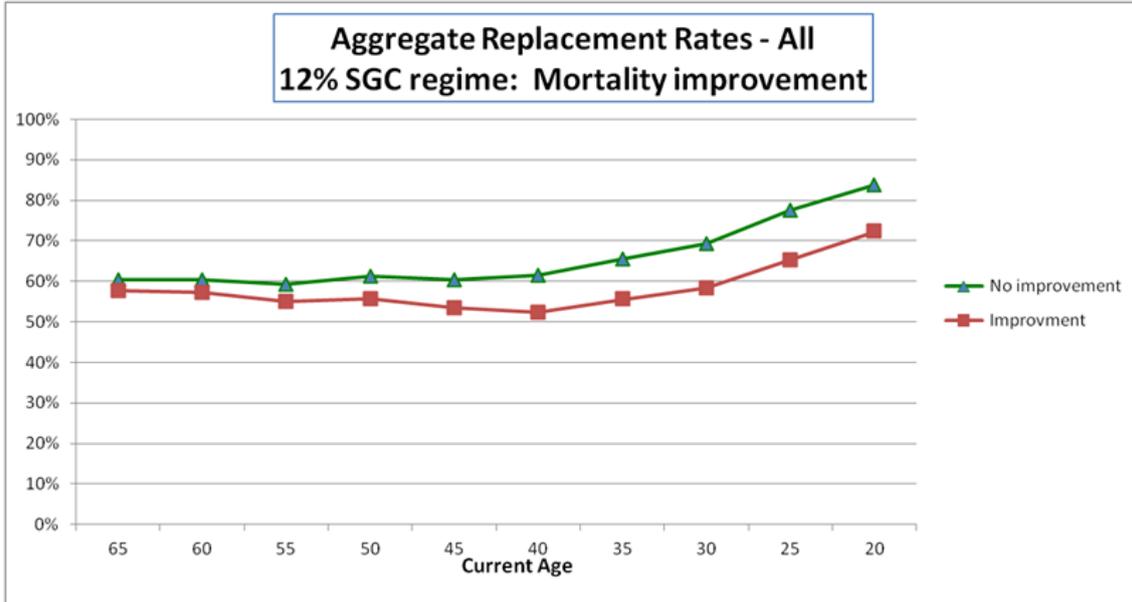
It has already been shown that it is necessary to reflect mortality improvement in the modelling.

The impact of mortality improvement in the model is illustrated by comparing All aggregate replacement rates with mortality improvement applied and not applied, assuming the base assumptions.

As above, the comparative result under the 12% SGC regime is given, assuming all other assumptions as for the base case.



Graph 6.5.1: Replacement Rates – Aggregate. Impact of mortality improvement



Commentary:

- ▶ Aggregate replacement rates improve at all ages so mortality improvement is assumed. As the current age declines the improvement increases, as would be expected. By current age 20 the extent of the improvement in the Aggregate population replacement rate is about 12%.
- ▶ From current age 35 onward the Aggregate replacement rates are over 65% when no mortality improvement is assumed.

It is also possible to compare the impact of the change in SGC regime from 9% to 12% on one hand, and mortality improvement on the other hand. To do this the difference between results obtained under the following scenarios are given:

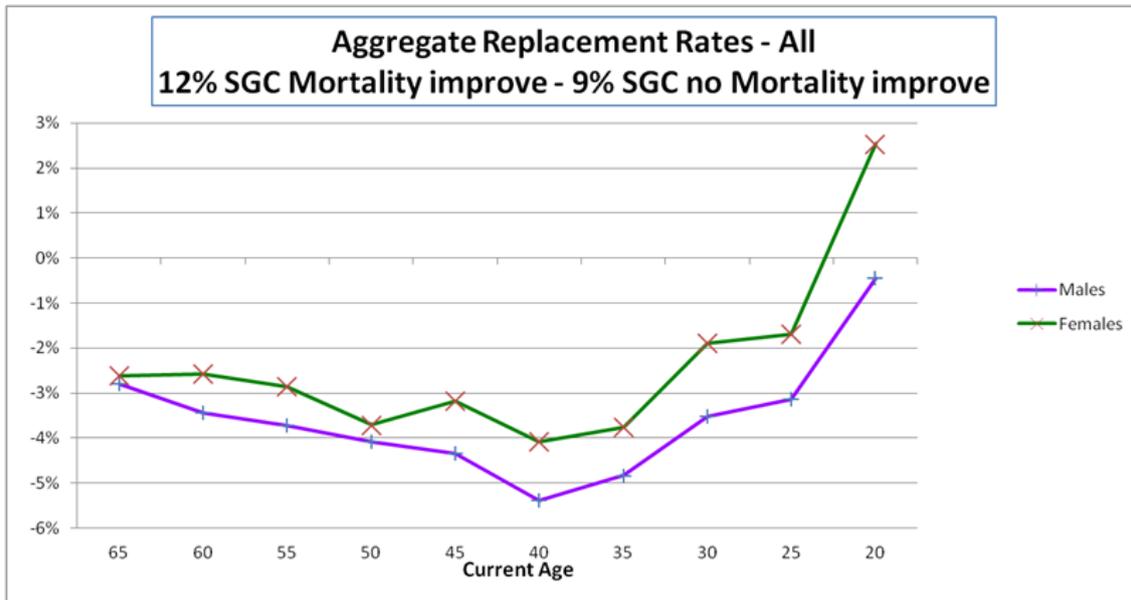
- ▶ Under the 9% SGC regime without mortality improvement, and
- ▶ Under the 12% SGC regime with mortality improvement.

All other assumptions are as for the base case.

In the following Graph the results from the 9% SGC regime without the impact of mortality improvement are subtracted from the results from the 12% regime with mortality improvement, so that instead of looking at replacement rate results differences between scenarios are given. A negative number implies that impact of reflecting mortality improvement is stronger than that of increasing the SGC regime from 9% to 12%.



Graph 6.5.2: Replacement Rates – Aggregate. Comparison of 9% SGC regime without mortality improvement and 12% regime with mortality improvement



Commentary:

- ▶ With the sole exception of females currently aged 20, Graph 6.5.2 demonstrates that the negative impact of reflecting mortality improvement for aggregate population replacement result outweighs the positive impact of moving to the 9% SGC regime to the 12% SGC regime.
- ▶ That is, the transition to the 12% SGC regime does not fully address the impact of future mortality improvement relative to the 9% SGC regime assuming no mortality improvement.

6.6 Period of 'expected' life in retirement

In the previous section the impact of mortality improvement on life expectancies was discussed. Here the impact of extending the period over which they need to plan to receive income to reduce the probability they exhaust their funds before they die is examined. As noted in section 5.1, exhaustion risk may also need to be addressed.

The model demonstrates the 'end user' impact on retirees of changes in probability of exhausting superannuation funds prior to death. The All aggregate replacement rates for three scenarios (all other assumptions are the base assumptions) are considered. The results assume the 12% SGC regime:

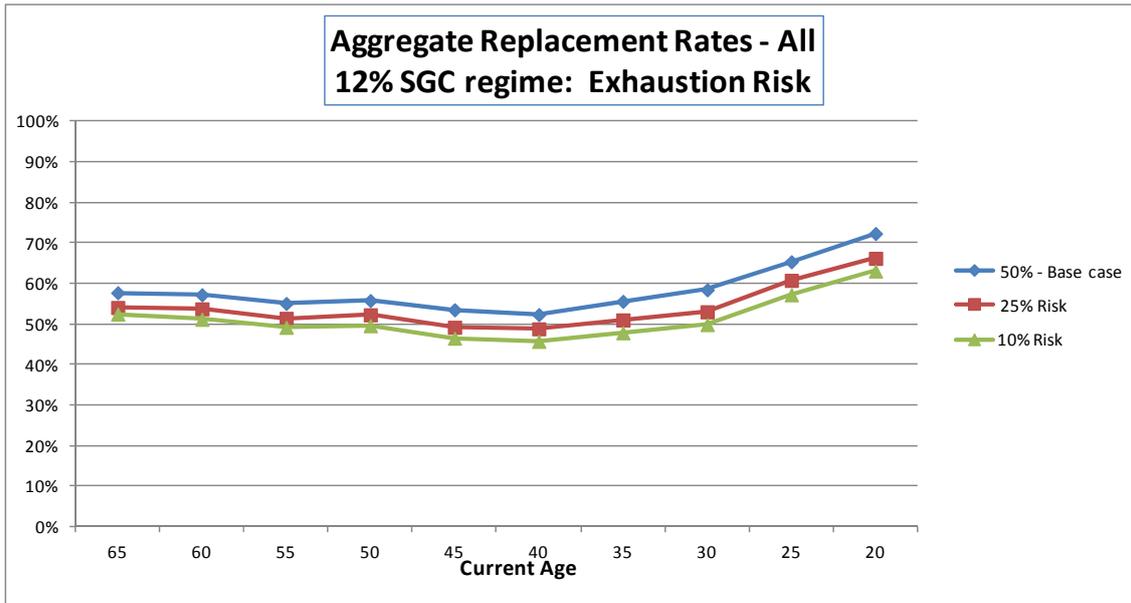
- ▶ Exhaustion risk 50%: This is, the base assumption as determined by the life expectancy at the age of retirement. Note the base assumption utilises life expectancies that reflect mortality improvement.
- ▶ Exhaustion risk 25%: That is, the probability of a retiree exhausting their superannuation funds is 25% or, equivalently, there is a 75% probability that the retiree will not exhaust their accumulated superannuation.



- ▶ Exhaustion risk 10%: Now the probability of the retiree not exhausting their superannuation funds prior to death is 10%.

The impact of these different levels of exhaustion risk for the aggregate population is examined. As above, the results assume a 12% SGC regime and all other assumptions as for the base case.

Graph 6.6.1: Replacement Rates – Aggregate. Impact of decreasing Exhaustion risk



Commentary:

- ▶ As the exhaustion risk reduces, it implies the need for a longer expected period in retirement to be reflected. As a consequence, replacement ratios decline.
- ▶ The reduction in Aggregate replacement rates between the base case and the 25% exhaustion risk case starts at about 3.5% for current age 65 and increase to about 6% for current ages 20. The reduction from the base case to the 10% exhaustion risk case starts at about 5% for current age 65 and increase to about 9% for current ages 20.
- ▶ There is debate around the exact nature and extent of future mortality improvements and so future expected numbers of years in life for given levels of exhaustion risk. However Table 6.6.1 makes it clear that the recognition of the impact of increasing lengths of time in retirement is necessary.
- ▶ The impact, at age 65 of the increase in expected period of retirement due to decreasing the exhaustion risk is muted compared to that which might initially be expected due to the opportunity to earn additional interest on superannuation balances which are used to support longer term drawdowns. Also, as seen earlier, there is a strong offsetting effect between superannuation funds availability and the Age Pension. In this sensitivity this offsetting effect explains why the replacement rates, while declining as the exhaustion risk declines, do not decline more precipitously. This can be read as a demonstration of the effectiveness of the current Age Pension’s structure and application.



6.7 Fees

The Cooper Review and the subsequent Stronger Super initiatives have raised the profile of the role that fees, annual percent of balance fees in particular, can have in the accumulation phase of superannuation. The sensitivity of results to seemingly small changes in annual fees is well established, for example through the ongoing 'compare the pair' advertisements.

It is noted that the impact of small decline in fees can also be interpreted as reflecting the impact of a similar small increase in expected investment earnings (after fees and taxes while holding fees and taxes in accord with the base case). Consequently the sensitivity of outcomes to small increases in net investment earnings is also demonstrated.

The model demonstrates the 'end user' impact on retirees of changes in fees through sensitivities of varying the fees in either or both the accumulation and drawdown phases and then comparing the resultant replacement ratios. The impact of reducing fees by 0.25% in the accumulation phase, the drawdown phase, and then in both phases is considered.

Only results for the 12% SGC regime are given.

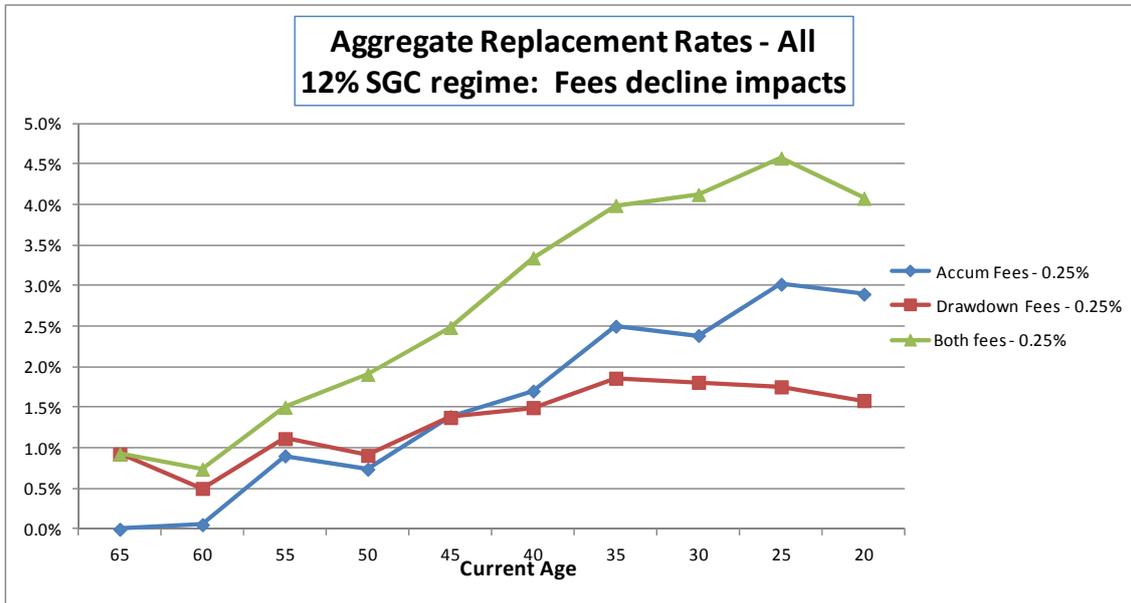
All aggregate replacement rates are compared with the base case for three scenarios (all other assumptions are the base assumptions):

- ▶ Fees in the base case are 0.90% for the accumulation phase and 0.85% for the drawdown phase.
- ▶ Accumulation scenario: Accumulation fees are reduced by 0.25% to 0.65%. The difference between the base Aggregate population replacement rate and that under this fee regime is given.
- ▶ Drawdown scenario: Drawdown fees are reduced by 0.25% to 0.60%. The difference between the base Aggregate population replacement rate and that under this fee regime is given.
- ▶ Both scenario: Both accumulation and drawdown fees are reduced by 0.25% to .65% and 0.60 respectively. The difference between the base Aggregate population replacement rate and that under this fee regime is given.

As the following Graph shows results for each of the above reduced scenarios with the base results subtracted from them, instead of looking at replacement rate results, differences between scenarios are given. The positive numbers show the impact of the three fee reduction scenarios for the different age cohorts.



Graph 6.7.1: Replacement Rates – Aggregate. Impact of decreasing fees by 0.25% in accumulation and/or drawdown phases



Commentary:

- ▶ Since the assumption is made that insurance costs in the accumulation phase are 0.25% of the accumulated balance, a reduction of fees in this phase by 0.25% has the same impact (on accumulation amount at age 65) as removing the cost of insurance cover. The Accumulation scenario therefore provides an indication of the impact on retirement incomes of having life insurance protection in place during the accumulation phase. It is material.
- ▶ When the superannuation account balance is viewed in isolation in the drawdown phase, it is the case that the impact of fees is more pronounced than in the accumulation phase. However, as discussed earlier, drawdown outcomes need to recognise the offsetting impact of the Age Pension. This explains why the results for the Drawdown scenario are not as strong as those from Accumulation scenario.
- ▶ Under the 9% SGC regime, the projection results show similar increases from fee reductions, although they all remain below all the 12% SGC regime results. However, the impact of the fee reduction under the 9% SGC regime is slightly stronger than that under the 12% SGC regime as the relative change in net earning rates (0.25% compared to 9% in contrast to 0.25% compared to 12%) is slightly larger.

Despite this, the aggregate population replacement rates under the 9% SGC regime, with the sole exception of those for 20 year olds when both fee reductions are applied, still do not reach the target 65%.



7 Concluding comments

7.1 Equity, Age Pension and superannuation

There is ongoing discussion around the equity of current tax concessions provided to superannuation, both in the accumulation and drawdown phases. A discussion paper, 'The fairness of government support for retirement income', published by Mercer in February 2010, reaches the following conclusions:

'The primary purpose of this research is to compare the relative level of government support for individuals and couples across a variety of income levels. This paper demonstrates the total government support for retirement income represented by the current arrangements taking into account both superannuation tax concessions and the government funded age pension is remarkably equal across a variety of income levels, including low, middle and high income earners.

Moreover, this paper demonstrates that contrary to public opinion, high income earners do not receive a greater level of government support for retirement income than low income earners.

These results are because where individuals save for their own retirement, it is likely there will be a reduction in the level of future age pension costs.'

The results provided in this report reflect the strong interaction between superannuation account balances and the Age Pension and clearly demonstrates that, as the account balances increase, the level of support required from the Age Pension to achieve target replacement rates in retirement declines. That is, the Age Pension is successfully achieving its primary purpose as Pillar 1 of the Australian retirement income system. The Mercer report noted above indicate that not only is the Age Pension achieving its financial objectives for retirees, but when taken in conjunction with those retirees superannuation savings, it is doing this in an equitable manner.

Recent research published by ASFA (February 2012) also supports this conclusion.

7.2 Summary of key findings

The purpose of this report is to better understand the impact of the increase in SGC from 9% to 12%. A model to quantify this impact in terms of replacement rates on retirement has been developed.

The definition of replacement rate has been refined. Results are provided using the more standards definition of a fixed percentage (in this case 65%) of pre-retirement income, and a more responsive definition of fully replacing after-tax pre-retirement income.

Modelled results under both definitions of replacement rate are that, using the base set of assumptions:

- ▶ Under the 9% SGC regime no future cohorts achieve the desired 65% aggregate replacement rate. That is, even when mature, the 9% SGC regime is not projected to achieve the desired 65% aggregate replacement rate.



- ▶ Under the current 12% SGC regime the current age 20 and 25 cohorts achieve the desired replacement rate of 65%. That is, the current 12% SGC regime, prior to maturity, is modelled to achieve the desired 65% aggregate replacement rate.

Three key findings emerge from this report. These messages inform current policy debates regarding superannuation and retirement incomes, and more broadly the overall retirement experience of retirees in Australia.

It follows from the results presented that a balanced discussion of retiree financial outcomes needs to consider at least three core strands and their interactions:

- ▶ The benefits flowing from superannuation accumulations
- ▶ The impact of receipt of a full or partial Age Pension reflecting marital status and home ownership
- ▶ Longevity and mortality improvement.

The importance of reflecting the benefits of decreased fees or, equivalently from a modelling perspective increased after fee and tax investment returns, in both the accumulation and drawdown phases, is also demonstrated.

While the focus of this Report is at a policy and strategy level but these conclusions are also relevant at an individual retiree level.



Appendix A Detailed model assumptions

Accumulation phase

Investment earnings rate: 7.5% per annum (pa) gross return on assets

This is consistent with other work for FSC by Rice Warner Actuaries regarding Retirement Savings Gaps since 2002. It is also consistent with objectives set by many funds and with historical data provided by APRA.

Tax rate applied to investment gains: 8% pa

This assumption reflects the impact of imputation credits, the 10% rate applied on capital gains on assets held for more than 12 months by a fund, and industry knowledge.

Consumer Price Increase: 3.0% pa

This is consistent with historical experience, assumptions used in other related works, and upper limit of Reserve Bank of Australia target range.

Salary increases: 4.5% pa

The gap between CPI and Salary increases (typically represented by AWOTE) has historically been about 1.5% and this differential is retained.

Expenses: 0.9% pa

Applied to member balance. This assumption is set after consideration of reports published by Deloitte and Rice Warner Actuaries in 2009 and discussions reported in the Cooper Review (2010). It is noted that future decreases in fees (sought in the future or potentially expected as investment balances increase in size) are not presumed in this assumption.

Insurance premiums: 0.25% pa

Applied to member balance. This is consistent with other work for FSC by Rice Warner Actuaries regarding Retirement Savings Gaps since 2002.

Superannuation contribution tax assumption: Tax of 15%.

All concessional (SGC and additional employer and voluntary contributions)



Superannuation contributions

Super Guarantee Charge (SGC) amount are 9% for the 9% regime, and follow the staggered increases for the 12 % regime. These rates are applied on incomes up to the specified concessional limits.

Year	9% SGC	12% SGC
2012	9%	9%
2013	9%	9.25%
2104	9%	9.5%
2015	9%	10%
2016	9%	10.5%
2017	9%	11%
2018	9%	11.5%
2019	9%	12%

Additional concessional superannuation contributions. Total concessional contributions are capped in accord with current government policy. Based on several sources, including prior published work for the FSC by Rice Warner Actuaries, ABS information, and other published materials, the following rates are applied for members assumed to make additional contributions, These rates are gender independent as they apply to salaries and salaries reflect gender differences.

Age	Additional concessional contributions
20	0%
25	4%
30	5%
35	6%
40	7%
45	9.5%
50	12%
55	15%
60	20%
65	25%



Non concessional (after-tax) contributions. These rates are expressed as a percentage of salary. Large lump sums are considered so the application of the relatively large limits (\$150,000 pa and \$450,000 per three years) does not need to be considered. These rates are gender independent as they apply to salaries and salaries reflect gender differences.

Age	Non- concessional (after-tax) contributions
20	0%
25	2%
30	2.5%
35	3%
40	3.5%
45	4%
50	5%
55	7.5%
60	10%
65	15%

Drawdown phase

Investment earnings rate: 7.0% pa gross return on assets

See above comments. This assumption is lower than that used in the accumulation phase as more conservative investment strategies are anticipated.

Tax rate applied to investment gains: -2% pa

This assumption reflects the impact of imputation credits.

Consumer Price Increase: 3.0% pa

This is consistent with historical experience, assumptions used in other related works, and upper limit of Reserve Bank of Australia target range.

Expenses: 0.85% pa

Applied to member balance. See above comments. This assumption is slightly lower than that used in the accumulation phase as larger balances and more conservative investment strategies are anticipated. Again, future decreases in fees are not presumed.



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